

Supporting Adult Learners in STEM Courses: Impacts of Peer Mentoring at a Community College

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Background

Public community colleges offer a range of educational offerings including certificate options, associate and bachelor’s degrees, and continuing education programs [1]. Across the United States, there are over 1,000 community colleges enrolling 10.9 million students with approximately 24% of those enrolled being adult learners [2]. Unlike traditional college students whose ages range between 18 and 22 years old, adult learners are over the age of 25. This demographic is motivated to pursue post-secondary education for career advancement or change, earnings potential, or to fulfill a personal dream. Some may enroll in degree programs whereas others return for additional credentials [3].

The institution of this study is Doña Ana Community College near the United States and Mexico border and is home to approximately 6,800 undergraduates; 27% are over the age of 25. Approximately 70% of the students identify as Hispanic yet only 16% of this demographic graduate in normal time [4], compared to the national average of community college graduation rate of 43% [5]. Normal time is the typical amount of time it takes full-time students to complete their program. At the community college level, the normal amount of time for associate's degree programs is two years [4]. To address the low graduation rate, the Science, Engineering, and Math (SEM) division piloted a peer mentoring program in 2023 in one science course. Subsequently, the program has expanded to several courses in the division such as Physics, Algebra, and others. The goal of the peer mentoring program is not only to work towards a higher graduation rate, but to provide student mentees with the skills they need to successfully persist through their degree programs.

In this study, peer mentors are students who successfully passed the class they are embedded in and provide academic and socioemotional support to students. The peer mentors attend the class regularly, offer real-time academic assistance to students during class assignments and lectures, and provide out-of-classroom support through group study sessions or individual tutoring sessions. Peer mentors provide academic support to the students and provide in-class presentations. These presentations include information regarding campus events and institutional support services e.g., tutoring, financial aid, housing and food, as well as teaching students how to register for classes, processes needed for transferring to a four-year institution, and how to navigate the institution’s learning management system [LMS], among others. While this study is part of a larger, multi-semester study, our focus is on the impact of peer mentors on adult students. We analyze data collected during the Spring and Fall semesters, 2025. Table I indicates the number of peer mentors and courses in each of these semesters. There are fewer peer mentors than courses as some peer mentors were hired for multiple courses

TABLE I
Peer Mentors and Courses

Semester	Peer Mentors	Courses
Spring 2025	15	27
Fall 2025	22	41

This study is guided by the Learning Partnerships Model [8] which asserts that students' academic goals are met through intrapersonal and interpersonal growth. The rationale for this framework lies in the dynamics of our study participants' goals to return to college as adults. Their intrapersonal goals of pursuing a degree intersect with their interpersonal reliance on peer mentors to assist them in achieving their goals. This study aims to address the following research questions:

- What components of the peer mentoring program help adult students achieve their intrapersonal goals?
- To what extent does the interpersonal relationship between a peer mentor and adult student contribute to the adult student's desire to persist in their STEM program?

Literature Review

Peer mentoring programs have academic and socioemotional outcomes on students and are frequently used as interventions to assist students in navigating college life [6], [7], [9], [12]. Those serving as peer mentors often orient new students to institutional and academic expectations, informing them of the importance of showing up to class and taking advantage of professor office hours. Additionally, peer mentors serve as an outlet for students to ask questions about institutional resources, allowing them to explore academic majors, career paths, and involvement opportunities. While existing research explores both academic and social outcomes of peer mentoring on student mentees, peer mentoring has been shown to improve students' grade point averages (GPAs) and persistence rates.

The topic of peer mentoring within the setting of a community college is a scarcely studied field, given that peer mentors are often continuing students in their third or fourth year of college and existing peer mentoring programs often seek to assist students in their first year of college [11], [13]. A multi-semester mixed-methods study utilizing surveys and focus groups explored the impact of the peer mentoring program on student mentees' academic and social success within STEM courses at a community college [7]. Findings suggest peer mentors positively impact students' academic skills by assisting students with assignments during class time, facilitating group study sessions, and teaching students new ways of studying. Moreover, this study demonstrated the importance of peer mentors' ability to increase student mentees' awareness of resources, including the institution's tutoring center, financial aid office, and food pantry.

A growing body of literature identifies the impact of peer mentoring on specific groups of students, such as racial minorities, students from low income families, and those who are first in their families to attend college and/or pursue a college degree [12]. For example, students who are first-generation often lack the awareness of institutional resources needed to assist with their academic performance and career exploration [11], [12]. Peer mentors provide such connections by encouraging students to visit campus offices. Additionally, several institutions often require first-year students to enroll in courses designed to increase their exposure and awareness of such

resources [12], [14], [15]. These courses often have a peer mentor embedded into the course and may require students to meet with their peer mentor. These courses are of importance to those first-generation students.

Similarly, research has been conducted exploring the impact of peer mentoring within STEM disciplines [7], [13]. This is a highly valued topic particularly in identifying ways to support students who are traditionally underrepresented in STEM fields. A study exploring first-year physics students with diverse backgrounds looked at the impact of peer mentors, continuing undergraduate and graduate students, on the new students' persistence from their first to second year [13]. Findings suggest peer mentors supported students' academics and social wellbeing. Examples of impactful academic practices included the ability for students to study with their peer mentors and discuss course content, whereas social benefits included the new students learning about institutional resources and discussing career opportunities with their mentors. Further analyses reflect strong GPAs for the students who had peer mentors as well as a sense-of-belonging for female and underrepresented student mentees.

Given the emphasis on first-year students, adult students over the age of 25 is a unique group that is often overlooked in peer mentoring literature. While some studies explore peer mentoring impacts on graduate students aged 25 and over, they are enrolled in master's or doctoral programs and have already successfully pursued a bachelor's degree [12]. Adult students often return to college after being removed for an extended period of time yet are motivated to pursue a degree program for career advancement or job security [3]. Community college data reflects approximately 24% of those enrolled as being 25 years or older [4]. A recent study explored the positive impact of peer mentors on autistic university students' effective communication skills, yet not all participants were over the age of 25 [16]. As a result, the present study contributes to the existing body of literature related to peer mentoring as it explores its impact on adult students within a community college setting.

Conceptual Framework

The Learning Partnerships Model [8], or LPM, is the framework in shaping this study. The LPM asserts that students' academic goals are met through intrapersonal and interpersonal growth; authority and expertise are shared in the mutual construction of knowledge among peers. As noted, the rationale for this framework lies in the dynamics of our study participants' goals to return to college as adults. Their intrapersonal goals for pursuing a degree intersect with their interpersonal reliance on peer mentors to assist them in achieving their academic and career-related goals within STEM disciplines.

Data Collection and Analyses

This present study utilizes qualitative data collected over a two-semester period. We designed and executed semi-structured interviews for student mentees, peer mentors, and faculty assigned to the peer mentored courses. The study was approved by the local Institutional Review Board (IRB) and participants were provided informed consent materials and subsequently agreed to participate. As noted, this study is part of a multi-semester, mixed-methods study. The impetus

for this study emerged from prior data suggesting the importance of peer mentors for adult students, specifically those with a) caregiving e.g., children, parents and other dependents, responsibilities and b) part-time and full-time jobs. Qualitative data are used for this study as to effectively answer our research questions and to understand the nuances and experiences of the participants which may not be obtained through close-ended, quantitative metrics [17].

Data were analyzed using thematic analysis [17], [18]. We reviewed the data and identified commonalities among responses, then grouped them into themes to present as findings. Our research questions directly aligned with our conceptual framework, so in analyzing data, we focused on finding themes that directly answered our research questions: 1) What components of the peer mentoring program help adult students achieve their intrapersonal goals? and 2) To what extent does the interpersonal relationship between a peer mentor and adult student contribute to the adult student's desire to persist in their STEM program?

Findings

The following findings are presented to answer each of the research questions - that is the components of the peer mentoring program that contribute to students' intrapersonal goals, and the components reflecting the interpersonal relationship between the peer mentor and student mentees. Findings directly reflect the thematic analyses of the qualitative data. To provide evidence and illustrate findings [17], [18], we offer several quotes taken from participants during the focus groups.

Motivation to Attend College

Students within our study had several intrapersonal goals reflecting their desire to pass their current classes, persist through their degree program, and develop skills or credentials necessary to advance their careers. These goals were evident through focus groups conducted with the student mentees, as one student reflected on why they were enrolled in a peer mentored Math course, *"I'm taking [Math] because I need a refresher for math. Because it's part of my degree, because I'm trying to do dental hygiene."* Similarly, another student expressed the impetus for taking a Math course, *"I'm taking college algebra... so right now it's a pre business [class]. But I wanna [sic] get my accounting degree. So I need this class in order to take accounting and statistics."* Together, these quotes identify students' immediate academic and long-term career goals. Components of the peer mentoring program that helped students achieve their intrapersonal goals included in-class academic support and skill development.

What emerged from the data regarding the interpersonal relationship between the peer mentor and mentee was students' conviction, or their belief that they can accomplish hard things. While student mentees did not report that peer mentors influenced their conviction, it was a similar sentiment held by many of the student mentees and perceived by many of the peer mentors.

You know, when you are working, and then you add that you are studying, and then you add that you are also a parent and sometimes you have to say, 'no, no, not right now. I've got a paper I gotta work on. I got an assignment I gotta work on, and it's due in X amount of time.'

This student went on to say that despite such challenges, they were able to maintain a 4.0 grade point average and sought out help from their peer mentor when needed. A peer mentor also noted the conviction and determination of one of the adult students enrolled in their Chemistry course, as noted in the following quote:

I have one in my class. It's the guy who I say is going to medical school. [He's] an older gentleman. And... he says he has his master's degree in data science. But he's interested in healthcare, so he's coming back to school to get all his prerequisites for medical school. And one thing I like about him is, like, he's really focused, and you can see... he's even somehow... even though I'm the peer mentor in the class, you can see he's also somehow helping the other students

This quote suggests the self-efficacy and conviction demonstrated by these adult student learners who, despite needing assistance from peer mentors themselves, also provide a benefit to their peers. Overall, skill development, coupled with adult student learners' conviction and determination, was an important component of the peer mentoring interpersonal relationship and was emphasized by faculty, peer mentors, and student mentees alike.

Peer Mentor Flexibility and Availability

Data revealed the several commitments, often daunting, that the adult students balanced. These included care-giving responsibilities, management of their households and maintaining part-time and full-time jobs. One student reported, *"I also have a full time job and two kids. It's a lot to juggle."* Similarly, a faculty teaching an online, asynchronous peer mentored course noted the following characteristic of many of the non-traditional, adult students: *"Students that are in those classes normally have a full time job, families, and other responsibilities."* This faculty member expressed that these students often sought help from their peer mentor after the normal 8 am - 5 pm business day. A student also reflected this sentiment during a focus group by noting their peer mentor provided study sessions on Saturday mornings.

As a result of their competing responsibilities, students enrolled in face-to-face courses valued in-class assistance offered by the peer mentor. A student enrolled in an Intermediate Algebra course expressed this sentiment:

Let's say, for example, the professor will give us an assignment to do, and sometimes she'll break us up into groups. So we have- we have to figure out the problems, of course, like in a group. So the mentor will, you know, he'll walk around and he'll ask us, you know, hey, what number are you guys doing? And then we'll tell him. And then he's like, Okay, if you guys need help, just let me know. So yeah, he engages with us, you know. He's just not sitting down, you know.

Similarly, students enrolled in online courses noted demands of full-time jobs, as one student reported:

The days that I work, it's 8:45 a.m. to 7:15pm, so I'm studying on my lunch, on my breaks. When I get off work at 7:15, I'm really jumping in and working on any

assignments, and I'm up until about 2... So, yeah, I've had to really make sure that I stay on top of what's due.

This student went on to say how helpful it is to connect with their mentor during non-traditional hours such as on the weekend or in the evenings. Further, this student is also a parent and noted caring for a teenage son who is autistic, suggesting multiple obligations outside of the classroom.

Perhaps the best way to summarize this finding is from a student reporting they seem to have better access to their peer mentor than the faculty: *"It's easier to go and ask [the peer mentor] a question. And you see them more often than my professor."* While this was not a sentiment shared by all student mentee participants, this finding reflects the importance of mentor availability - in and outside of the classroom - for adult student learners.

Skill Development

An additional component that helped adult students achieve their intrapersonal goals was the guidance provided by their peer mentors that allowed students to develop new skills. Given the majority of the participants had not been in a college classroom in several years, peer mentors and faculty observed their limitations pertaining to technology. As a result, many of the peer mentors spent time in teaching them how to use the Learning Management System (LMS), how to upload documents, and other technology-related tasks. Faculty were pleased with this assistance as it allowed students to access course materials and submit assignments, as exemplified by the following quote from the faculty focus group:

I noticed that at the beginning of the semester especially, [the peer mentor] assisted... he told me about maybe, like, 6 or 7 out of our 20 [students] needed assistance with basic [LMS] navigation, right? So that was great to have that resource because I don't think [the students] would have come to me.

As emphasized in the quote, faculty felt that students would not seek help from them in such circumstances and were more comfortable in approaching the peer mentors for assistance with technology. During a peer mentor focus group, one participant noted about an adult student: *"one of my older students just asked, like, here and there, just, like, how to upload certain documents,"* suggesting the importance of peer mentors in assisting students with what traditional-aged students may perceive as simple tasks.

In addition to skills related to technology, faculty, peer mentors, and student mentees reflected on skills related to studying and learning course content, as one faculty reported: *"I have identified the specific skills (e.g., breaking down complex ideas, creating study guides, offering encouragement) that were most valued by students."* This was a sentiment shared by other faculty who valued the peer mentors for contributing to students' skill development.

The peer mentored courses within the SEM department were perceived as challenging by several of the students and historical institutional data reflected a high rate of students failing or withdrawing from the course. As such, the peer mentors were tasked with assisting students with academics and received training on tutoring them. As a result, most of the student mentees' skill

development were directly related to the course content e.g., completing in-class assignments and studying for exams.

Peer mentors held one-on-one tutoring and group study sessions with faculty reporting increased attendance during exam times. One faculty shared the following sentiment regarding their peer mentor providing assistance to students on assignments:

The mentors are well informed of their assignments and always ready to learn. The mentors met with me once every week outside the classroom and in the classroom and always actively engaged in class and outside the classroom with the students.

Similarly, a faculty teaching a Math course noted using active learning during lecture. This faculty member went on to explain the challenges that students may experience during active learning but how the peer mentor assisted in that process, as exemplified by the following quote:

So my classroom is a flipped classroom. We do active learning in class, in the in-person and on the Zoom meeting. I feel that the mentor is good. We connect to make sure that we're not just focused on the correct answer, we're focused on the process. Like, the mentor and I have had some communication about how we assist the students during the active learning... the first mentor I worked with and this mentor have picked up on the, you know, like, cues we use, and it's been beautiful to watch them help students figure it out for themselves, rather than just be focused on the correct answers.

During focus groups with student mentors, they also emphasized assisting students with learning content, completing assignments, and preparing for tests- all which reflect assisting students with skill development. One peer mentor noted the following assistance offered to students at exam time: *"near the exams, because usually we do either a study session or provide them study guides or something."* Finally, another student mentee expressed the willingness of the peer mentor for assistance with other courses: *"He would offer tutoring for other classes as well, but I only take maths so far. But he'd offer, psychology, chemistry, higher level maths."*

Discussion and Conclusion

This study sought to address the following research questions:

- What components of the peer mentoring program help adult students achieve their intrapersonal goals?
- To what extent does the interpersonal relationship between a peer mentor and adult student contribute to the adult student's desire to persist in their STEM program?

Collecting qualitative data from faculty, student mentees, and peer mentors allowed us to answer these questions as focus groups provided participants with an outlet to describe their lived experiences and perceptions related to the peer mentoring program. The components of the peer mentoring program that allowed adult students to achieve their goals were directly related to academic support - that is: peer mentor flexibility and availability and the development of skills -

technical, study, time management, and others - in which student mentees felt supported to pass their SEM courses.

The Learning Partnerships Model [8] guided this study and asserts that students' academic goals are met through intrapersonal and interpersonal growth; authority and expertise are shared in the mutual construction of knowledge among peers. Findings suggest that peer mentors provided adult student learners with guidance course content, navigating campus resources, and teaching them technical skills, among others. Simultaneously, however, peer mentors were inspired by the conviction and determination of adult student learners, evidenced by peer mentors' observations of adult student learners supporting their peers.

The adult student learners in our study admitted to their reliance on peer mentors to assist them in achieving their academic and career-related goals within STEM disciplines. Similarly, adult student learners had awareness of their limitations e.g., the demands of working full-time, parenting of children - babies through teenagers, providing support to spouses, and managing household responsibilities. Despite these challenges, their focus on persisting through their degree program to obtain careers in medicine, accounting, and other disciplines, was unwavering. Adult student learners were able to draw upon peer mentors at their convenience to assist them in balancing external demands so to be successful in the classroom.

Our study and its findings provide implications for other postsecondary institutions, specifically community colleges. Across the United States, there are over 1,000 community colleges enrolling 10.9 million students with approximately 24% of those enrolled being adult learners [2]. As faculty and administrators of community colleges anticipate this percentage to rise, embedding peer mentors into synchronous and asynchronous classes can be fruitful in assisting students with their intrapersonal goals. Further, as our study suggests, adult student learners value real-time assistance from peer mentors especially as it pertains to learning content related to Science, Technology, Engineering, and Math. While some institutions refer students to Artificial Intelligence or various platforms, adult student learners greatly benefit from a human being- that of a peer mentor, no matter what their age.

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