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# Enacting Spiritual Activism to Develop a Sense of Belonging: Latina Community College Students Choosing and Persisting in STEM

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Guided by the theoretical frameworks of sense of belonging and spiritual activism, this study examines the experiences of first-generation Latina community college students who navigated the choice to major in science, technology, engineering, and mathematics (STEM) and their experiences as they prepared to transfer to a 4-year college from two Hispanic-serving community colleges. Informed by semi-structured interviews with eight Latina students, the study found that participants chose to major in a specific STEM field only after they had explored other options. After choosing a STEM major, the participants experienced academic and interpersonal invalidations, which made them question whether they belonged in STEM. However, they had access to multiple institutional resources, including scholarship funds, a supportive peer group, and validating faculty, which supported healing from previous invalidations and contributed to their sense of belonging. As individuals who encountered both inequities and microaggressions, spiritual activism reinforced a sense of belonging in STEM for Latina students.

The fields of science, technology, engineering, and mathematics (STEM) were established in congruence with a white male-centric culture that is competitive and individualistic (Carlone, 2003; Ceci & Williams, 2007; Hill et al., 2010; Ong et al., 2018), which does not align with the cultural upbringing present in Latina/o/x<sup>1</sup> communities (Martinez, 2013). Students of Color and Women of Color continuously receive implicit and explicit messages reminding them that they do not belong in both STEM undergraduate (Fries-Britt & Griffin, 2007; Malone & Barabino, 2009) and graduate education (Solórzano, 1998). For example, some faculty advise Latina/o/x students, in particular, to disassociate from their cultural backgrounds and students resort to managing stereotypes through various strategies such as espousing forms of whiteness and erasing their ethnic markers (McGee, 2016; McGee & Martin, 2011). These strategies intend for students to be taken seriously in STEM but lead them to feel exhausted and anxious (McGee, 2016). If STEM education fosters such exclusionary contexts for Latina students, the Chicana feminist concept of spiritual activism aligns with their experiences. Spiritual activism is fueled by marginalized individuals being made to feel inadequate and entails engaging in a process to heal from negative experiences (Anzaldúa, 2002). This article builds on previous literature by examining anti-deficit approaches that Latina community college STEM students take as they attempt to carve out a sense of belonging.

Although the percentage of Latina undergraduate students who earn a degree in STEM has increased slightly over the last few years, they continue to be underrepresented when compared to their overall numbers in higher education (Santiago et al., 2015). Latinas account for about 8% of women earning a bachelor's degree in STEM; of those, 59% are in biological sciences, followed by 16% in engineering (Santiago et al., 2015). Furthermore, upon earning a STEM degree, Latinas represent only 2% of individuals in science and engineering careers (Santiago et al., 2015).

The disparities to access a STEM pathway begin early. Latina/o/x students experience inequitable access to academic opportunities throughout K–12 (Contreras, 2011) and the majority enroll in community college, which becomes a pivotal point in Latinas accessing STEM, particularly if they are first-generation students (Malcom, 2010; Rodriguez et al., 2016). Because the majority of Latina students attend community colleges and Hispanic-serving institutions (HSIs), there is a critical need for studies that examine the Latina community college students in STEM fields (Crisp & Nora, 2012; Rodriguez et al., 2016).

To address the underrepresentation of Latinas in STEM, a growing number of studies focus on their experiences and intersectional identities (Rainey et al., 2018; Rodriguez et al., 2016; Rodriguez et al., 2019; Rodriguez, Doran et al., 2019; Rodriguez, Friedensen et al., 2019). The current study builds on previous research by focusing explicitly on the experiences of low-income, first-generation Latina community college students pursuing a STEM degree. When including a focus on intersectional identities, we do not simply mean the intersection of two different identities, such as race and gender. Instead, we consider the concept of intersectionality (Crenshaw, 1990) where multiple forms of inequality, along various axes of the social world, affect individuals' experiences with and perceptions of the world around them.

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<sup>1</sup> The term Latina/o/x refers to people from Mexico, Central America, the Caribbean, and South America, even if they come from a country that is not Spanish-speaking (Salinas & Lozano, 2019). Because Spanish is a gendered language, Latino is masculine, Latina is feminine, and Latinx is a non-binary term (Salinas & Lozano, 2019).

Previous research finds that when negotiating religious and STEM identities, Latina 4-year college students often “create separate worlds in order to preserve their beliefs within either role” (Rodriguez, Friedensen et al., 2019, p. 39). To account for Latina students negotiating multiple and often conflicting perspectives, this article is guided by both spiritual activism (Anzaldúa, 2002) and sense of belonging (Hurtado & Carter, 1997) to examine the experiences of eight Latina community college students. The article addresses three guiding questions: How do Latina students navigate the choice to pursue a STEM degree? What are the experiences of Latina students after they choose to major in STEM? How do Latina students develop a sense of belonging in STEM?

The article highlights the “clash of realities” (Anzaldúa, 2002, p. 563) that the participants, all of whom were part of a STEM Scholars Program,<sup>2</sup> encountered when they made the decision to pursue a STEM degree. After choosing a STEM major, the participants experienced various academic and interpersonal invalidations or microaggressions (Solórzano, 1998), which made them question whether they belonged in STEM. However, they were able to access multiple institutional resources, including scholarship funding, a supportive peer group, and validating faculty, among other resources. Having access to such resources supported the inner healing process from previous invalidations. Their sense of belonging developed from their inner healing and their intersectional identities. Before discussing sense of belonging and spiritual activism, we provide an overview of findings from previous studies focused on Students of Color, Women of Color, and Latina students in STEM.

## STUDENTS AND WOMEN OF COLOR IN STEM

Students of Color often receive messages that they do not look like successful STEM students (Fries-Britt & Griffin, 2007; Malone & Barabino, 2009), which influences their decision to alter their authentic identities so as to diminish their ethnic background (McGee & Stovall, 2015). Women of Color, in particular, often have a lower sense of belonging, in comparison to both white men and women (Rainey et al., 2018). Women of Color can feel especially isolated as STEM majors after experiencing stereotypes based on their race, gender, and ethnicity (Charleston et al., 2014; S. Rodriguez et al., 2019). Such hostile contexts often influence the decision to leave STEM (Rainey et al., 2018). Similarly, having a strong science identity correlates with a sense of belonging in STEM and Women of Color report a lack of science identity in comparison to white men (Rainey et al., 2018).

The responses to such negative experiences can vary. For instance, Black students in STEM may respond by being hypervigilant and avoiding “Black behavior” in an attempt to avoid stereotypes (McGee, 2015; McGee & Martin, 2011). Black students also often feel the pressure to overachieve academically because a high grade-point-average (GPA) signifies to others that they are worthy of being in STEM and that they have earned their high GPA (McGee, 2015; McGee & Martin, 2011). For Students of Color overall, experiencing racial stereotypes increases anxiety, feelings of anger, “impostor syndrome,” and overworking (McGee, 2015), and such feelings provide the context for activating spiritual activism.

Latina/o/x students experience distinct stereotypes and use different strategies in response to stereotypes based on race (McGee, 2016). McGee found that Latina/o/x students noticed that

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<sup>2</sup> A pseudonym was used for the program.

faculty and peers maintained stereotypical understandings of their abilities once they learned that students grew up in impoverished, racially homogeneous communities. In addition, faculty advised Latina/o/x students to disassociate from their cultural identity by distancing themselves from their hometown friends, adjusting their accent, and not being involved in student activist groups. McGee (2016) termed the concept of pretending to align with white cultural norms as *frontin'*, which resulted in devaluing ethnic identity and anguish. To avoid experiencing stereotypes, students resort to stereotype management (McGee & Martin, 2011), which includes light-skinned Latina/o/x STEM students resorting to espousing forms of whiteness, erasing their ethnic markers, and passing for white students (McGee, 2016). Practices that aimed to diminish ethnic identity in order to manage stereotypes and prove their abilities to succeed in STEM resulted in Latina/o/x students feeling exhausted and deflated (McGee, 2016).

### LATINA STUDENTS IN STEM

A key obstacle that Latina students in STEM encounter is that they are steered away from STEM by being encouraged to pursue teaching and social service pathways where they can serve as caregivers (Castanzarite & Trimble, 2008). Once they choose to major in STEM, developing a STEM identity becomes essential for students to remain in STEM (Carlone & Johnson, 2007). A STEM identity<sup>3</sup> entails how individuals perceive themselves in the overlapping dimensions of competence, performance, and recognition as a “science person” (Carlone & Johnson, 2007, p. 1190). This process includes learning science content, knowing how to perform as a scientist, and receiving both internal and external recognition (Carlone & Johnson, 2007). Before Latina/o/x students enter college, it is often challenging for them to see themselves as future scientists (Sorge et al., 2000).

Once in college, a portion of STEM students will not see themselves as scientists and change their major to a non-STEM field (Chen & Soldner, 2013). Latina STEM students often encounter microaggressions because their men peers do not view them as qualified or competent (Camacho & Lord, 2013; Wilkins-Yel et al., 2018), which is in line with the notion that STEM represents a liminal space where they do not belong (Camacho & Lord, 2013). Moreover, Latina/o/x STEM students often encounter cultural incongruity with their field, which affects academic GPA (Cole & Espinoza, 2008). Spirituality and religious identities can also influence the experiences of Latina students in STEM and they have to negotiate the differences between the two areas (Rodriguez, Friedensen et al., 2019). The importance of cultural identities highlights the need to understand further the “cultural incongruity that likely exists for Latino [*sic*] students” in STEM (Cole & Espinoza, 2008, p. 298). Latinas in engineering often resort to general student organizations (such as sororities and Latina student organizations) that center on Latina/o/x culture as a support to develop a sense of belonging in higher education (Banda & Flowers, 2017). On the one hand, some research finds that Latina engineering students tend to stay away from STEM organizations that center on gender and/or Latina/o/x culture (Banda & Flowers, 2017), which challenges findings about Latina/o/x students enacting whiteness (McGee, 2016). On the other hand, more recent literature finds

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<sup>3</sup> In this article, the term *identity* is defined as “individual agency as well as societal structures that constrain individual possibilities” (Brickhouse et al., 2000, p. 286).

that Latina students in STEM turn to Latina/o/x-centered STEM organizations (Rodriguez & Blaney, 2020). Given the differing findings regarding the influence of identity, culture, and resources, more research is needed to inform how to best support the educational journeys of Latina students in STEM.

## CONCEPTUAL FRAMEWORK

The present study builds on previous findings to continue understanding the experiences of Latina students pursuing a STEM degree. Sense of belonging (Hurtado & Carter, 1997) and spiritual activism (Anzaldúa, 2002) guided the development of this article. Sense of belonging served as a lens to understand the experiences of Latina students at their college campuses. As individuals who (had) encountered inequities and microaggressions, spiritual activism reinforced a sense of belonging with the experiences of Latina students. Integrating the concepts into a framework facilitates a focus on sense of belonging at the level of mindbodyspirit and aligned well with the participants' emphasis on pursuing a career in STEM because it would benefit a wider community.

### Sense of Belonging

To account for unwelcoming campus climates and as an alternative to social integration (Tinto, 1993), sense of belonging considers the process that Students of Color undertake to develop a sense of membership in a college institution (Hurtado & Carter, 1997). Sense of belonging has been defined as “psychological or normative sense of academic and social integration in their transition to college” (Hurtado et al., 2007, p. 842). In other words, sense of belonging involves a student feeling like part of a particular community just as they are, not by fitting into a specific mold. In quantitative studies, sense of belonging as a construct has been measured as “the extent to which the student felt part of the campus community, saw him/herself as a member of the college, and had a strong sense of belonging at his or her respective institution” (Hurtado et al., 2007, p. 856).

While HSIs are often discussed in a deficit perspective by focusing on traditional measures of student success, Cuellar (2015) established various benefits that Latina/o/x students receive at HSIs, in contrast to those who attend predominantly white institutions (PWIs). For example, although Latina/o/x students enter HSIs with lower levels of academic self-concept, within 4 years, their levels of academic self-concept are higher than their peers at PWIs (Cuellar, 2015). Sense of belonging has also been established as a particularly important influence on the likelihood of Latina/o/x students to persist in STEM (Garcia & Hurtado, 2011).

### Spiritual Activism

Latina engineering students have been conceptualized as “fractured” individuals who navigate borderlands because they “occupy the social margins” and are “perpetually in a crossroad of wanting to belong but never really fitting in” (Camacho & Lord, 2013, p. 10). Thus, we integrate spiritual activism (Anzaldúa, 2002) into our conceptual framework to examine the experiences of Latina STEM students as they navigate the process of establishing their sense of belonging.

Although some scholars include spiritual activism when discussing pedagogy (Delgado Bernal, 2001; Elenes, 2013), scholarly identities (Delgado Bernal, 1998), and Chicana feminist epistemology (Calderón et al., 2012), we considered Keating's (2008) critique: "We might admire Anzaldúa's bold spirit vision yet fear that if we explore it in our work, we will harm our careers. Not only will our colleagues scoff at us, but we will have difficulty publishing such explorations" (p. 55). Such fears are intensified for Chicana scholars because they are viewed as intruders in the academy (Keating, 2000, Lara, 2002). This unique issue facilitates the opportunity to center spiritual activism within STEM education and serves to challenge epistemological racism.

Anzaldúa (2002) established spiritual activism as a spirituality that pursues social justice and change by transforming both as an individual and the individual's world. Keating (2008) explained further that "spiritual activism . . . offers valuable lessons for . . . social justice activists . . . when applied to racism, sexism, homophobia, and other contemporary issues—can sustain and assist us as we work to transform social injustice" (p. 56). Spiritual activism is the interconnect-edness of an individual spiritual healing through change and changing the world alongside others through social justice actions (Anzaldúa, 2002). Anzaldúa (2002) explained that prior to enacting spiritual activism, individuals can "feel angry, fearful, hopeless, and depressed, blaming [one]self as inadequate" (p. 569). We envisioned an alignment with the experiences of Latina STEM students, given the likelihood that they are often viewed as outsiders, not experts (Camacho & Lord, 2013). We envisioned spiritual activism as part of our framework to overcome collectively the institutionalized racism and sexism that Latina students encounter in STEM education.

The process of spiritual activism begins at the individual level: "to cope with racial and gender oppression . . . (which) enabled you to defuse the negative energy of putdowns" (Anzaldúa, 2002, p. 572). At the same time, outer action is explained by an individual seeking allies to develop communities that entail "personal growth and social justice" (Anzaldúa, 2002, p. 574). By integrating sense of belonging with spiritual activism, we aim to understand how Latina students in STEM heal the fractured mindbodyspirit.

## METHODS

This article draws from interviews collected as part of a larger mixed methods study funded by the National Science Foundation.<sup>4</sup> The grant offered a multi-year scholarship to students (STEM Scholarship Program) and aimed to examine the experiences of students earning STEM degrees at four community colleges and one 4-year college in Southern California, all of which had HSI status. When writing this article, the study was in Year 3 of 5 years. The study includes pre- and post-surveys with students, interviews with 46 students (of those 11 identified as Latino and eight as Latina). For this study, the findings were derived from interviews with eight Latina students who applied, and were selected, for the STEM Scholarship Program. Upon being selected as a Scholar, they received a need-based scholarship and were connected with institutional resources, which varied by college. The participants in this study were pursuing a STEM degree at one of two Hispanic serving community colleges (HSCCs) in Southern California. At Soleado College,<sup>5</sup> 68% of students identify as Latina/o/x

<sup>4</sup> NSF Project #1644261, led by Dr. Kimberley Cousins.

<sup>5</sup> Soleado and El Valle are both pseudonyms.



and the median household income is 50,000 USD per year. At El Valle College, 62% of students identify as Latina/o/x and the median household income in the local area ranges between 35,000 USD and 55,000 USD. Both colleges serve a large percentage of low-income students.

The lead author accessed student contact information from the scholarship coordinator, reached out to the participants via e-mail, and interviewed each participant once. Semi-structured individual interviews were conducted in person and over the phone during the 2018–2019 academic year as participants were preparing to transfer or had just transferred to a 4-year college. As indicated in Table 1, the majority of students transferred to a CSU campus, which is traditionally a teaching-focused and not research-intensive institution. In addition, Table 1 shows that the majority of students majored in a type of biology, except for Andrea who majored in computer engineering. Questions included: Have you experienced establishing goals in STEM classes and not meeting them? Do you feel like you made the right choice with (specific STEM major)? Do you identify as a scientist/major? When do you think that transition happened, from student to scientist/major? On average, the interviews lasted about 50 minutes.

## Data Analysis

After each interview was transcribed, we wrote analytic memos to reflect on the data. We used initial coding and developed 41 codes, which included research and exploring careers, acquiring new knowledge, adjustments, choice of major, conflicting schedules, cultural differences, micro-aggressions and mistreatments, and research and internship opportunities. This was followed by values coding, guided by the research questions (Saldaña, 2015). The values coding was particularly helpful to understand the connection between the intersecting identities of participants and their experiences in STEM. We used selective coding to group the process codes into summative categories (Lincoln & Guba, 1985), which we developed into themes. Throughout the data analysis process, we developed a comprehensive codebook (Saldaña, 2015).

TABLE 1  
Participant Information

| <i>Pseudonym</i> | <i>Community College</i> | <i>Major</i>         | <i>Transfer Institution</i> |
|------------------|--------------------------|----------------------|-----------------------------|
| Sandra           | Soleado College          | Biochemistry         | CSU                         |
| Andrea           | El Valle College         | Computer Engineering | CSU                         |
| Jasmin           | Soleado College          | Microbiology         | UC                          |
| Victoria         | Soleado College          | Microbiology         | UC                          |
| Karen            | El Valle College         | Biochemistry         | CSU                         |
| Feliciano        | Soleado College          | Biology              | UC                          |
| Juana            | El Valle College         | Biology              | CSU                         |
| Diana            | El Valle College         | Biology              | CSU                         |



## Positionality and Trustworthiness

As Chicanas and Latinas, we enacted Chicana feminist epistemology (Delgado Bernal, 1998) as part of the research process. The lead author conducted the interviews over the phone and in-person. As a first-generation Chicana college graduate from a low-income background who grew up in a rural part of California, it was easy to develop rapport with the participants during the interviews. This strengthened the research process, particularly when the participants had to use a Spanish word or phrase that cannot be interpreted. Because the research team spoke Spanish and were first-generation college students, we were additionally adept throughout the coding process. In addition, the second author has a background in STEM coursework and was able to contribute her knowledge as we analyzed the data.

Multiple steps were taken to ensure trustworthiness. Credibility was addressed through member-checking (Lincoln & Guba, 1985); after transcribing and coding interviews, we shared the transcripts and preliminary findings with the participants and invited their feedback. Transferability was addressed by providing a description of the contextual factors (Guba, 1981) and institutional resources available in the community colleges through the findings. Finally, we considered the feedback from STEM faculty colleagues by sharing preliminary findings.

## FINDINGS

Four key themes emerged. We found that the participants chose to major in a specific STEM major only after they had explored other options. After choosing a STEM major, the participants experienced various academic and interpersonal invalidations or microaggressions, which made them question whether they belonged in STEM. However, they were able to access multiple institutional resources, including a supportive peer group and validating faculty. Having access to resources supported the inner healing process from previous invalidations and contributed to their sense of belonging. As individuals who (had) encountered inequities and microaggressions, spiritual activism reinforced a sense of belonging with the experiences of Latina students and aligned with their commitment to pursue a graduate degree in STEM in order to contribute to communities similar to theirs.

When choosing to major in STEM, every participant benefited from exploring various majors and reflecting on their interest in the subject matter. While some chose within STEM fields, others considered outside majors. Andrea and Karen searched within STEM majors to find the right fit. When Karen was living with her aunt, who was pursuing a nursing degree, the aunt selected nursing as a major for Karen:

I didn't want to do nursing. I'm too sensitive; my grandpa had just gotten really sick and I was in the hospital with him. I was just like, "I don't want to be in this work environment because I'm going to take it home with me." Then I was like, "I want to do biology." I had one teacher that scared me for some reason and I honestly think I was passing the class but I think that shied me away from biology. I was like, "I'll take chemistry."

Karen pursued biology because she knew that nursing would not be a good fit but later changed to chemistry because she encountered a biology professor with teaching practices that were not student-centered.

Karen explained the experience with doubting whether she should pursue biology:

She just had really hard exams and when we would get our exam grades back they would be terrible . . . . When we would ask her, “Hey, how are we doing? Do you think we should drop?,” she wouldn’t like to tell us our grade. She would just say that it was up to us if we wanted to drop. If you kept doing bad on these tests, it kind of scared you. What’s sad is that I had just taken I think the second exam and I actually think I did well but I dropped it even before seeing my test score. I thought I would fail the class . . . . A friend that actually stayed in the class hadn’t met with her once and the professor told her that if she didn’t pass the next exam then she wouldn’t pass the class. She stayed in the class, failed the exam, and still passed the class with a C. If she passed then I would’ve passed too because we were always the same level.

Instead of fostering validation, the professor created self-doubt and invalidated Karen’s interest in biology. This speaks to the power one faculty member can have in whether students feel like they belong in a STEM field. Eventually, she had a professor who allowed time for students to reflect on their majors and Karen chose biochemistry.

Jasmin’s experiences resulted in choosing to transition out of STEM due to a lack of guidance and mentoring:

I was undeclared at first. Then I was continuing with math to see how it works . . . . I was a math major for a while but then I ended up leaving . . . . I just felt like it was getting too complicated. It wasn’t fun anymore . . . . I would go to tutoring; they would mess up a lot.

When math classes became too challenging, Jasmin reached out to the tutoring center for help but it only created further confusion. When she began to struggle academically, she changed her major:

Last semester, I took one class that I needed and the rest of them were fun . . . . I didn’t want to have to quit college yet . . . . I wanted to have some time to think and I ended up becoming a music major.

Jasmin’s commitment to pursuing a college degree did not allow her to stop-out when courses were too challenging or uninteresting. Instead, she took the time to explore and pursued a music degree focusing on classical guitar. Two years later, she was close to graduating but realized that majoring in music would be a mistake. She explained: “It was so fun but I felt like playing the guitar was more of a hobby for me.” As a result, Jasmin reflected on what she enjoyed:

I had to register towards college. I started realizing that this wasn’t the right direction for me. What I actually liked from school was math and science . . . . I remember that I took a biology class in college and I really liked it. That’s how I got like, “You know what? This is what I want to do.”

Jasmin searched for the “right direction” in selecting a major and she switched from math to music to biology. Throughout this time, her parents were supportive of the transitions and she was able to reflect on her interest and passions to find a major that she enjoyed.

Similar to Jasmin, Diana shared that her family and friends were also a source of encouragement while she searched for a major: “I’ve had the best support group, friends, family; they are all very encouraging and give me good words like, ‘Keep doing it, you can do it!’ When it’s hard,

they are definitely the ones who keep pushing me.” Every participant had at least one family member who was supportive, which motivated them to continue pursuing a STEM degree.

### Engaging in Institutional Resources to Heal from “A Clash of Realities” with STEM

Once in STEM, the participants encountered microaggressions and moments of invalidation that influenced them to question their abilities to pursue the degree. The experiences aligned with the notion of *choques* (clashes) (Anzaldúa, 2002), which describes obstacles that an individual encounters after she develops a new identity. Anzaldúa (2002) theorized, “blocked from your own power, you’re unable to activate the inner resources that could mobilize you” (p. 545). Thus, the individual struggles and remains unable to tap into resources. Similarly, the participants experienced obstacles after they decided to pursue a STEM major. The obstacles were primarily related to academic preparation and their intersecting identities of race, gender, language, and ethnic culture. Despite the multiple clashes that students encountered once in STEM, they did not stop-out. Because they had access to institutional resources, they were able to develop a network of support that consisted of a counselor who specialized in STEM, at least one supportive STEM faculty mentor, and a community of peers.

Academic preparation was a concern when students initially pursued a STEM degree because they often came from under-resourced high schools and had to adapt to a more rigorous academic environment in college. As a result, some were placed in developmental mathematics courses. For Feliciana, it meant that she would need at least three semesters of math before enrolling in college-level math, which made her question her abilities to pursue a STEM major:

I was like, “Oh my gosh, you have to take so much math.” I tested pretty low, so it really set me back. I thought, “Maybe I shouldn’t do this because I’m not going to be able to pass all these math classes. Should I even be doing this major?”

Feliciana’s experience provides insight into one specific type of academic clash, which extended her time-to-degree. Placing three levels below college-level mathematics made her question whether she should persist in college and pursue a STEM degree. Thankfully, Feliciana had access to an award-winning 3-week summer program that prepared students to retake the assessment. Through the program, she placed higher in the math sequence:

I tested two levels up . . . I didn’t have to take three classes that I didn’t need and don’t count to transfer . . . I took that class the next semester . . . I ended up getting an ‘A’ . . . It was so crazy, I was like, “This is not real.” That was my first “A” ever in a math course; it does depend on the professor too. I became really good friends with that professor and he was the one who told me, “You should tutor at the tutoring center” . . . I was so thankful . . . It was a really good feeling, especially since I’ve never been good at math and I was able to develop that skill . . . Support systems are really important.

After encountering her academic clash, Feliciana accessed institutional resources that prepared her to retake the math assessment and move up two levels. By earning an “A” in the math course, Feliciana experienced academic validation. The instructor further validated her abilities to pursue STEM when he encouraged her to be a tutor. Feliciana’s experience highlights that academic validation can serve to heal previous academic traumas and insecurities.

The intersectional identities of participants also influenced the clashes they experienced. For instance, Jasmin's identities as a Latina whose first language was not English influenced the self-perceptions of her academic abilities in STEM. She noted: "Sometimes, when I'm in a group, people don't think I'm that smart or something." In other words, Jasmin understood that others see Latinas as intellectually inferior and she had to navigate such deficit perceptions. Similarly, Victoria recalled being overlooked by men peers:

The people in the [study] room will ask each other for help and me and my friend, we're doing math together, the same type of math level. The guys never asked us, they had never thought to ask us, and when we showed them (that) we were doing the same thing they were kind of like going back to their own thing without really acknowledging us for math. It was just kind of like a sense of dismissal.

As Latina students, their gendered racial identities marginalized them in STEM. Interpersonal microaggressions from classmates were fueled by stereotypes. Even when they proved that they were academically capable, they were not acknowledged.

While participants experienced interpersonal racial microaggressions related to their perceived academic abilities, Victoria explained that she was enrolled at an HSCC and able to develop positive relationships with peers from similar backgrounds:

Being a Latina, it has helped me to find my own little community here at school. I find my own friends who share the same heritage and we can relate to each other. We can also study and joke with each other by finding that common ground between us . . . . They've been essential to helping me and me helping them to foster growth here.

As Victoria exemplified, having access to a supportive peer group validated her academically and socially because she and her peers could support one another as Latinas. Feliciano also shared that being comfortable with friends in the math course allowed her to be vulnerable and ask for help: "The friends I had in [math], I was okay with telling them, 'Oh my God, I don't think I want to do this anymore.'" Coming from similar backgrounds allowed for the participants to feel comfortable with their peers and they were able to ask each other for help.

Beyond having to overcome the clashes at the institutional and interpersonal level, students also navigated clashes between their ethnic culture and the culture in academia. Andrea noted:

In our Mexican culture, family is everything. Family is the priority, it is considered the highest priority, and here it's all about money . . . . You have to sacrifice everything just to get where you are . . . . In Mexico, you don't think about yourself, you think about the family as a whole . . . . I don't think it's anything I'm ever going to give up . . . . If they thought about first-generation [students], regardless of where you come from, just trying to keep your traditions and cultures, while at the same time trying to pursue a higher education.

Andrea explained a clash she experienced when trying to consolidate her time spent in college classes and doing academic work with the commitment to her family. Andrea critiqued the culture of academia because it did not acknowledge students who were not part of the white mainstream American culture. To some extent, she understood that the institution was not created with students like her in mind.

Finally, students clashed with STEM because the majority of faculty were white or were men who did not share their identities. Although she was successful in STEM, Sandra explained:

I don't have any professors in my field that are Latino and Latina . . . . I definitely have good mentors but it is a little sad that we don't have someone that looks like us teaching . . . . I feel inspired by other women scientists and I think I would feel really inspired by other women scientists who are Hispanic . . . . In my classes, I have mostly women and we are all women scientists but the people who are teaching are not usually women and are not usually Hispanic.

Even if the faculty did not say invalidating comments to the participants, the lack of Latina/o/x and women faculty served as a constant reminder that the student population was not represented in the STEM faculty. Therefore, they did not have access to faculty mentors who looked like them. The lack of representation reinforced the idea that a Latina may not belong in STEM fields.

Nevertheless, the participants had access both to faculty who were supportive and resources to help them navigate STEM. Andrea recalled that "The only one to help me there was a professor who was half time . . . . If it wasn't for him, I wouldn't have done very well in my electronics [course] . . . . He wanted to see us succeed and he made time for me." Jasmin also shared that she had institutional support when she was in biology, unlike when she struggled as a math major:

I had a lot of support at this time . . . . I would go to office hours and get a lot of help from teachers. I would also get help from classmates, like doing homework together. Sometimes I did struggle with the second semester of calculus . . . . It was pretty challenging but that final support really helps.

As a biology student, she had access to a community of support with her instructors and peers. When courses became challenging, she asked for help and received guidance from multiple reliable sources.

Jasmin also became involved in extracurricular activities. she stated, "I was part of ballet folklórico. Also, I was part of the biology club and STEM club." Jasmin also joined the Math, Engineering, and Science Achievement program (MESA<sup>6</sup>) at the community college, which influenced her pathway in STEM. She explained, "[Through] the MESA program in the college, I learned about the scholarship that NSF offers. I always like going to the meetings because I always learn about new opportunities." She was able to spend time in clubs that balanced her passion for science and her culture, and the MESA meetings were beneficial to her future because that is where she learned about the opportunity to apply for a scholarship. When she received the scholarship, it reaffirmed Jasmin's decision to pursue biology and she "felt really happy" because "it was the biggest scholarship that [she] ever

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<sup>6</sup> As indicated by the MESA website, after the Civil Rights Movement, the program was developed by educators and activists at Oakland Technical High School in 1970. MESA aims "to help underserved and underrepresented students achieve success in STEM studies and careers" (MESA About Us, [n.d.](#), para. 1). The program is centered in California and the vision is to ensure that the STEM workforce in California reflects the diversity of the population in the state.

received.” Receiving the scholarship served as a form of validation that she belonged in STEM.

### Developing a MindBodySpirit Sense of Belonging

After accessing a network of support at the community colleges, the participants transitioned into a state of belonging in mindbodyspirit. The shift was evident in four ways. First, every participant shared that they enjoyed their major and learning about the STEM topic. Second, participants shared that they maintained their intersecting identities and thrived in their community college. Third, the participants either identified as scientists or felt that once they completed their degree, they would be scientists. Finally, the participants reinforced that they maintained their identities because they bridged the commitment to their family and community with their STEM identity, which influenced their interest in pursuing a graduate degree.

After taking her professor’s advice, Feliciana became a teaching assistant in the summer transition program that had helped her prepare to retake the math assessment exam. She explained the multiple forms of involvement beyond taking her core courses:

I was working in the tutoring center and I was in all of the science clubs . . . . I was a TA; it was helping people in my shoes and helping me keep my math skills. I wanted to help people in my situation and tell them, “Hey, it’s possible.” The bio and chem club, they had a lot of opportunities, like we would go to research labs and go check them out, see how it is . . . I was in MESA, that’s how I learned about the internships and scholarships.

Feliciana went from feeling like she did not belong in STEM to being involved in science clubs, having access to internship and scholarship information, and serving as a role model to others who had placed in developmental math.

As participants developed a sense of belonging in STEM, they embraced their mindbody-spirit. Andrea elaborated that she balanced her love for computer engineering with the love for her family:

I enjoy taking apart computers, I love the hardware aspect, I like using my hands and (I) take apart the components. I love learning about the actual hard drive . . . . I never want to abandon my relationships with my family, culture, and traditions, so I always had to make sure I made time for that; sometimes that meant, well, maybe I could get an “A” in this class, but [if] I have to make time for some reason, I’ll settle for a “B.”

Andrea knew that family was one of the most important parts of her life and, as much as she loved her major, she refused to put academics over family. Her ability to commit to her whole identity as a computer engineering major speaks to a sense of mindbodyspirit belonging.

Karen also explained that her family influenced her decision to pursue a PhD in the biomedical field:

I’m going to do at least a PhD . . . . My dream is biomedical research . . . . My grandpa’s diabetic and he’s had a lot of heart issues . . . . When I would have [to write] research papers . . . I would

look into stuff that my grandpa was going through. That would help me understand what was going on with his body. . . . Being a Latina, we're not exposed to a lot of opportunities like that right off the bat or at least people in that field. Being able to be one of the first people in my family to do something like that would be awesome . . . . Everything I'm learning is super awesome. I geek out because of it. My family is like, "She's thinking science again" . . . . They're proud . . . . My grandma for instance, she's like, "Don't get a boyfriend. It's a distraction from your school." My grandpa . . . he likes hearing about my research . . . My mom's proud. My dad's super proud too and my sister too.

It was evident in Karen's journey that developing a mindbodyspirit sense of belonging in STEM centered on her family. The example she provided of her grandmother challenges the deficit gendered notion of Latinas being expected to marry and have children. Instead, her grandmother reinforced the need to finish her degree. She was motivated to pursue biomedical research because she hoped to help individuals with health concerns, which aligns with the outer actions in spiritual activism.

At the time of her interview, Sandra was applying to graduate school and the outer actions as motivation were also evident. She shared:

I want to get a PhD. I want to be a professor . . . . At the community college . . . I had access to so many opportunities that helped me shape myself feeling like a scientist. I want to make sure that the next generation of students have access to those things at an affordable price . . . . I want to make sure that other people in the [area] have the opportunities.

Sandra was driven to pursue a PhD with the goal to return to her local college and serve as a Latina role model to the next generation of students. In other words, her mindbodyspirit sense of belonging in STEM was fueled by her previous validating experiences in community college and the possibility of teaching others in the future—inner healing and outer actions, respectively. The majority of participants aimed to continue their education after earning a bachelor's degree by either earning a teaching credential or pursuing a PhD in order to contribute to their communities through their career choice.

## DISCUSSION

The present study contributes to the literature in two key areas. The findings clarify the process that Latina students navigated when choosing to major in STEM. The findings in our study highlighted that Latina students engaged in self-reflection and were able to consider various majors, both in and out of STEM, before choosing their final major. The findings clarified that the participants were not actively recruited into a STEM major; instead, they actively sought out different possible majors to determine if the fit was right for them.

The findings build on previous studies that examined the experiences of Latina STEM students. Previous studies documented that Latina students in STEM navigate stereotypes, self-doubt, and feeling like impostors (Rodriguez & Blaney, 2020). Similarly, in the present study, Latina students experienced various moments where their intersecting identities clashed with STEM settings. To address such negative experiences and begin to develop a sense of belonging, Latina students reframed their isolation to acknowledge that their intersecting identities of race and gender allow them to connect with similar peers and foster a sense of community.



Prior research also highlighted the importance of Latina students receiving recognition from faculty, peers, and family members in developing and reinforcing a STEM identity (S. Rodriguez et al., 2019). In the present study, it was evident that instead of having to hide their cultural and ethnic identities, the participants' sense of belonging was strengthened by integrating their family and community into the process. In addition, the students did not view themselves as trailblazers as in the Rodriguez and Blaney (2020) study, but they did believe they changed spaces so that other students who related to their identities would feel like they belonged in STEM as well. The participants in this study used the recognition and validation from faculty and faculty advisors to heal from the negative clashes that they experienced in the past. Having a supportive community of peers who identified as Latinas, faculty who acknowledged their academic abilities, institutional support systems in place to overcome academic challenges, financial aid, and their family's engagement in their education ensured that the participants persisted in STEM.

The current study also contributes to the literature about the process that Latina students experienced after they chose to pursue STEM at the community college. In particular, the findings highlight the importance of Latina students experiencing academic and social validation as a step toward inner healing from previous traumas in STEM. As depicted by Figure 1, the process begins with "clashes" creating a separation of mindbodyspirit for students. For students in this study, clashes included experiencing racial microaggressions (Yosso et al., 2009), invalidations (Rendon, 1994), and inequitable access to resources, among others, at the institutional and/or interpersonal levels. Considering that STEM is a traditionally white man-dominated field that is culturally incongruent for Students of Color (Ceci & Williams, 2007; Hill et al., 2010), the participants experienced multiple clashes.

The "Validation" arrow represents the process that students experience with academic and interpersonal validation. Rendon (1994) established that validation is an enabling, confirming, and supportive process initiated by in- and out-of-class agents that fosters academic and

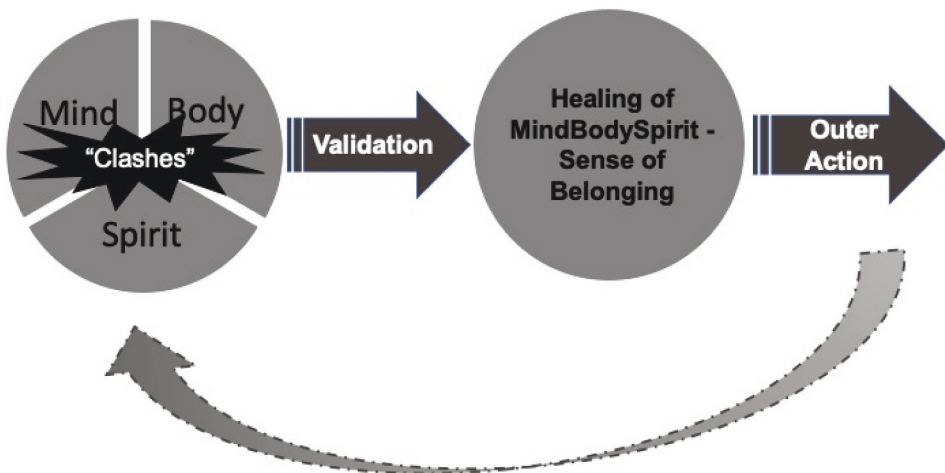


FIGURE 1. Validation fostering inner healing of mindbodyspirit to develop a sense of belonging.

personal development. At their HSCC, the students in the study had access to various resources, such as tutoring, tutoring jobs, and the STEM Scholarship Program, which resulted in academic and social validation. Being validated then influences the ability to heal from previous clashes (or traumas), which is in line with inner healing in spiritual activism (Anzaldúa, 2002). Inner healing entails reclaiming the mindbodyspirit.

In this study, healing the mindbodyspirit entailed students developing a sense of belonging in STEM and higher education. Figure 1 continues with the “Outer Action” arrow, which is the second component present in spiritual activism. Figure 1 concludes with a dashed arrow from “Outer Action” back to clashes because students will likely continue to experience various moments where they are not welcomed into STEM. As the findings showed, once the participants engaged in validation and developed a sense of belonging in STEM, their intent to continue in STEM and/or pursue a graduate degree was fueled by the desire to support their communities.

## IMPLICATIONS AND CONCLUSION

This study has various implications for policies and practices that support and retain Latina students in STEM education. Overall, institutional leaders need to ensure a community of intersecting resources to foster the academic and social validation of Latinas. When considering the framework in Figure 1, institutional leaders, faculty, and student affairs practitioners can play a key role in the validation process.

The majority of recommendations for practice push administrators to shift expectations on college campuses to influence the pedagogical practices of faculty. The participants of this study all attended an HSCC, which provided an opportunity for them to connect with peers without having to divide or negate their identities. This reinforces the need for all colleges and departments to ensure that Latina students have access to a community of peers who acknowledge their intersectional backgrounds from an asset-based perspective as they support one another. This is tied to both the epistemological knowledge of students and their experiences in the classroom.

For example, an Ethnic Studies course would facilitate an asset-based knowledge of the marginalizing contexts their peers may navigate. Such knowledge would develop students’ critical consciousness and address various deficit perspectives that students maintain, thus, reducing the likelihood of students resorting to stereotypes and committing microaggressions. For students in STEM specifically, the course could be a required Ethnic Studies STEM course, which confronts the issue of STEM reproducing white supremacy, whiteness, and sexism. The knowledge gained from an Ethnic Studies STEM course would aim to influence the epistemological perspectives of all students so that in both the short-term and long-term, they avoid reproducing inequalities and challenge stereotypes in the future.

In addition, faculty members who acknowledge the academic strengths and validate Latina students is also necessary to support Latina student success in STEM. Institutional leaders, faculty, and faculty advisors must engage in ongoing mandatory professional development. Although one professional development workshop will not transform engrained deficit perspectives, such training will, at least, enable leaders, faculty, and student affairs practitioners to consider that Latina students have (or will) experience invalidations and microaggressions related to their various identities. Just as important is the need to prepare student affairs practitioners and

faculty to be good mentors. For example, this can include a faculty learning community aimed to understand that family and community are important to Latina students in STEM. In the learning communities, STEM faculty can focus on developing possible course assignments that engage family and/or community members. In the classroom, faculty must make curricular decisions that challenge the individualistic competitive culture present in higher education. By ensuring that students connect with one another and assigning group projects or peer-supported assignments, faculty can develop a classroom culture that aims for students to support one another.

Findings also reinforce the recommendation that has been made time and again—faculty need to represent students, particularly in STEM programs at HSIs. However, until hiring structures change to allow for a shift in demographics, STEM faculty need to be equipped to acknowledge the various identities of Latina students from an asset-based perspective so that students do not feel the need to hide their background or cultural identity.

Academic counselors and other student affairs practitioners are also important agents who can foster validating experiences for Latinas in STEM. By participating in professional development workshops that center an asset-based perspective of Latina students, student affairs practitioners can provide better guidance to first-generation Latina community college students so students can enter STEM majors and navigate the pathways to transfer. Knowing that Latina students have likely experienced moments of invalidation where they were steered away from belonging in STEM (Camacho & Lord, 2013; Solórzano, 1998; Wilkins-Yel et al., 2018), student affairs practitioners have to be prepared to validate the abilities of Latina students to pursue a career in a STEM field.

Future research should continue to examine the intersectional experiences of Latinas in STEM to understand how they navigate the cultural incongruities they encounter. Such research should account for the various institutional contexts of 4-year colleges, PWIs, HSIs, and community colleges. The research focus will vary by institutional type. While research at PWIs may focus on the mechanisms in place to ensure that Latina students have access to STEM pathways, a research study focused on HSIs and PWIs separately should consider the forms of institutional support and accountability present to ensure that STEM programs have the adequate representation of Latina students. While academic GPA and completion rates are important, there is a need to move away from only examining these traditional measures of success. In other words, future research should consider additional forms of success that Latinas experience in STEM, such as being prepared to conduct work that aims to support low-income communities or pursuing graduate school.

While this study focused on Latina students in STEM, all research focused on Latina students in higher education should be conducted from an asset-based multi-disciplinary perspective. Without a multi-disciplinary approach, the current study may have only uncovered the beginning of the process, which has been told before: Latina students in STEM experience invalidation, marginalization, and microaggressions. By incorporating the lens of spiritual activism, we were able to propose a framework that explains the process present in healing the fractured mindbodyspirit of Latina students. We contend that future asset-based research should continue to engage in a multi-disciplinary approach to understand the experiences. As Anzaldúa argued almost two decades ago:

Science has to change its story; it must accept information that goes beyond the five senses . . . . If science is going to continue as the reigning paradigm, it will have to change its story, change the

way it controls reality, and begin acknowledging the paranormal, intuition, and subjective inner life.  
(as cited in Keating, 2000, p. 18)

Similarly, we contend that STEM higher education must find a way to challenge its roots in white supremacy. While Latina students in the present study had access to tools that supported their healing process, which also served as motivation to pursue graduate school, they will likely have to continue encountering invalidations and microaggressions on their journey to earn a PhD in STEM. As a field, STEM higher education must change to ensure that the learning environments allow for cultural congruity, student validation, and preparation to dismantle the white supremacist foundations of STEM.

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