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Voices of Support: Community College Instructors of Color Reflections on Fostering Self-Efficacy in Corequisite Mathematics Students

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Abstract: This study explores the newly adopted corequisite model in a southern U.S. state, where placed students take their developmental and traditional mathematics courses concurrently. This qualitative study, rooted in a self-efficacy framework, explored the viewpoints of four mathematics instructors of color teaching at two Texas community colleges that have implemented the corequisite model. To achieve this, semi-structured interviews were employed during Fall 2022 to explore how instructors believed they could provide the best support for their students within this innovative educational model. Through interpretive phenomenology methodology, four major themes came to light: (1) *Student Challenges Perceived by the Instructor*; the instructors articulated various challenges in assisting their students, (2) *Instructor's Overcoming Challenges via Encouragement and Vulnerability*; despite their mentioned challenges, most instructors demonstrated a commitment to addressing their students' social and emotional needs, often by displaying vulnerability and openness, (3) *Instructor's Relatedness and Empathy to Help Students Succeed* and (4) *Becoming Mathematics Instructors*; instructors acknowledged that their personal experiences, including instances of oppression and shared social identities such as language, race, national origin, and mathematical backgrounds, significantly shaped their identity as educators. These experiences also influenced their teaching methods and their capacity to connect with students. Overall, this study highlights how educators in the corequisite model navigate challenges, extend emotional support, and leverage their shared experiences with their students to foster a more effective and empathetic teaching environment.

Keywords: mathematics education, self-efficacy, instructors of color, identity, corequisite mathematics
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Introduction

In 2017, Texas House Bill 2223 transitioned developmental students to the corequisite model, where they take a non-credit bearing course and a credit-level mathematics courses simultaneously in one semester (Texas Higher Education Coordinating Board, 2018). This shift placed students in corequisite courses when they were deemed not college-ready based on high-stakes assessments (Texas Corequisite Project, 2020). Prior to this model, students considered "unprepared" had to complete developmental courses before enrolling in required mathematics classes.

Mathematics has "a history of underserving African Americans, Latinos, and those in poverty" (Battey & Franke, 2013, p. 2; Willey & Ataide Pinheiro, 2019) as well as those who belong to one or more historically oppressed groups, for example women and LGBTQ+ students (see Ataide Pinheiro, 2022; Ataide Pinheiro et al., 2025b, 2025c; Dias & Ataide Pinheiro, 2024; Neto & Ataide Pinheiro, 2021). Developmental courses, unfortunately, have shown similar outcomes, disproportionately and negatively affecting students of color (Dunigan et al., 2018; Marshall & Leahy, 2020; Peaslee, 2017). Approximately 60% of college students take at least one developmental course (Grubb et al., 2021), with 66% of those students identifying as Black or Latine (Brathwaite et al., 2020), and around 70%

being first-generation college students (FGCS; Nix et al., 2020). Community colleges, in particular, enroll a higher proportion of Black and Hispanic students compared to White students, with most coming from low-income backgrounds and being FGCS (Peaslee, 2017). Furthermore, Peaslee (2017) noted that these students often enter community college with low self-efficacy, which refers to an individual's belief in their ability to "exercise control over their own level of functioning and over events that affect their lives" (Bandura, 1993, p. 118). Low self-efficacy is associated with lower levels of academic achievement (Ayllon et al., 2019), which can contribute to higher college attrition rates (Peaslee, 2017). Large-scale initiatives targeting specific student populations are lacking, as most efforts focus broadly on supporting developmental students (Brathwaite et al., 2020). Given the significant enrollment of students of color in corequisite courses at community colleges, institutions must prioritize strategies to support these students effectively.

Community colleges, while enrolling a significant proportion of students of color, have received less research attention compared to four-year institutions (Bahr et al., 2016; Bickerstaff et al., 2017; Card & Wood, 2019; Chang, 2005). However, they serve as vital educational pipelines, particularly for underrepresented groups (Chang, 2005). Faculty, especially instructors of color, play a critical role in student success and learning (Bonneville-Roussy et al., 2019; Wood et al., 2015), particularly for underserved populations. This study focuses on how community college instructors of color in a southern U.S. state perceive their support of corequisite mathematics students' self-efficacy, exploring the factors that influenced their journey to becoming mathematics educators. This paper aims to answer the following research questions: *How do community college instructors of color in a southern U.S. state believe they are supporting corequisite mathematics students' self-efficacy*? and *What key aspects played a role in these instructors of color becoming mathematics instructors in a community college?*

Theoretical Framework

This study uses Bandura's (1977, 1993) self-efficacy framework to explain human behavior. Self-efficacy predicts motivation, learning, self-regulation, and achievement (Bandura, 1997) and is shaped by an individual's belief in their abilities, which influences what they can accomplish. Bandura identified four primary sources of self-efficacy: performance accomplishments, vicarious experiences, verbal persuasion, and physiological states. These sources influence students' motivation, resilience, and achievement, particularly in challenging domains such as mathematics.

Performance accomplishments, or enactive mastery experiences, create the most substantial self-efficacy, especially when a person perceives success (Maddux & Stanley, 1986; Usher & Pajares, 2008). For mathematics learners, solving problems and experiencing success boosts confidence and persistence (Maddux & Stanley, 1986). Vicarious Experiences occur when individuals observe others succeed, fostering the belief that they too can achieve similar outcomes. In corequisite models, peer collaboration and group work provide students with opportunities to learn through observation and shared problem-solving (Bandura, 1986; van Dinther et al., 2011). Verbal persuasion, or social encouragement, can reinforce or diminish self-efficacy, and is typically acquired via feedback (Tschannen-

Moran & McMaster, 2009). Lastly, physiological states, including emotional arousal and anxiety, can negatively impact self-efficacy (van Dinther et al., 2011). These four sources influence the amount of effort individuals put into tasks, shaping their academic experiences (Bandura, 1997). Within teaching, self-efficacy can guide how instructors support students' motivation and learning.

Mathematics Self-Efficacy

Within mathematics education, self-efficacy significantly predicts performance and persistence (Wood et al., 2015). Students with high mathematics self-efficacy are more likely to engage with challenging tasks, apply problem-solving strategies, and persist through difficulties (Bandura, 1997; Usher & Pajares, 2008). Self-efficacy is central to how students perceive their ability to perform, and it significantly influences their confidence, understanding, and performance in math courses. Research has shown that developmental mathematics courses can negatively impact students' self-efficacy, particularly for women and minorities, leading to disengagement and attrition (Bickerstaff et al., 2017; Green, 1990).

Hu et al. (2015) found that students often feel surprised when they are placed in corequisite courses. These courses, while intended to support students deemed not college-ready, can affect students' confidence and attitudes toward math (Higbee & Thomas, 1999). Bickerstaff et al. (2017) and Brathwaite et al. (2020) emphasized the critical role of students' attitudes about mathematics in shaping their success.

Corequisite Models and Self-Efficacy Implications

Corequisite models, designed to accelerate student progress by placing them in college-level courses with just-in-time support, offer an opportunity to reverse the negative impacts of traditional remediation (Marshall & Leahy, 2020). However, research highlights that students often feel surprised and discouraged when placed in corequisite courses, perceiving it as a signal that they are not college-ready (Hu et al., 2015). This initial perception can negatively affect self-efficacy, causing students to doubt their mathematical abilities.

Wood et al. (2015) emphasize that mathematics self-efficacy is a key predictor of academic success, with students who experience positive feedback viewing themselves as capable and motivated to persist. Conversely, negative feedback can have the opposite effect, diminishing confidence and reinforcing feelings of inadequacy (Bouffard-Bouchard, 1990). Therefore, the structure, design, and delivery of corequisite courses must intentionally incorporate strategies that build students' self-efficacy, such as performance accomplishments through scaffolded learning and vicarious experiences through peer collaboration (Bandura, 1986; van Dinther et al., 2011).

Faculty Influence in Building Students' Self-Efficacy in Mathematics

Instructors play a critical role in fostering students' self-efficacy (Ayllón et al., 2019; Wood et al., 2015), particularly for students in corequisite models who may enter with low confidence and heightened anxiety. Ayllón et al. (2019) highlight that instructors who are "dependable and available to offer support" positively shape students' self-belief (p. 1). Faculty who engage with students via the four constructs of self-efficacy, for example, through

verbal persuasion—offering constructive feedback, emphasizing growth, and encouraging persistence—can reframe negative experiences and build resilience (Dweck, 2006; Tschannen-Moran & McMaster, 2009).
Faculty of color serve as especially powerful role models for minoritized students, reinforcing a sense of belonging and providing vicarious experiences that enhance self-efficacy (McCoy et al., 2017). When students see instructors who share their backgrounds succeed in mathematics, they are more likely to view themselves as capable of similar success (Bandura, 1997). Additionally, faculty-student relationships play a vital role in reducing physiological states of anxiety, creating environments where students feel safe to take risks and engage with challenging content (Komarraju et al., 2010).

Pedagogical Approaches Influencing Students' Self-Efficacy in Mathematics

Institutions and instructors play a pivotal role in shaping student success, particularly in mathematics, where effective pedagogy can significantly influence learning outcomes. How instructors present material directly impacts students' understanding and engagement (Higbee & Thomas, 1999; Wood et al., 2015), and meaningful content delivery has been shown to improve student progress (Marshall & Leahy, 2020). Students are more likely to succeed when instructors build strong relationships, implement curriculum effectively, and create supportive learning environments (Ayllón et al., 2019; Bahr et al., 2016; Chang, 2005). Pedagogical approaches that affirm students' identities, connect learning to real-world contexts, and foster a sense of belonging further enhance self-efficacy in mathematics, empowering students to engage with and excel in challenging content. These approaches not only reduce math anxiety but also promote equitable learning experiences that empower students to succeed.

Contextualized learning, which connects math to real-world experiences, is a proven method for reducing math anxiety and increasing motivation (Brathwaite et al., 2020; Darwin et al., 2022). Contextualized approaches, like referencing career fields such as healthcare, make content more relatable and improve self-efficacy (Bandura, 1993, 1997). Embedding student culture into the curriculum affirms their identities, enhancing engagement and success (Battey, 2013). Culturally relevant pedagogy (CRP) celebrates students' languages, values, and beliefs, supporting equitable education and preparing them for STEM careers (Ataide Pinheiro, et al, 2025a; Gay, 2018; Magee et al., 2020; McCoy et al., 2017). CRPs are especially helpful for underserved populations (Ladson-Billings, 1995).

An essential practice connected to CRPs is social and emotional learning (SEL), which affirms student identities and addresses equity and social justice issues (Ladson-Billings, 1995; Paris & Alim, 2017). SEL improves academic outcomes (Brackett et al., 2012; O'Connor & McCartney, 2007, as cited in White et al., 2022). "Through SEL, practices ideally 'center student racial identity and culture, agency, and instructional transformations'" (White et al., 2022, p. 2). SEL also fosters cultural sensitivity, addresses racial injustices, and improves both academic and nonacademic outcomes (White et al., 2022). Instructors who approach learning with openness and vulnerability and engage in caring interactions enhance SEL (McCoy et al., 2017; Komarraju et al., 2010). SEL is vital in community colleges, where student-faculty relationships directly impact academic success (Komarraju et al., 2010). Without SEL, students of color may experience inequities (Givens, 2021).

Mitigating Mathematics Anxiety via Faculty

Math anxiety, described as an "adverse emotional reaction to mathematics," disproportionately affects community college students, particularly women and minoritized populations (Brooks, 2020, para. 2; Yeager et al., 2011). Math anxiety can undermine self-efficacy by triggering physiological states that reinforce negative perceptions of one's abilities (Yeager et al., 2011). Particularly, Ayllón et al. (2019) found that instructors who are "dependable and available to offer support" positively impact students' self-efficacy and success (p. 1).

Instructors play a crucial role in mitigating math anxiety by fostering supportive learning environments and using SEL practices that promote confidence and persistence (Brackett et al., 2012; O'Connor & McCartney, 2007). McCoy et al. (2017) noted that faculty "served as gatekeepers for accessing STEM-related careers for students of color" (p. 1), and faculty of color provide critical support. Instructors must be mindful of stereotypes, as many minority students experience math anxiety (Brooks, 2020; Cox & Ataide Pinheiro, 2024). Instructors can mitigate this anxiety by providing constructive feedback and collaborative learning opportunities (Bickerstaff et al., 2017; Hu et al., 2015; Marshall & Leahy, 2020).

Faculty can further reduce mathematics anxiety by providing opportunities for students to strengthen self-efficacy in mathematics. For example, these practices can be demonstrated through vicarious experiences in collaborative learning environments and peer support, where students observe others succeed, fostering the development of their own confidence (van Dinther et al., 2011). Moreover, verbal persuasion through positive reinforcement and feedback can help reframe negative experiences and shift students' mindsets toward growth and achievement (Dweck, 2006).

Supporting Corequisite Students in Mathematics with High-Impact Practices

Corequisite students, particularly in mathematics, often enter courses with low self-efficacy; yet, they can thrive when faculty implement high-impact practices that intentionally build confidence and competence. These practices include scaffolding content, encouraging peer collaboration, and providing consistent feedback that emphasizes growth and mastery (Hu et al., 2015; Marshall & Leahy, 2020; Nix et al., 2020). Faculty play a pivotal role in developing students' mathematical skills and fostering self-efficacy, with faculty of color, in particular, serving as powerful advocates and role models who provide critical support (McCoy et al., 2017; Wood et al., 2015). McCoy et al. (2017) found that faculty "served as gatekeepers for accessing STEM-related careers for students of color" (p. 1), with faculty of color providing substantial support. However, despite the recognized importance of faculty-student interactions, limited research has examined how these relationships impact self-efficacy at the community college level (Chen et al., 2021; Bickerstaff et al., 2017; Wood et al., 2015).

Given that faculty-student relationships directly influence academic success (Komarraju et al., 2010; Wood et al., 2015), more research is needed to understand how faculty, particularly instructors of color, perceive their role in supporting corequisite students and enhancing their self-efficacy. This study seeks to fill that gap by exploring the

experiences of faculty of color and their efforts to foster self-efficacy in corequisite mathematics courses, ultimately contributing to a deeper understanding of how faculty-student interactions shape and support students' self-belief and success in mathematics courses.

Methods

This qualitative study aims to examine the perspectives of instructors of color who teach corequisite mathematics courses at community colleges in a southern U.S. state, using semi-structured interviews as the method of data collection. Qualitative research can be used to understand the phenomenon, experience, or perception of how an individual came to process what is being analyzed (Merriam & Tisdell, 2015). Further, qualitative approaches to research allow a deeper understanding of how people make sense of their experiences (Merriam & Tisdell, 2015), the uniqueness of their own lives (Patton, 1999) and allow for an in-depth look at people's "meaning-making processes" (Leavy, 2022, p. 124). Qualitative studies investigating self-efficacy are underrepresented (Klassen et al., 2011; Narayanan & Ordynans, 2022; Wheatley, 2005), and quantitative self-efficacy studies often do not provide a holistic idea of the phenomenon being explored (Wheatley, 2005; Wyatt, 2014, 2018).

Interpretive Phenomenological Study

In the present study, we used an interpretive phenomenology methodology to add to the qualitative studies on self-efficacy and discern themes of the experiences of instructors of color with the new mathematics corequisite legislation. A phenomenological approach is appropriate to illuminate different outcomes in an individual's experiences (Limberg, 2000), despite adhering to similar legislative initiatives (e.g., corequisite courses) or teaching within the same discipline (i.e., mathematics). To explore these instructors' lived experiences, four teachers in this study were interviewed regarding their experience teaching mathematics under the corequisite model. Per Limberg (2000), phenomenological studies highlight differences in individuals' outcomes that may be explained through their different means of life experiences, which can be compared or contrasted to someone who experienced a similar phenomenon (e.g., teaching mathematics, undergoing new state mandates).

Study Design

Prior to interviewing the participants, we developed interview questions to better understand educators' personal and professional backgrounds and developed research questions through the lens of our theoretical framework. In doing so, we included questions about instructor's experiences supporting the corequisite mathematics students, as well as probing about instructor's opinions of the new corequisite model. For example, one interview question was "How would you describe successfully supporting the students in your corequisite course?" to allow instructors the opportunity to mention in- or out-of-class examples of supporting students' self-efficacy (e.g., working with them individually on math problems), as well as opportunities to discuss anything they perceived as the biggest challenge with the corequisite courses (e.g., students' math anxiety).

Participants

Participants in this study were recruited from two community colleges in a southern U.S. state via email. The first author identified two institutions in the southern U.S. state that were following the mandated corequisite model according to the state and obtained institutional review board approval from both institutions. Once approval was obtained, the full-time mathematics instructors who taught corequisite students were emailed; those who were interested and self-identified as an instructor of color were asked to email the researchers for further information. Four participants agreed to participate in the study; see Table 1 for participants' self-identified demographics. We decided to interview four instructors based upon the time constraints of this study (i.e., needing to be completed within a semester-long time frame), as well as the number of instructors meeting the requirements of the study (i.e., identifying as a mathematics instructor of color, as well as previously or currently teaching corequisite courses). Instructors from community colleges were selected as community colleges have higher enrollment of developmental and corequisite students (Marshall & Leahy, 2020), as well as higher enrollment of minority students (Peaslee, 2017).

Table 1

Participants' Self-Reported Demographic Information

Pseudonym	Gender	Race	Sexual Orientation	Age Range	Teaching Experience
Consuelo	Cis Woman	Mexican American	Straight	50-59	18+ years
Dani	Androgynous	Latin	Queer	40-49	6 years
Corrina	Cis Woman	African American	Straight	50-59	17 years
Paul	Cis Man	Salvadorian	Straight	40-49	15 years

Researchers' Positionalities

The first author was a mathematics corequisite instructor at a community college in North Texas at the time this was written. She identifies as a White woman in STEM. As a woman in STEM, she recognizes how her experiences can support her understanding of the study participants' experiences as marginalized individuals in STEM. She has taught Grades 9–14 (ninth through two-year college).

The second author is a STEM teacher educator at a major research institution in West Texas. He identifies as a Black Queer man and an immigrant to the United States. He has taught mathematics since 2013 to Grades 9–16 (ninth through four-year college) and graduate school students.

The authors' multiple experiences with the teaching of mathematics and many of their marginalized identities contributed to them making sense of the data collected through the interviews. They shared an empathetic space with community college instructors of color who navigate the teaching of developmental students.

Data Collection

Data collection was carried out through individual semi-structured interviews conducted during the fall of 2022. Each of the four interviews was held virtually via Microsoft Teams and lasted between 40 minutes and one hour. The first author led the interviews, while the second author participated by asking additional probing questions as necessary after each session. A semi-structured format was chosen to allow flexibility in addressing the interview's objectives beyond the pre-scripted questions (Leavy, 2022). Following each interview, we promptly debriefed and reflected on emerging themes.

Interpretive Phenomenological Analysis

In this study, we used an interpretive phenomenological approach as research methodology. Per Larkin et al. (2006), interpretive phenomenological analysis (IPA) takes place in two stages: (a) the phenomena (e.g., instructors' experiences teaching corequisite courses) are analyzed, and (b) the phenomena are interpreted within a wider context. Within this study, IPA was achieved through each instructor's experience of corequisite courses being explained through the collected data (semi-structured interviews) and then exploring the similarities and differences within the participant's experiences.

The data from the video recordings were transcribed using an automated transcribing service, coded, and analyzed with support drawn from the authors' debriefs and the usage of MAXQDA (a software to analyze qualitative and quantitative data). Instructors' individual experiences were coded using an in-*vivo* approach, which is achieved by underlying phrases in the data (Merriam, 2009). Individually, both authors used inductive coding (Strauss & Corbin, 1990) to make sense of each interview, then subsequently met to discuss their coding.

Once all the interviews were preliminarily coded by each author, the codes were grouped into categories on which we agreed. We met to discuss each interview in separate meetings, discussed similarities and differences within their coding, and wrote notes to initially develop categories. After meeting with each participant, we individually went back to the data to recode each interview. Subsequently, we met regarding each interview to discuss any additional codes that emerged in the data. In the second round of coding, from the categories, we developed the themes into four main groups to understand the data and expand on the major ideas voiced by the participants (Strauss & Corbin, 1990), which are discussed in the findings section.

It is worth noting that although these data were inductively coded to allow categories and themes to emerge organically, the interview questions were aligned with self-efficacy theory, *and* the eventual findings were tied to the literature surrounding self-efficacy.

Trustworthiness

Ethics and integrity are central to social research (Leavy, 2022) and must be regarded throughout the research study. In the present study, the researchers obtained institutional review board approval to ensure the protection of

the participants of the study. Upon the collection and analysis of data, we met weekly to debrief interviews and any coding discrepancies.

Results

After going back through the data several times individually and as a pair to fully understand the data, we found four overarching themes emerging from the categories (see Table 2): (a) Student Challenges Perceived by the Instructor; (b) Instructor's Overcoming Challenges via Encouragement and Vulnerability; (c) Instructor's Relatedness and Empathy to Help Students Succeed; and (d) Becoming Mathematics Instructors.

Table 2

Constructing Categories and Themes

Example Quotes	Category	Overarching Theme
Students are "entitled and don't want to do much," (Consuelo) "Very few students show up to class, and when they do show up it is hard to get them to participate." (Paul)	Instructional Challenges	**Student Challenges Perceived by the Instructor**
COVID-19 has changed the student's mindset, and getting students to "enter back into society… after staying home," (Corrina)	Systematic Structural Issues	
"notable difference in skill set coming out of high school" since the COVID pandemic. (Dani)	COVID Influence/Today's Student	
"I watch out for power dynamics [...] a lot of times male Caucasian students are more willing to speak up.... than perhaps a female person of color". (Dani)		

Asks students “why they are in college” and become a “mentor” for students. (Corrina) “I want this to be a safe space; I don’t try to make my job easier. I try to genuinely address each class as a new entity. And sometimes I’m just constantly building new courses.” (Dani) “instructors put their heart and soul and effort into everything they have to try and help these students be successful.” (Consuelo) Paul wants students to feel comfortable by letting them know that he “doesn’t know everything”, and “tries to not have an ego”, and “being vulnerable”. "when I was in the 5th grade- that's the first time I had a black teacher and at that moment I realized I could be a teacher.” (Corrina) “You can still learn it [math], it’s not too late, I started super older. If I can do it, so can you… it may take a couple times, but you’re always welcome back if you fail, that’s not a comment on you. All it means is you need more time with the material. I tell them these things over and over… you can be good at math.” (Dani) “I learned as a very small kid, just being around Ethiopians, people from the Middle East, India, Vietnam, Cambodia.. just the whole plethora of beautiful humanity, I was around it all the time. And I think that really plays a huge role more than anything else… the way I can connect with students.” (Paul)	Instructional Practices Instructor Identity	**Instructor’s Overcoming Challenges via Encouragement and Vulnerability**

"I was not gifted at math... I didn't know that I wanted to study math, I didn't know I found it interesting." (Dani) "math kind of opened the world up to other sciences, philosophy, all kinds of stuff... I try to push that to my students, too", "math can open the doors to almost anything you wanna learn about." (Paul) "There is a cultural barrier, I think sometimes, as soon as they could see that, ohh, this person understands my background a little bit [...] I instantly feel the tension go away." (Paul) "They don't see a lot of people that look like them in STEM, and that is important." (Corrina)	Mathematical Relatedness Personal Relatedness Classroom Culture	**Instructor's Relatedness and Empathy to Help Students Succeed**
"It was the instructors here [at the community college where she now works] that got me to thinking about getting into the field of education." (Consuelo) "My experience as a developmental student—that's what made me into a successful instructor because I was not gifted at math." (Dani) "Math is the portal to all other knowledge" (Dani)	Identity Feelings of Empathy Personal Experiences	**Becoming Mathematics Instructors**

Student Challenges Perceived by the Instructor

Instructors highlighted challenges in supporting students' self-efficacy, particularly regarding technology, generational differences, the COVID-19 pandemic, and systemic inequities. Consuelo shared, "Students are entitled and don't want to do much," expressing frustration over low engagement and attendance. Paul echoed this concern, stating, "Very few students show up to class, and when they do, it is hard to get them to participate." Consuelo added, "I tell students to 'look around' after the first few weeks to observe which students are no longer attending." Corrina emphasized the pandemic's lingering effects: "COVID-19 has changed students' mindsets and getting them to enter back into society after staying home is a challenge."

Instructors also addressed skill deficits among students. Dani noted the "notable difference in skill set coming out of high school" post-pandemic, while Corrina explained that many challenges stem from systemic issues, saying, "It's a societal problem." Reflecting on power dynamics, Dani shared, "A lot of times, male Caucasian students are more willing to speak up than perhaps a female person of color." Additionally, the corequisite model's accelerated pace presented obstacles. Corrina described it as "a lot for students since there are way too many things to learn in one

semester with one hour of help." Consuelo agreed, lamenting the lack of class time: "It's one of my biggest challenges with corequisite students." Corrina also shared an instance of racial bias, recalling, "He was a big guy, Black guy, and they were afraid of him. If your teachers are afraid of you, that's not a good experience to have in class."

Instructor's Overcoming Challenges via Encouragement and Vulnerability

Encouragement represents the overarching theme of the instructors' journeys to becoming mathematics instructors and how their experiences shaped the openness (vulnerability) they displayed to their students. An in-depth analysis of the teachers' identities will be shared and discussed, but the theme of encouragement and vulnerability emerged as a *result* of the instructors' identities and journeys to becoming mathematics instructors.

Instructor's Encouragement

The support these instructors have experienced through their personal, educational, and professional journeys influences the value they place on encouraging their students generally and is used as a means to help them overcome the aforementioned challenges. For example, Corrina asks students to determine "why they are in college" and hopes to become a "mentor" for their students. She admitted that students "don't see a lot of people that look like them in STEM, and that is important" to overcome the systematic barriers (e.g., race) that she identified as a hindrance to students' success. Paul emphasized the importance of helping corequisite students overcome the fear of embarrassment when asking questions by actively encouraging them to speak up in class. He shared that, at times, he avoids discussing math altogether to build relationships and create a more comfortable environment for participation. Paul acknowledges the importance of building relationships as he reflects on his experiences growing up, ""I learned as a very small kid, just being around Ethiopians, people from the Middle East, India, Vietnam, Cambodia... just the whole plethora of beautiful humanity, I was around it all the time. And I think that really plays a huge role more than anything else… the way I can connect with students." Dani highlighted his focus on fostering a safe and welcoming classroom space. He also takes a personalized and adaptive approach to teaching, explaining, "I don't try to make my job easier. I try to genuinely address each class as a new entity. And sometimes I'm just constantly building new courses." Consuelo reflected on her methods for motivating students, noting, "Instructors put their heart and soul and effort into everything they have to try and help these students be successful," while emphasizing "how important it is to make sure they are attending [class] because I make my class so interactive." By incorporating interactive activities, group work, and storytelling about math, she believes students can support one another while gaining exposure to "different scenarios to know that not every problem is the same."

Instructor's Vulnerability

The theme of vulnerability emerged strongly among the instructors, who often shared personal experiences to connect with and inspire their students. Dani, for instance, used his own journey to encourage his students, telling them: "You can still learn it [math], it's not too late, I started super older. If I can do it, so can you . . . it may take a

couple times, but you're always welcome back if you fail, that's not a comment on you. All it means is you need more time with the material. I tell them these things over and over . . . you can be good at math."

Consuelo shared her story as a single mother who balanced work and college, using her experience to motivate students facing similar challenges. Reflecting on her inspiration to teach, Corrina explained, "When I was in the fifth grade—that's the first time I had a Black teacher and at that moment I realized I could be a teacher." Corrina reflects on how her personal experiences have been shaped by her personal experiences, mentioning "they [her students] don't see a lot of people that look like them in STEM, and that is important." Paul also emphasized showing vulnerability, saying he openly makes mistakes in front of his students and has "no ego about it." He believes that being approachable and human helps dismantle the stigma many students associate with college professors.

Through their vulnerability, the instructors highlighted various ways they support corequisite students, both academically and non-academically. Corrina described how simple actions, like "talk[ing] to them [students] about how college works," can make students feel they belong in learning spaces. She emphasized the importance of students feeling like "they're part of the community . . . [and] assets to the community." Paul, on the other hand, likened his role to that of a mathematical psychologist, focusing on understanding what works best for his students and finding ways to motivate them effectively.

Instructor's Relatedness and Empathy to Help Students Succeed

The theme of relatedness emerged from instructors demonstrating empathy or sharing cultural, social, racial, linguistic, gender, or mathematical similarities with their students. For instance, Corrina shared that a student sought her out during office hours because they shared the same racial identity, which made the student feel more comfortable approaching her. Similarly, Dani noted that his ability to connect with students stems from his own experiences as a former developmental student. As he said, "I was not gifted at math . . . I didn't know that I wanted to study math, I didn't know I found it interesting." Consuelo said she relates to her students through her experiences as a single mother, telling her students "I have to struggle for that, just like they do" or "using stories that relate to their culture." She emphasized that with students "the bond is so important"; sharing her personal experiences, she told her students she also had to struggle through college to be successful. Instructors also recognized the impact of shared experiences on breaking barriers; Paul attempted to relate anything to math for his students; he expressed, "Math kind of opened the world up to other sciences, philosophy, all kinds of stuff . . . I try to push that to my students, too" and "Math can open the doors to almost anything you wanna learn about." However, Paul did recognize "there is a cultural barrier, I think sometimes; as soon as they could see that, ohh, this person understands my background a little bit [. . .] I instantly feel the tension go away," He recognized that having a mutual background with students makes them feel safer and helps them open up; he believes it is essential students have a teacher they can relate to.

Seeking relatedness with students resulted in instructors extending their empathy and to their students. The instructors wanted their students to feel comfortable, to know it is "OK to make mistakes," and that they were once

also in their students' shoes to some extent. This empathy may be through creating a "community" or a "safe space" for the students and getting to know them. As Paul recalled, "those experiences with my instructors was valuable" and he aimed to "knock down the wall to help them [students] ask questions or participate", "show that you're human", encouraging them to "do something you love," "willingness to talk" to the students, and "be honest and open about our own experiences."

Becoming Mathematics Instructors

The challenges instructors perceive in their students, the ways they overcome those challenges through encouragement and vulnerability, and their feelings of empathy and connection are deeply shaped by their identities. To capture this, we sought to understand each instructor's unique journey into mathematics and teaching at the college level. Consuelo shared how encouragement from colleagues motivated her to pursue both an associate and a bachelor's degree. She reflected, "I never saw in myself the potential they saw," and added, "It was the instructors here [at the community college where she now works] that got me to thinking about getting into the field of education." Having received support herself, Consuelo focuses on persistence in her teaching, drawing from her own experiences as a single mother juggling work and school. She sees struggle as an integral part of the college experience and emphasizes to her students that while the path may be hard, it is worthwhile. She candidly acknowledges her sacrifices—working two jobs and getting little sleep—and expects her students to show similar dedication to succeed.

Dani described his entry into teaching as accidental. Like Consuelo, he began college later in life, sharing, "I did not start college right out of high school." Encouragement from instructors at his college played a pivotal role in his journey to becoming a community college teacher. Recalling his own challenges as a developmental math student, Dani remarked, "She [a teacher] was the first person who had ever encouraged me in math," and "My experience as a developmental student—that's what made me into a successful instructor because I was not gifted at math." Dani prioritizes creating a safe space for his students, rooted in his own experience as a Queer student who felt safe and welcomed at his community college.

For Corrina, seeing a Black teacher in fifth grade opened her eyes to the possibility of becoming an educator herself. She now strives to be a role model as a Black woman in STEM, showing her students that they, too, can achieve success in any field. Corrina emphasizes emotional support strategies for advancing students of color, noting inequities she has observed among her White colleagues. She believes representation matters and seeks to ensure her students of color see themselves reflected in their instructors.

Paul's identity as an educator began forming in high school, influenced by his experiences as a first-generation college student from a low-income, immigrant family. He explained, "Math is the portal to all other knowledge," underscoring his enthusiasm for the subject. Like Consuelo and Dani, Paul faced familial expectations to prioritize work over higher education, but teachers played a critical role in guiding him toward college and a career in

teaching. He shared, “In terms of my academic and even professional career . . . I learned from other instructors and professors.” Paul uses both mathematical and emotional intelligence to support his students, acknowledging the stigma that sometimes comes with being a professor. He reassures students by admitting, “I don’t know everything,” and encourages them to find purpose in their careers. Grounded in his experiences of poverty and immigration, Paul often shares his story to connect with his students and help them see the value of persistence.

Discussions

Through encouragement, vulnerability, relatedness, empathy, and addressing challenges, instructors of color in community colleges in a southern U.S. state demonstrated their profound commitment to supporting students and shaping their self-efficacy; the self-efficacy influence was often formed as a result of their identity as an educator. However, how one individual (e.g., a teacher) influences another individual’s (e.g., a student’s) self-efficacy can be difficult to determine. These educators actively worked to address emotional, social, and academic challenges, often rooted in their own experiences and identities. Bandura’s (1977, 1997) self-efficacy framework—performance accomplishments, vicarious experiences, verbal persuasion, and physiological states—provided a lens through which their efforts can be understood. Further, Bandura (1977) acknowledged that an individual’s self-efficacy can be influenced if provided performance accomplishments, vicarious experiences, verbal persuasion, and physiological states. Further, a crucial distinction by Bandura (1997) must be noted: that it is the actual teaching *behaviors* that lead to changes in student outcomes. Within the context of this study, there are instances where the instructors may have contributed toward positively influencing the students’ self-efficacy or even correcting a negative perception of self-efficacy in mathematics.

Supporting Students Amid Challenges

The challenges instructors faced created a unique context for fostering self-efficacy. For example, the classroom challenges instructors face creates different fixations. Collectively, the instructors mentioned an increased difficulty in their profession due to the COVID-19 pandemic. As a result, this may influence the way instructors teach, how they interact with students, and, inevitably, how they influence their students’ self-efficacy. Paul mentioned the difficulty of getting students to show up and actively engage in his mathematics courses post-COVID. As a result, he attempts to mitigate this challenge by being vulnerable and providing encouragement; vulnerability is a theme that all of the instructors displayed to some extent. The environment created by faculty can lead to student’s greater sense of self-efficacy; this can be done through validation (Card & Wood, 2019), encouraging words (Bickerstaff et al., 2017), affirming their abilities (Chen et al., 2021; Wood et al., 2015), and being available for interaction outside of the classroom (Komarraju et al., 2010). Bickerstaff et al. (2017) found that faculty members can help earn student success while making their efforts transparent. Instructors can facilitate experiences where students identify their strengths while faculty guide them through difficult tasks and offer constructive feedback.

These challenges often intersected with systemic inequities. Dani acknowledged the power dynamics he is mindful of and the math anxiety his students experience; consequently, he takes deliberate steps to foster a safe and supportive environment. The physiological source of self-efficacy can be negatively associated with anxiety

(Bandura, 1993), and for some students, this can be debilitating (Brooks, 2020). Dani's efforts to acknowledge and actively mitigate his students' anxiety could have positive implications for their sense of security in the mathematics classroom. Teachers of color often prioritize creating environments that address students' SEL needs (White et al., 2022). For Dani, this approach may stem from his personal journey as a Queer individual navigating education in a conservative area he once struggled to connect with. Paul emphasized his desire for students to feel comfortable asking questions and seeking help, aiming to counteract the stigma he associates with instructors who exhibit ego or lack vulnerability—an approach shaped by his own experiences with such teachers.

Consuelo highlighted the challenges she faces in getting students to consistently attend class. Drawing from her experiences as a single mother balancing multiple jobs while pursuing her degree, she uses her story to motivate students, emphasizing that while earning a degree is challenging, perseverance is key to success. Faculty-student relationships play a critical role in college success (Wood et al., 2015), and Corrina focused on addressing students' confidence and emotional barriers before building their mathematical skills. Like Dani, she recognized the impact of students' negative past experiences with math, which can affect their emotional and physiological readiness to learn (van Dinther et al., 2011). Corrina also sought to serve as a mentor, helping students "see someone like them" in STEM. Black educators, in particular, can play a significant role in fostering positive Black racial identities among students (White et al., 2022), a need that is especially relevant in mathematics (Battey & Franke, 2013). These oppressive structures, as described by the instructors, have profoundly shaped their identities as educators and influenced their practices and interactions with students.

Encouragement and Vulnerability as Tools for Transformation

The challenges instructors mentioned in their interviews were oftentimes mitigated with encouragement and vulnerability, which emerged as vital tools for instructors to foster student self-efficacy. By sharing their personal struggles and successes, instructors created an environment where students felt seen, supported, and capable of overcoming obstacles. Dani shared his experiences as a Queer man and a non-traditional developmental math student who returned to school in his 30s and struggled with math. He recognized that sharing this vulnerability resonated with his students, fostering a connection and helping him avoid being perceived solely as an authority figure. All the instructors noted that many students had negative past experiences with math, which could make them hesitant to seek help.

The instructors' willingness to be vulnerable was crucial in building these connections, enabling students to feel supported and fostering an environment conducive to learning (Ayllón et al., 2019). In this essence, through their vulnerability, the instructors were able to alleviate the negative they indicated many students had about mathematics through normalizing mistakes; in doing so, this aids students in learning mathematics and positively influences their self-efficacy (Gordon, 2022). Faculty relations with students are crucial to their success in college (Wood et al., 2015) which was evident in the instructor's vulnerability and attempts at relating to students. Komarraju et al. (2010) found that student-faculty interactions are a significant predictor of academic self-concept, intrinsic motivation and extrinsic

motivation. In particular, students who are vulnerable and "at risk" are less likely to initiate faculty interaction, and the faculty member must be approachable to the student.

Relatedness and Empathy in Building Connections

Instructors consistently leveraged relatedness and empathy to create meaningful connections with students and foster belonging. These instructors related their social identities (e.g., language, race, national origin, mathematical experiences) to find common ground with their students. Specifically, in colleges, students of color have difficulties relating with white instructors (Chang, 2005), which makes these themes especially interesting and necessary to discuss. Importantly, relatedness did not necessarily always mean *sameness*. Further, within relatedness, there is an essence of empathy at play, and instructors want to establish relationships with their students before learning occurs.

In their study, Goroshit and Hen (2015) found that instructors who were empathetic toward their students implemented SEL strategies, and positively contributed to both teacher and students' self-efficacy. Further, Ayllón et al. (2019) and McCoy et al. (2017) found that instructors who are empathetic and caring foster positive academic and emotional outcomes, particularly for students with low self-efficacy. Students with low self-efficacy respond well to instructors who are "dependable and available to offer support" (Ayllón et al., 2019, p. 1) and seek instructors who are open and caring (Komarraju et al., 2010; Peaslee, 2017). In this study, empathy often manifested through intentional relationship-building and creating safe spaces. As aforementioned, Corrina acted as a mentor to her students so they could see a black woman in STEM; Consuelo and Dani had experiences as non-traditional students and were able to extend those experiences to their students. These experiences are especially important to highlight within the context of this study because community colleges often house minorities (Peaslee, 2017) and non-traditional students (Chang, 2005); often, these students feel as if they do not belong in college, which can negatively influence their self-efficacy (Peaslee, 2017). Paul further acknowledged that there were times when the class would not focus on math at all; however, he believed that building these relationships was essential to eventually guiding students toward math success. Additionally, Paul made an effort to relate math to students' daily experiences. This approach, which encourages students to see math in the context of their everyday lives, aligns with CRP (Magee, 2022). Teachers of color are more likely to implement this strategy (White et al., 2022), and it plays a crucial role in enhancing students' self-efficacy (Ayllón et al., 2019).

Implications for Self-Efficacy in a Post-COVID Era

Self-efficacy is the bridge that connects motivation and learning or developing the motivation to learn. Teachers have meaningful roles in helping students evaluate their capabilities, particularly when learning new tasks and how the instructors approach the students (van Dinther et al., 2011).

Through *enactive mastery*, Dani, Consuelo, and Paul reassured students that mistakes are part of learning, encouraging them to try again and offering consistent support. *Social persuasion* came through messages like, *"It's OK not to know," "You can learn this,"* and *"Ask me over and over again." Physiological states* were addressed as instructors

worked to reverse the effects of students' negative past experiences with math, fostering more positive interactions. Although *vicarious experiences*—learning through observation—were not explicitly observed in this study, they are often linked to self-efficacy (van Dinther et al., 2011).

The findings of this study suggest that self-efficacy constructs may play a heightened role in post-COVID education. While Maddux and Stanley (1986) argued that not all sources of self-efficacy are necessary to influence outcomes, this study highlights the growing importance of *psychological states.* Instructors recognized and mitigated students' math anxiety through encouragement, vulnerability, and fostering a sense of belonging. These practices, aligned with social-emotional learning (SEL) strategies—commonly emphasized by instructors of color (White et al., 2022)—helped create safe and supportive learning environments, which has positive implications for self-efficacy. Moreover, the instructors' ability to mitigate systemic inequities and provide culturally relevant, empathetic instruction underscores the importance of representation and relational teaching practices. These strategies are crucial not only for enhancing mathematical self-efficacy but also for advancing equity in education overall, as researchers have long advocated (see Childers et al., 2024; Darwin & Ataide Pinheiro, 2023; Fúnez-Flores et al, 2024; Goldberg et al., 2023; Hong et al., 2023).

Limitations and Conclusion

In this study, instructors of color in community colleges in a southern U.S. state have demonstrated a strong commitment to supporting their students and enhancing their self-efficacy. Through encouragement, vulnerability, and empathy, they have actively shaped their students' self-belief and created positive learning environments. These instructors have leveraged the constructs of self-efficacy in various ways.

Encouragement and vulnerability have played a significant role, as instructors shared personal experiences, creating relatability and empathy with students. By acknowledging their own struggles, they showed students that it's okay to make mistakes and seek help. Relatedness and empathy further played crucial roles, with instructors using their social identities to connect with students and create safe spaces for expression, fostering a sense of belonging. These efforts have been particularly important in the post-COVID context, where heightened anxiety affected students. Instructors also recognized students' past negative experiences and worked to mitigate these challenges by fostering positive future experiences.

Overall, the instructors in this study have gone beyond traditional teaching methods by prioritizing the emotional and psychological well-being of their students. Their efforts to build strong, empathetic relationships with students have likely had a profound impact on self-efficacy, motivating and empowering students to believe in their abilities and succeed academically. This study underscores the importance of not only what educators teach but also how they teach and the emotional support they provide to students, particularly in diverse and often marginalized communities.

There are two limitations in this study that contribute significantly to our findings. First, we only had four participants in this study, which significantly limits the possibility of stories we could co-construct with participants. Second, in this study, we only focused on postsecondary mathematics instructors from a southern U.S. state, limiting the generalizability to other contexts. Further studies must analyze more broadly the experiences of community college instructors of color across the United States, since they can further contribute to our understanding of the ways instructors of color support students' self-efficacy.

Implications

This study has offered a platform to explore the perspectives of instructors of color on the most effective ways to support corequisite students in mathematics. In summary, this study continues to reinforce the importance of vulnerability in the teaching profession and the effects such vulnerability can have in supporting students' development of their self-efficacy in an area it is often lacking- mathematics. This study highlights the critical importance of cultivating a teaching workforce that reflects the identities of students in community colleges, particularly given that these institutions primarily serve historically marginalized populations in the U.S. We emphasize that this need extends beyond the U.S., calling for a global effort to diversify the teaching workforce to better mirror the identities of students in classrooms worldwide. While we recognize that achieving this diversity is a complex and ongoing challenge, governments and policymakers can play a pivotal role by creating targeted programs, offering incentives, allocating grant funding, and enacting policies that promote and sustain a more diverse teaching workforce.

Future studies must continue to investigate how teachers have supported students' self-efficacy, especially by foregrounding *vicarious experiences*—learning through observation—which is something our study could not foreground. We advise educators continue to incorporate in their teaching CRP (Magee, 2022), SEL (White et al., 2022), vulnerability, and relatedness to more effectively support diverse student populations and work toward providing equity for all in educational systems that have been proven to be inequitable.

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