IMPROVING EQUITY THROUGH COREQUISITE SUPPORT

RECOMMENDED CITATION

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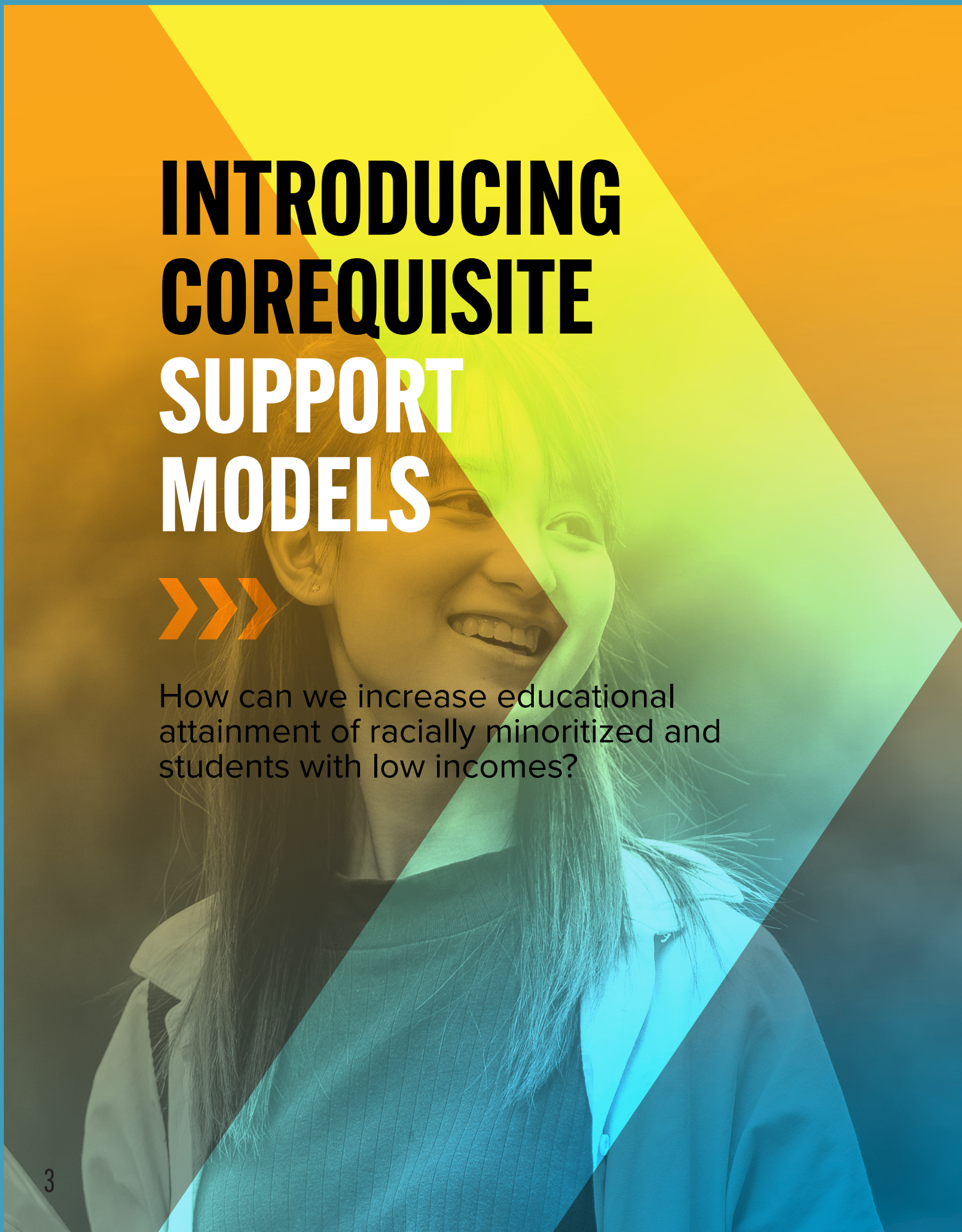
STRONG START TO FINISH

INTRODUCING COREQUISITE SUPPORT MODELS

How can we increase educational attainment of racially minoritized and students with low incomes?



Community colleges are a primary access point to higher education for many students, particularly Black, Latinx[1], Asian American, Indigenous students, adult learners, and students with low incomes. More than two-thirds of community college students nationally are labeled academically underprepared in math and/or English, and racially minoritized[2] students, including Black and Latinx students, are often overrepresented in non-college credit developmental education courses.[3] Numerous studies have shown that students enrolled in traditional developmental education courses have lower persistence and degree completion rates.[4]

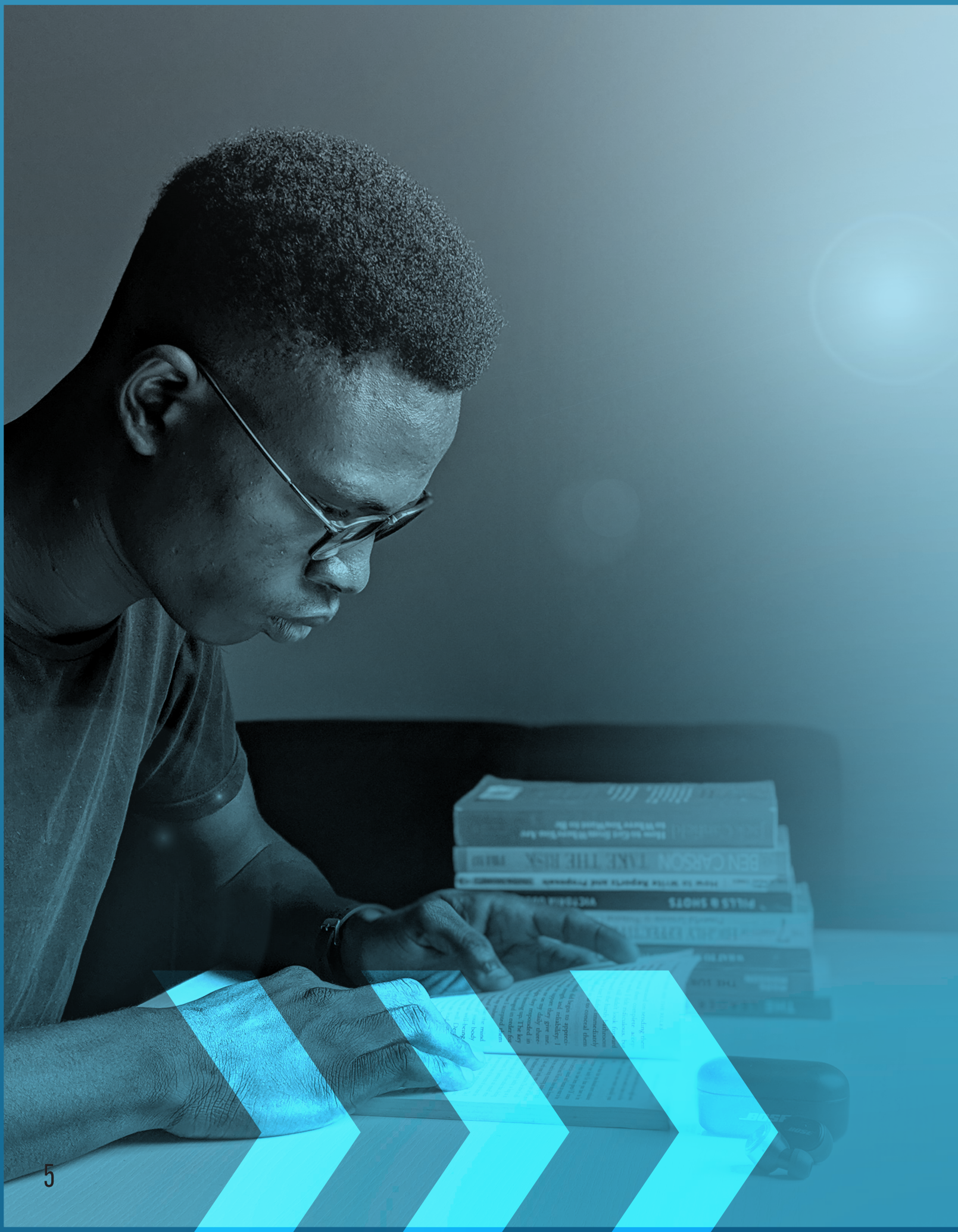
The corequisite support model is a reform effort that has been implemented in states and institutions across the U.S. to replace traditional developmental education courses in hopes to improve student success. This model has seen promising results with more students transitioning into college-level coursework and graduating after completing corequisite courses.[5] As with any promising reform, inequities can also be found when taking a closer look at the data. Nationally, nearly 30% of students in corequisite courses still do not pass on their first attempt and racially minoritized students are again overrepresented among this group.[6] These numbers highlight the need to further explore features within the corequisite model that can be improved and optimized to truly address the needs of racially minoritized students working towards a college degree.

This report highlights key findings from a multi-year, mixed-methods research study of the corequisite model at Houston Community College (HCC), one of the nation's largest and most racially/ethnically diverse community college systems. **Our goal was to better understand the effect of corequisite coursework – the benefits and potential areas for improvement – on the academic success of a student body that is predominately Black and Latinx.**

Our study focused on two areas. First, we examined the corequisite course design features and instructional practices that are associated with student success in developmental and college-level math and English courses. Second, recognizing not all students will successfully complete corequisite courses on their first attempt, we examined the subsequent pathways and institutional support services that could help these students get back on track towards their educational goals. Collectively, our findings help identify strategies at both the classroom and institutional level that maximize the effectiveness of corequisite models with careful attention to equity issues and increasing educational attainment among racially minoritized and students with low incomes. As we discuss equity in this report, we refer to the definition provided by the Center of Urban Education at the University of Southern California, which views equity as "achieving parity in student educational outcomes, regardless of race and ethnicity. It moves beyond issues of access and places success outcomes for students of color at center focus."[7] This also requires institutions to review and change policies and practices that reduce barriers for minoritized students.

1 We use the term Latinx as a gender-neutral term for individuals who identify as having ethnic and historical roots to Spanish colonizers and indigenous groups of present-day Mexico, Central America, South America, and parts of the Caribbean (Salinas & Lozano, 2017). HCC reports data using the term Hispanic, but in this report it is reported as Latinx. We use the term Black to include both Black Americans and Black international students. However, in statistical models, predictors are added to model the success of international students versus students with permanent residency and/or citizenship.

2 We use the term minoritized to denote the objective outcomes resulting from the historical and contemporary practices of racial-ethnic exclusion along with the continued social, political, and economic existence of marginality and discrimination (Chase et al., 2014). The focus is not on numerical representation rather access to societal privileges within the U.S.



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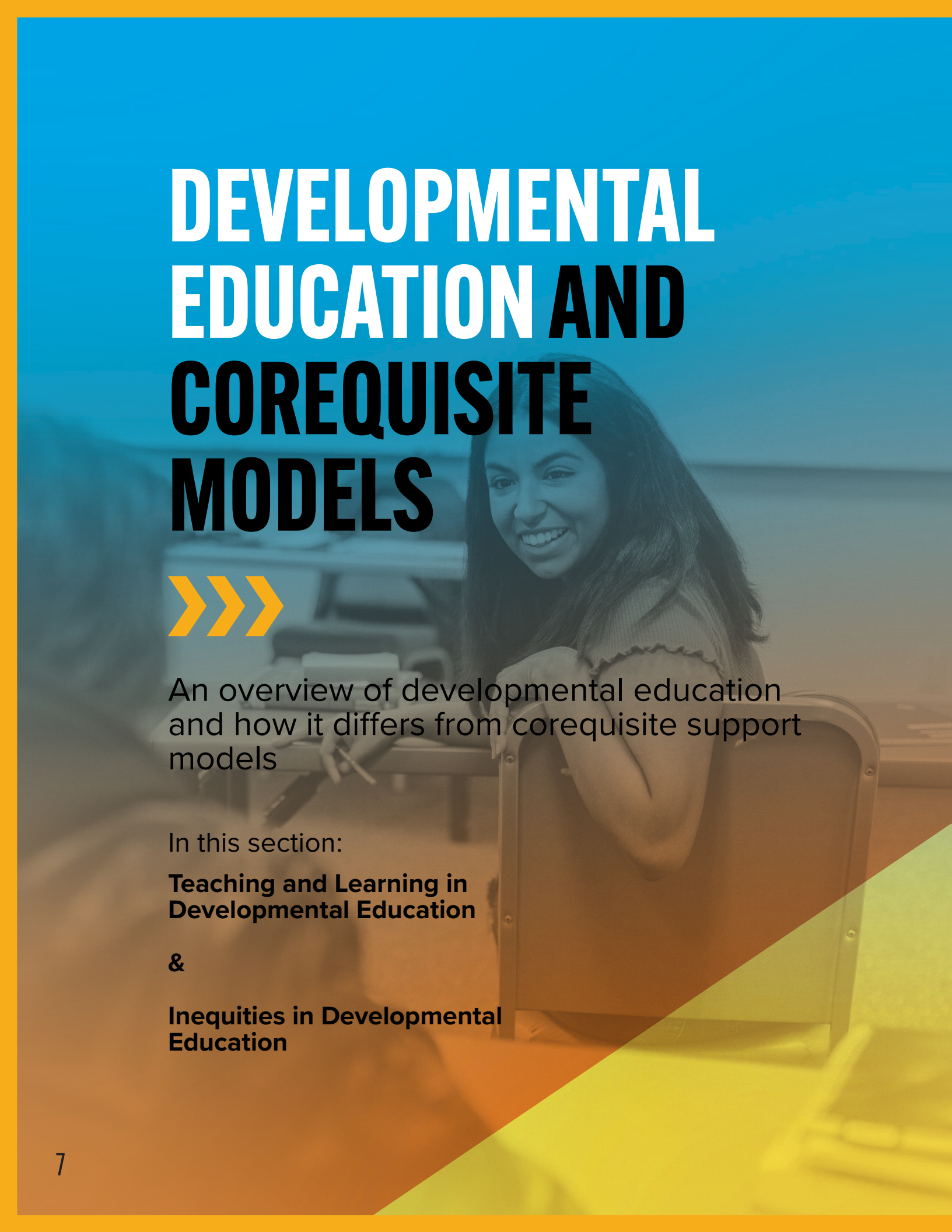

An overview of developmental education and how it differs from corequisite support models

In this section:

Teaching and Learning in Developmental Education

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Inequities in Developmental Education

Developmental education was originally designed to prepare students who were considered "not college-ready" for college-level coursework. However, many students were spending too much time and money enrolled in these courses that did not go towards earning a college certificate or degree.[8] Indeed, students would frequently stop-out before even reaching their first college-level credit-bearing course that serves as the gateway requirement for a degree. Because of low course completion rates, statewide efforts and national organizations like Complete College America (CCA) began the push for developmental education reform. Further, equity concerns have plagued developmental education: students who are assigned to developmental education are more likely to be young, Black, Latinx, part-time, and/or female, and are more likely to be enrolled in large colleges serving high proportions of working, racially minoritized, and economically disadvantaged students.[9]

Corequisite courses have become a popular model to replace traditional developmental education courses. In this format, students are concurrently enrolled in a college-level course and a developmental education support course. Students are then able to start their college career by taking college-level coursework while also receiving structured academic support.[10] The goal is for students to begin college-level coursework immediately, with appropriate supports, and accelerate their eventual completion or transfer. Ultimately, the corequisite model aims to shift the burden from the student's need to be "college-ready" to higher education institutions to address the academic needs of its students.

DEVELOPMENTAL EDUCATION AND COREQUISITE MODELS

Teaching and Learning in Developmental Education

Research on developmental education has expanded in recent years to study large-scale reform efforts and different delivery models.[11] There is an awareness of teaching strategies and classroom-level reform efforts that are taking place;[12] however the impact these modifications have on student success has yet to be examined closely.[13]

Scholars have pushed for more student-centered teaching approaches to create more engaging and supportive learning environments in developmental education courses.[14] Research has also shown promising student success outcomes when faculty use innovative teaching approaches in math developmental education,[15] particularly strategies that help students overcome math fears and anxiety[16] and incorporate language support in teaching math.[17]

Additionally, scholars have highlighted the importance of helping developmental education students improve other college skills (e.g., study skills, note-taking, time management) beyond what is found in the course content.[18] For example, programs like the CUNY Start program have found more holistic services with specially trained faculty and advisors have increased the number of students enrolling in future college-level courses.[19]

Inequities in Developmental Education

Research has also highlighted the inequities that remain in developmental education, and the experiences of racially minoritized students. Scholars have identified factors that contribute to inequities such as "stereotype threat."[20] Racially-minoritized students experience stereotype threat within invalidating classroom environments where students begin to develop self-doubt and increased anxiety.[21] These experiences undermine student success and disproportionately impact minoritized students. Research has also brought attention to the racism and implicit bias racially-minoritized, particularly Black students, must manage in the classroom from faculty and other students.[22]

To address these inequities, organizations have recommended more holistic professional development and training to enhance faculty teaching.[23] This requires faculty and advisors to reshape their ways of thinking about students in developmental education from a deficit to a non-deficit perspective—rather than blaming students, believing in students' abilities and meeting students where they are academically. Scholars also offer recommendations such as incorporating a culturally relevant curriculum that validates students' lived experiences to help build students' confidence.[24] Ultimately, our study helps bring attention to classroom-level practices that can address inequities and enhance student success in the corequisite model.

> **"the most critical aspect of developmental education reforms is the extent to which they reshape classroom-level instructional practices *in ways that improve students' learning.*[25]"**

BACKGROUND AND STUDY CONTEXT

A closer look at the Houston Community College corequisite model

In this section:

2019-20 HCC Student Enrollment and Demographics,

Developmental Education Policy in Texas,

HCC English and Math Corequisite Pathways,

The Corequisite Learning Environment

&

Research Design and Context

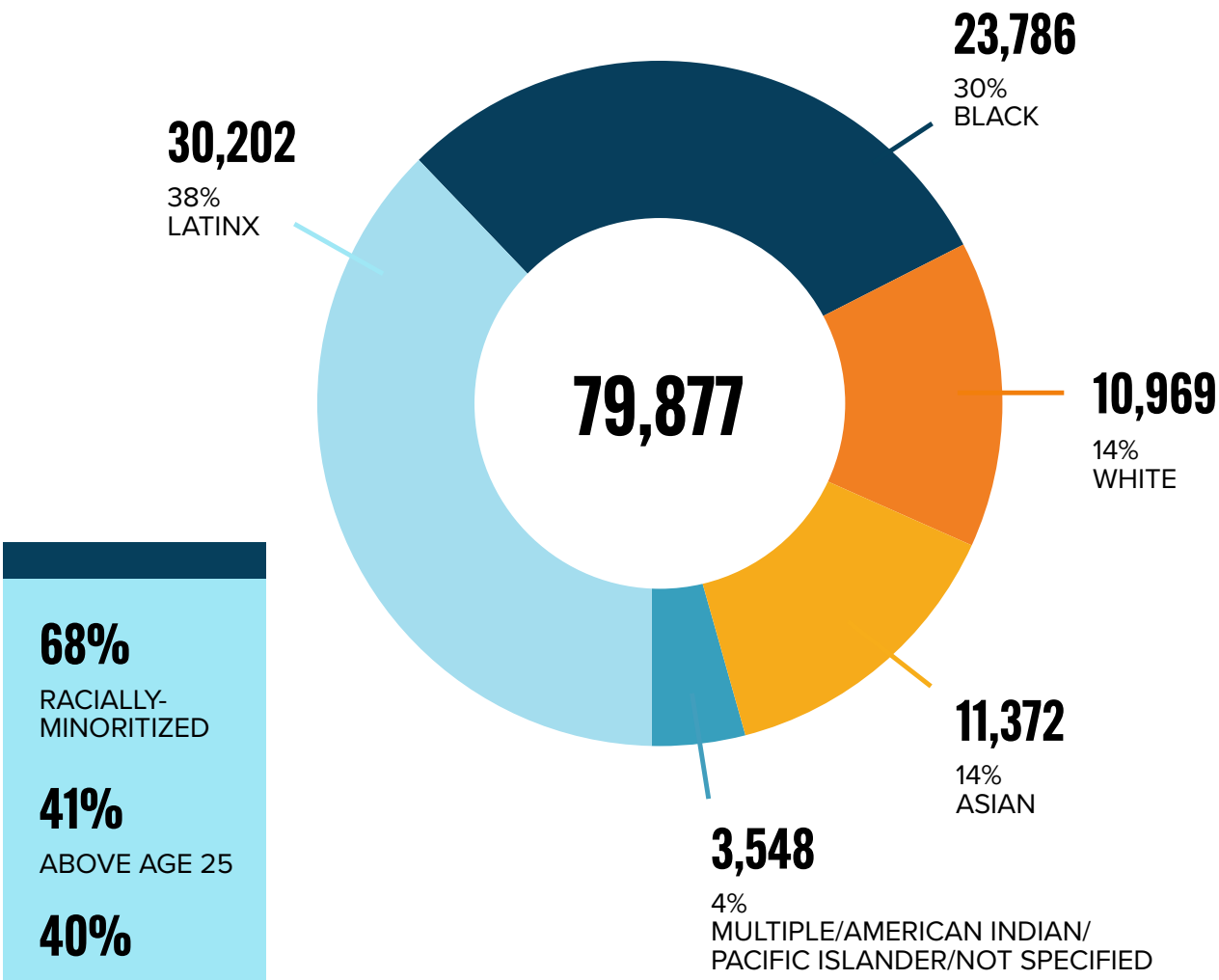
Our study takes a closer look at the corequisite model at Houston Community College—one of the nation's most racially/ethnically diverse community college systems located in one of the most diverse urban areas in the U.S.

2019-20 HCC Student Enrollment and Demographics

HCC has approximately 80,000 students enrolling annually. As a system, it spans approximately 630 square miles—half the size of Rhode Island—and serves seven school districts. HCC offers a wide-range of academic programs including transfer-oriented and workforce programs. In 2019-2020, the HCC student body was: 68% racially minoritized (see Figure 1, below), 41% above age 25, and 40% Pell Grant recipients. Additionally, approximately 38% of new HCC students were referred to developmental education in Fall 2019.[26]

FIGURE 1

2019-20 HCC ENROLLMENT BY ETHNICITY



DEVELOPMENTAL EDUCATION POLICY IN TEXAS

Texas House Bill 2223

In 2017, Texas passed legislation (HB 2223) mandating higher education institutions across the state use the corequisite model to deliver developmental education courses to students deemed academically underprepared.[27] The purpose of HB 2223 was to improve the persistence and completion rates of students enrolled in traditional developmental education courses. HB 2223 also gave institutions until the fall of 2020 to have at least 75% of their developmental education enrollment in corequisite courses, which required institutions to prioritize this new state mandate.[28] However, institutions were given the autonomy to determine how to structure and implement corequisite courses as long as the learning outcomes established by the state were met. HB 2223 also required institutions develop a "Plan for Academic Success" with students who did not pass the corequisite course. This plan should be based on course materials (e.g., assignments) and student behaviors (e.g., poor attendance) and should address any issues that prevented them from passing the course. This requirement prevents institutions from simply having students retake the course, and encourages them to be more intentional about providing holistic support services to help students who did not pass.

What does it require?

Texas HB 2223 mandates that higher education institutions across Texas use the corequisite model to deliver developmental education courses to students deemed academically underprepared.

What's the goal?

The goal is to improve the persistence and completion rates of students enrolled in developmental education.

HCC Corequisite Model

Beginning in fall of 2018, HCC students considered academically underprepared in Math and/or English were advised to enroll in corequisite courses. Students were informed about the benefits of corequisite courses, such as receiving "just-in-time" academic support while taking the college-level course, in addition to saving time and money. The corequisite courses are designed as support courses for the paired, college-level courses and each corequisite/college-level pairing shares the same student learning objectives. Students who pass the corequisite courses are then designated as "college-ready" in the state of Texas and can enroll in all courses requiring college-level reading, writing, or math. If students additionally pass the college-level course, they have completed a gateway requirement for their degree.

HCC corequisite courses are modeled from the Accelerated Learning Program (ALP) developed at Baltimore City Community College, which is one of the most popular and widely studied corequisite course models.[29] However, it is important to note the HCC English Department used the ALP model from the beginning to develop their corequisite courses, while the Math Department modified their corequisite courses in their second year to incorporate ALP features. In the ALP model, the course is comprised of a mix of students enrolled in only the college-level course and students also enrolled in a supplementary support course. The support course includes a smaller cohort of students from the same college-level course who receive additional support directly before or after the gateway course. Though most ALP models use the same instructor for both sections, due to its size, HCC also included sections taught with co-instructors.

- **Modeled after the Accelerated Learning Program (ALP) developed at Baltimore City Community College**
- **Available to students deemed underprepared in Math and English**
- **Designed to support courses for the paired, college-level courses and share student learning objectives**
- **Can save students time and money and accelerate their academic momentum**

HCC ENGLISH AND MATH COREQUISITE PATHWAYS

English Pathways

HCC utilizes two primary pathways for students needing support for college-level courses in English. The first pathway, the English for Speakers of Other Languages (ESOL) pathway, tends to serve students with relatively strong reading and writing skills in their native language but who are learning English as a second language. Integrated reading and writing (INRW) tends to serve students who were educated in English but need to strengthen their reading and writing skills. Both ESOL and INRW courses are paired primarily with freshman composition (ENGL 1301).

There are four English corequisite pathways (see Figure 2, p. 16) that include college-level courses in English Composition (ENGL 1301), Introduction to Humanities (HUMA 1301), and U.S. History (HIST 1301). The support course sections paired with the college-level course are Integrated Reading or Writing (INRW 0300) and English for Speakers of Other Languages (ESOL 0370).

Math Pathways

There are also four Math corequisite pathways (see Figure 3, p. 16) and each is paired with its own support course: College Algebra (MATH 1314/0314), Business Math (MATH 1324/0324), Contemporary Math (MATH 1342/0342), and Elementary Statistical Methods (MATH 1342/0342). These pathways align with a student's area of study, that informs which track the student will take.

ENGLISH
PATHWAYS

ENGL 1301
INRW 0300
English Composition and Integrated Reading/Writing

HIST 1301
INRW 0301
U.S. History and Integrated Reading/Writing

ENGL 1301
ESOL 0370
English Composition and English as a Second Language

HUMA 1301
INRW 0302
Introduction to Humanities and Integrated Reading/Writing

HCC COREQUISITE MATH AND ENGLISH SECTIONS

FIGURE 2

College-level Sections

Corequisite Courses

MATH
PATHWAYS

MATH 1314
MATH 0314
College Algebra

MATH 1324
MATH 0324
Business Math

MATH 1332
MATH 0332
Contemporary Math

MATH 1342
MATH 0342
Elementary Statistical Methods

FIGURE 3

HCC Corequisite Study

The goal of our research project was to improve the academic performance, persistence, and graduation rates of HCC students required to take corequisite coursework in Math and/or English. The project was executed via a long-standing research to practice partnership between the University of Houston (UH) and HCC.

The first objective of our study was to identify the structural characteristics of a corequisite course that are related to student success. Our guiding research question was:

Research Question 1

> **To what extent do the structural characteristics of a corequisite course relate to success in corequisite coursework for first-year students across the HCC System? Does the relative importance of these structural characteristics differ by students' race, age, and income status?**

The second objective of our study involved identifying trajectories to success and degree completion when students do not pass (fail, withdraw) corequisite courses on their first attempt. Our guiding research question was:

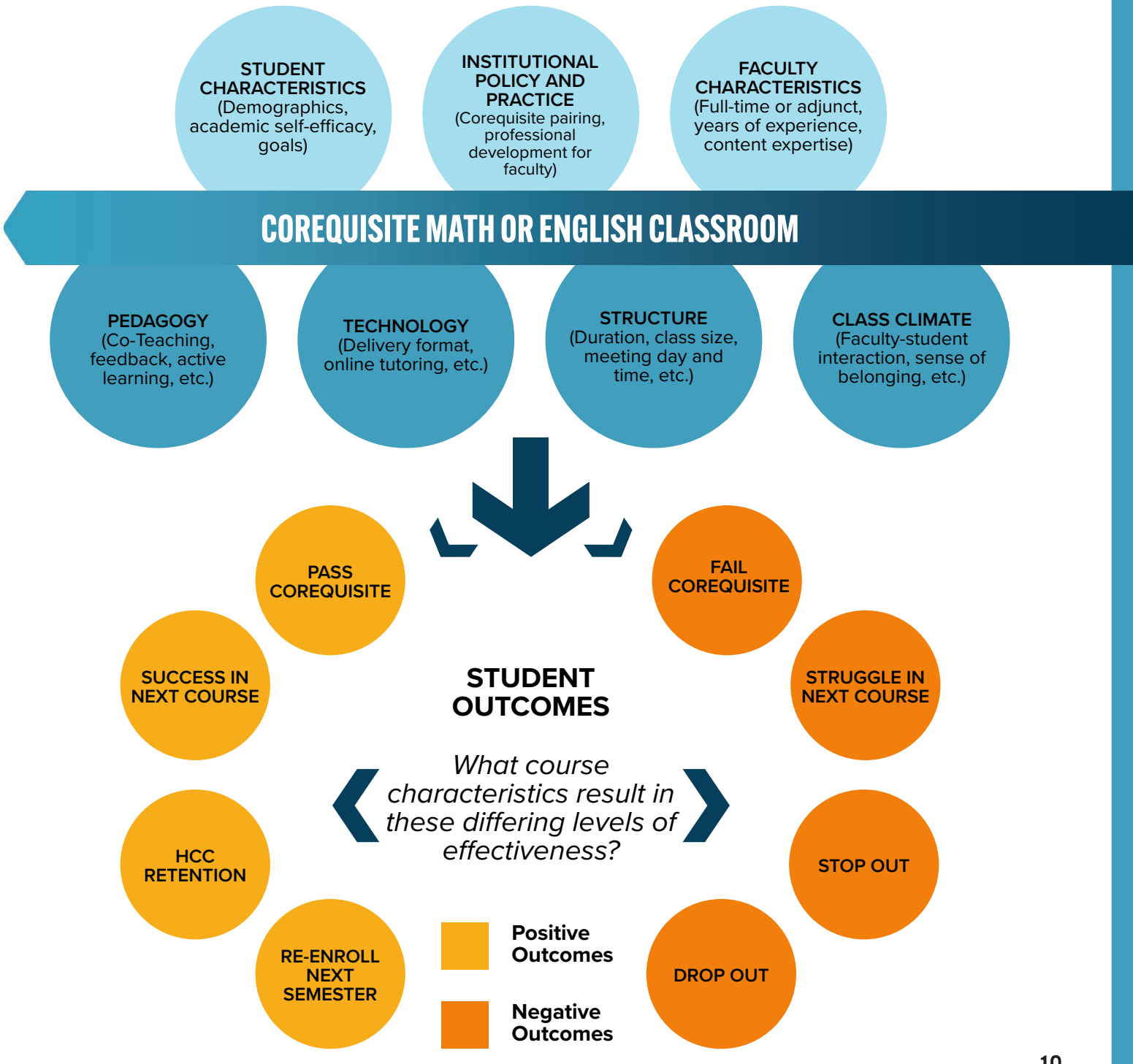
Research Question 2

> **How do HCC students who fail or withdraw from corequisite sequences differ from students who pass corequisites? What factors predict the subsequent enrollment behaviors (e.g., immediate re-enrollment, change major, transfer, stop-out) of students who do not initially pass corequisites?**

Figure 4, (p. 18) provides a visual representation of the key constructs and outcomes of interest in our study.

THE COREQUISITE LEARNING ENVIRONMENT

FIGURE 4



RESEARCH DESIGN AND CONTEXT

Answering Our Research Questions

To answer our research questions and learn more about the HCC corequisite model, we analyzed student data extracted for the 2019-2020 and 2020-2021 academic years from HCC's administrative files containing student information and course characteristics (see Appendix III for Student Sample Characteristics). To this, we added information about transfer taken from the National Student Clearinghouse.

We also conducted interviews with corequisite faculty and students, as well as student success deans who have direct oversight of the academic advising and support services provided to corequisite students. Table 1 (p. 20) breaks down our interview participant numbers and Appendix IV provides more descriptive characteristics of all our participants. Table 2 (p. 20) further highlights the diversity of the corequisite students we interviewed, which included a majority of racially minoritized students.

Along with the rest of higher education and the world, HCC experienced profound disruptions as a result of the COVID-19 pandemic. The pandemic began in spring 2020 during the first academic year of our study. Prior to the pandemic, all corequisite courses were taught using an in-person format. At the start of the pandemic, in March 2020, all corequisites were transitioned to a format referred to as "Online on a Schedule" in which students meet at a designated time in a virtual platform. Pages 21 and 22 further highlight the impact of the COVID-19 pandemic.

TABLE 1 › STUDY INTERVIEW PARTICIPANTS

COREQUISITE STUDENTS	Math	19
	English	23
COREQUISITE FACULTY	Math	26
	English	25
STUDENT SUCCESS DEANS		3

TABLE 2 › COREQUISITE STUDENT INTERVIEWS: DEMOGRAPHIC CHARACTERISTICS

N = 42

COREQUISITE COURSE	Math	19	GENDER IDENTITY	Woman	32
	English	23		Man	9
				No answer	1
RACE/ ETHNICITY	White	2	AGE RANGE	18-19	9
	Black	23		20-24	7
	Asian	4		25-30	9
	Latino/Hispanic	10		31-40	9
	Two or more	3		41-50	3
				51-60	4
				60+	1

COVID-19 PANDEMIC

Challenges and Opportunities

The COVID-19 pandemic created challenges in our everyday lives that no one could have anticipated. Our study was developed before the COVID-19 pandemic and data collection began in fall 2020 as higher education institutions were navigating their first full semester with remote learning. We made modifications to our study such as conducting interviews and focus groups at multiple HCC campuses virtually rather than in-person.

We also recognized that HCC students were now enrolled in corequisite courses for the first time in an online format. Prior to the pandemic, all corequisite courses were taught in-person, but shifted after March 2020 to a format referred to as "Online on a Schedule" in which students meet at a designated time in a virtual platform (i.e., synchronous classes).

We cannot ignore that the COVID-19 pandemic influenced student learning and faculty teaching practices across the country and within HCC's corequisite model. Our findings should also be understood within this unexpected context. Below, we highlight the voices of HCC students and faculty to demonstrate some of the challenges, but also opportunities that resulted from the COVID-19 pandemic.

COVID-19 Pandemic: Student and Faculty Voices

> During Thanksgiving break, I lost my grandpa to COVID-19, so we had to fly out. That's when I really started not to – I guess you can say, I started feeling a bit overwhelmed and depressed because of my grandpa, **so I started not really going to classes anymore and things kind of went south."**
>
> – English Student

> Teaching online even though we feel more isolated, **it gives us more reasons to kind of check in,** "I didn't see you in class last week. What's going on?" That will follow me when we go back to face-to-face because I didn't do it as much [when] face-to-face in terms of, "Look, are you okay?"
>
> – Math Faculty

> It was very frustrating because I got kicked out [of my apartment] during the pandemic, and **that hurt having no job, being homeless, having kids—it was stressful."**
>
> – Math Student

> I have more students come visit during my office hour than before...So, right now, in the virtual environment, **it's a lot easier for students to schedule a private meeting with me."**
>
> – English Faculty

> It was challenging because whenever the city shutdown and all the schools closed, my kids' schools closed and everyone was virtual. At that time, I just had one laptop and my son had his laptop for his school, but my daughter is in elementary [and] I didn't have one for her. **We were sharing a computer, so that was the challenge."**
>
> – Math Student

> The **online environment** has been good in many ways because as an older teacher, it **has forced me to learn more technologies** and many that I will be carrying forward when we get back to face-to-face. One of those things is my Canvas shell. I never really utilized my Canvas shell as a resource, but now I'm finding that it is a great resource to refer students to.
>
> – Math Faculty

KEY FINDINGS

In this section:

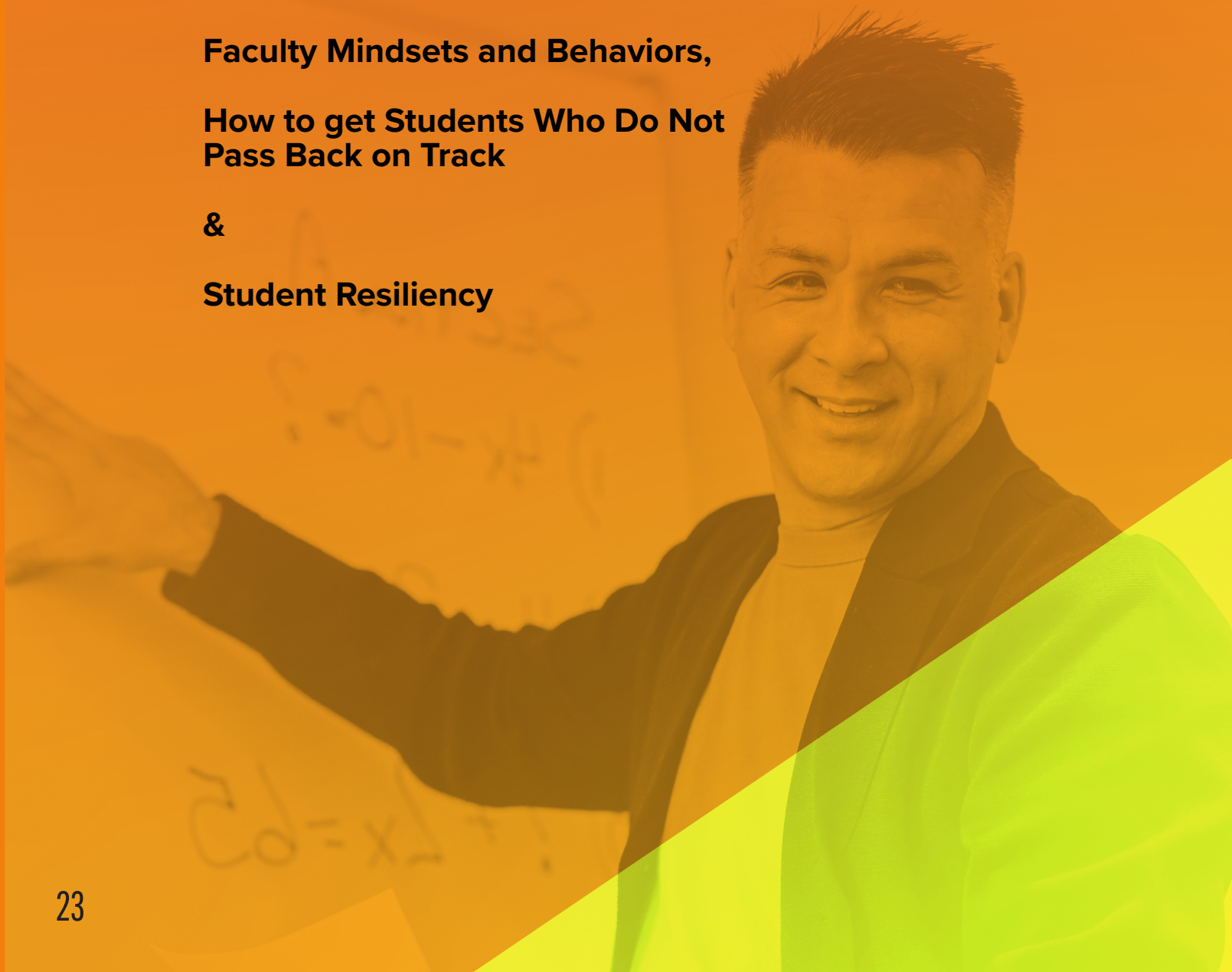
Faculty Pedagogy

Faculty Mindsets and Behaviors,

How to get Students Who Do Not Pass Back on Track

&

Student Resiliency



What did we learn?

Our findings are organized by first highlighting the pre-course factors (e.g., student and faculty characteristics), followed by course design features (e.g., pedagogy and class climate) that influence student outcomes (see Figure 4, p. 17). More information on our quantitative and qualitative methods can be found in Appendix II. In practice, the nested and interacting nature of these factors influence whether a student will successfully pass corequisite courses. We close this section by focusing on the students who did not pass the course and identify how to help them get back on track, while also recognizing students' resiliency.

Which students enroll in the Corequisite courses?

English Corequisites: International students were more likely to be placed into ESOL than INRW. INRW students were more likely to be Black whereas ESOL students were more likely to be Asian. After accounting for International Status, corequisite students were more likely to receive Pell and attend full-time. Students in the INRW sequence were less likely to be STEM majors. Proportions of Latinx students in INRW and stand-alone college-level English were similar.

Math Corequisites: Students in the mathematics corequisite were more likely to be female, Black or Latinx, more likely to receive Pell, and less likely to be international students than those placed in College Mathematics. They were also less likely to be STEM majors.

This underscores previous findings that placement in corequisite sequence is, in itself, an equity issue. Students were placed in corequisites, as opposed to college-level coursework, based on test scores and/or multiple measures, which included consideration of high school coursework. Placement in corequisite coursework is influenced by attendance in under-resourced p-16 schools and in access to coursework in middle school and high school. Moreover, under-representation of corequisite students in STEM fields contributes to opportunity gaps in STEM careers.

Table 3, p. 25 provides a visual representation of which students enroll in corequisite courses.

STUDENT AND FACULTY CHARACTERISTICS

- More likely
- Less likely
- No relationship

TABLE 3 WHO ENROLLS IN COREQUISITE COURSES?

Enroll in ESOL corequisite English

- More likely to be international student (on an F1 Visa)
- More likely to be Asian

Enroll in either corequisite English

- More likely to be Pell recipients
- More likely to be Enrolled full-time

Enroll in INRW corequisite English

- More likely to be Black or Latinx
- Less likely to be STEM majors

Enroll in the Math corequisite

- More likely to be Female
- More likely to be Black or Latinx
- More likely to be Pell recipients
- Less likely to be international student
- Less likely to be STEM major

Which student characteristics predict success in the Corequisite course?

ESOL Sequence: Pass rates in the ESOL sequence were very high. There were no differences in success rates in the corequisite between demographic groups, except for a trend toward a disadvantage for students taking the corequisite sequence in their first semester at HCC. This trend merits further investigation. But one possible explanation is that in general, students who were not in their first semester in HCC had taken prior ESOL coursework. This prior experience may have served both to strengthen language skills and acclimate international students to the educational systems in the United States.

INRW Sequence: Students who were female, Latinx, were full-time students, began the semester with a college-level GPA over 2.5, lived in zip codes with higher median incomes, and were majoring in the health sciences were more likely to pass the corequisite course. Once median zip code income was accounted for, Pell status did not predict success. Additionally, students who were also referred to developmental mathematics were less likely to pass the corequisite, corroborating previous literature suggesting that students deemed not college-ready in multiple subject areas are more likely to struggle.

Math Corequisites: Generally, female students and students who began the semester with a higher GPA were more likely to pass the corequisite across corequisite sequences. Black students were less likely to pass the corequisite. In the College Algebra sequence (1314/0314), international students outperformed students who did not possess F-1 Visas, and Latinx students out-performed white students.

This suggests that students who had not been successful in prior coursework remained at-risk of failure in the corequisite model and additional supports would be needed. It likely reflects access to technology during the pandemic and also highlights the need to expand equity-minded pedagogical practices.

For the Business Math sequence (1324/0324) in particular, students were more successful when their test scores indicated that they were closer to college-level, when they did not take math in their first term, and when they were in the Business area of study. Social and Behavioral Sciences students who enrolled in the Business Math sequence were less likely to succeed. With the exception of the Business sequence, match or mismatch with college major did not predict success.

Interestingly, part-time vs. full-time enrollment did not predict success in the math corequisite, there was no effect of Pell grant award recipients and Latinx students largely outperformed white students.

Similar effects were present when we examined which students passed both the corequisite and college level math course. However, using this measure, alignment of college major predicted success in all three non-algebra sequences. Students performed similarly in the College Algebra (1314/0314) sequences across areas of study.

Table 4, p. 27 provides a visual representation of student success in corequisite courses, labeled by characteristics.

TABLE 4 › WHO PASSES COREQUISITES ON THE FIRST ATTEMPT?

Succeed in INRW Corequisite English

- More likely for Female students
- More likely for Latinx
- More likely for those who began the semester with a college-level GPA over 2.5
- More likely for Full-time students
- More likely for those who live in zip codes with higher median incomes
- More likely for those majoring in health sciences
- Less likely for those also referred to developmental math

Succeed in ESOL Corequisite English

- Trend towards less likely for students in their first semester

Succeed in College Algebra Corequisite

- More likely for international students
- More likely for Latinx students compared with white students

Succeed in Non-Algebra Corequisite

- More likely for international students
- More likely for Latinx students compared with white students

Succeed in Math Corequisite

- More likely for older students
- No relationship for part-time or full-time students
- No relationship for Pell

Per institutional practices at HCC, a successful corequisite course outcome was defined as having earned a final course grade of A, B, or C; conversely, a final grade of D, F, W (withdrew), IP (In Progress), or I (incomplete) represented a non-passing mark. During Spring 2020, due to the pandemic, students could elect to receive a P (Pass) in lieu of an A, B, or C; these were also considered passing marks.

STUDENT AND FACULTY CHARACTERISTICS

Do characteristics of the course and instructor predict student success in the corequisite?

We examined the following course and instructor characteristics:

Course Schedule: Number of days per week and placement of the corequisite
Number of Instructors: One instructor versus two instructors
Instructor Characteristics: Full-time versus part-time
Modality: Online versus in-person (confounded with the onset of COVID-19 pandemic)

English Corequisites: Student outcomes did not differ across the course scheduling variables, and surprisingly, there was no difference in outcomes by modality. Students taught by part-time faculty were more likely to pass the corequisite than students taught by full-time faculty. It is unclear why students taught by part-time faculty were more likely to pass, but questions of rigor should be investigated since this did not extend to the college-level course.

We examined whether students were more successful when both the corequisite and college level were taught be the same faculty member. In prior focus groups and interviews, some faculty had indicated that, when the courses were taught independently, it was difficult to ensure the corequisite and college courses were 'in sync.' In other cases, however, faculty indicated that they felt that as a two-person team, they could support students better than they could individually. When students were taught by full-time faculty, they were more likely to pass the course when a single faculty member taught both the college level and the corequisite. This was not the case when the faculty member was part-time.

Math Corequisites: Results were similar for mathematics. Again, success rates in the corequisite course were higher when students were taught by part-time faculty. In math, students who passed corequisites taught by full-time faculty were more likely to pass the college-level course. Again, although the reason for the effect is unclear, questions of rigor should be investigated.

Analyzing students' grades, we found no advantage in passing the corequisite for one vs. two instructors, but students were more likely to pass the college level if the courses were taught by the same faculty member. It is likely that the team dynamics of the paired instructors is critical.

As previously discussed, the modality was confounded with the pandemic. When students were taught by part time faculty, success rates were higher when students were taught in-person than online. When students were taught by full time faculty, modality of instruction was not related to student success.

Student Perspectives on Corequisite Structure

Student and faculty interviews also revealed some students struggled because at the time of registration they were unclear how the corequisite course pairing 'worked'. For example, some students were confused about how the two courses were connected and designed to directly support each other. Several students did not realize the corequisite was worth 6 total credit hours (as opposed to 3), which required additional classroom/study time and financial costs than originally anticipated.

FACULTY PEDAGOGY

Faculty Pedagogy: Learning from Highly Effective Faculty

While our quantitative analysis focused on course design features, our qualitative analysis considered the classroom experiences that students need to be successful. A faculty member's pedagogy and mindset about their students proved more important than the nature of their appointment (full-time or adjunct), course structure (one or two instructors), or modality (in-person or online).

The most effective faculty members often had pass rates across their corequisite and college-level sections that were 15% to 20% higher than the average pass rates at HCC for English and math corequisite courses (see Table 5, p. 32). These highly effective faculty recognized that most students are in the corequisite courses precisely because traditional teaching methods have not worked for them. Below, on pages 29 and 30, we share strategies highly effective faculty modeled in their corequisite courses.

Student-Centered Teaching: Less lecture and more opportunities for practice and collaboration

> "You have to put them in charge. You can't just model all the time. You can model one problem. Give them an idea. Then, you have to go watch them while they're doing the problem. **Whenever they get stuck, don't let them quit."**
>
> – Math Faculty

> "We also did these group activities where I would – it was like the little round-robin thing. **Each person had the responsibility of going like solving a problem in steps.** So, if you are person one, you have to write out step one, then pass it onto the second person to do step two."
>
> – Math Faculty

Responsive Teaching: Asking students what they need and where they struggle

> My class is not just about lecturing about a particular topic. I'm not lecturing to my students, **I'm having a conversation with them** and I'm asking them to tell me, "Where are you? How do you understand this?"
>
> – English Faculty

Building Broad Learning Skills: Develop learning skills that extend into other courses and beyond

> I teach them how to access the online library database. I tell them how to navigate it as far as downloading sources…how to access our online tutoring services. Really, **the things I'm using again are forward thinking things that they can apply later [on].**"
>
> – English Faculty

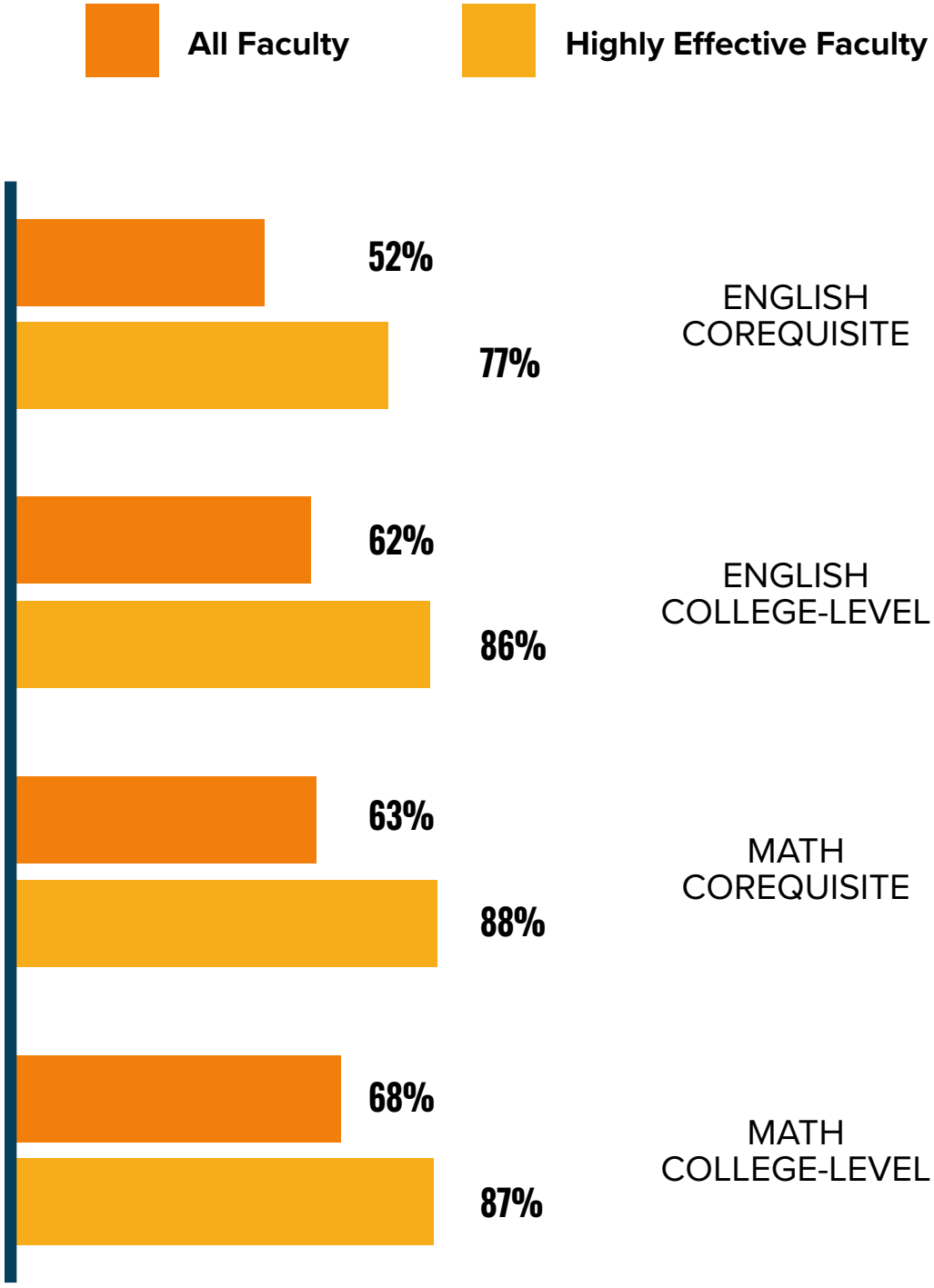
Corequisite/College-Level Connections: Clear and explicit connections to the college gateway class

> I develop all the exercises in my coreq class based on the needs of the 1301 [college-level] class… They need to accomplish this big task so what are the things I can be doing in the ESOL [coreq] class that can support those?"
>
> – English Faculty

Table 5, p. 32

We used purposeful sampling to identify faculty who have a demonstrated record of success teaching corequisite courses. Specifically, we used the following criteria to identify these “highly-effective” faculty: 1) course evaluations; 2) percentage of students who pass the corequisite course; 3) percentage of developmental education students who pass the college-level section; 4) and nominations from department chairs. A list of faculty were identified based on criteria 1-3; this list then used to run an analysis and cross-referenced with nominations.

TABLE 5 ❯ COURSE PASS RATES FOR HIGHLY EFFECTIVE FACULTY (2019 - 21)



FACULTY MINDSETS AND BEHAVIORS

Besides faculty pedagogy, we found other faculty mindsets and behaviors were also important to student success in corequisite courses. What often distinguished highly effective faculty was an asset-based mindset guiding their belief that every student has the talent and ability to excel academically.

Some faculty mentioned students' prior negative experiences with English and/or math in the K-12 system, and the most effective corequisite faculty emphasized the importance of building corequisite students' confidence and academic self-efficacy. These faculty were also more accessible and responsive; created a community of learners; and showed empathy and care by validating students' experiences. Below, on pages 33 and 34, we share quotes from highly effective faculty and the students who benefited from these mindsets and behaviors.

Building Confidence: Believing in students

> **I believe that everyone is capable of growing.** I think everyone is capable. I believe that a lot of my students haven't had anybody believe in them."
>
> – English Faculty

> I spend a lot of time convincing my students that they have a right to be where they are; they can do it."
>
> – Math Faculty

> I felt that he understood the quiet, more confused students like myself at the moment feeling lost."
>
> – Math Student

> He really wanted to see what our weaknesses were because **he made sure that we didn't feel bad for asking the wrong question** because there was no wrong question in his classroom and I enjoyed that."
>
> – Math Student

Being Available: Proactive and personalized outreach

> **I do try and stay in constant communication.** If I have a student that's not showing up, I will try and contact them myself. If it doesn't work, I go to counselors and do everything possible to try and get them engaged with it."
>
> – English Faculty

> Even after hours, students will send her an email and she will respond next day."
>
> – Math Student

Building Community: Creating a supportive learning community

> I create that community of learning. You don't have to be afraid of your age or anything like that. Nobody is going to talk bad about you. That's not what we're here for. We're all in this together."
>
> – Math Faculty

> It has been amazing like people willing to ask questions. If anybody asks any questions, you're not afraid to ask questions."
>
> – Math Student

Being Compassionate: Showing empathy and care

> I'm also really good about just listening to their concerns which is why I've started to do the check-in every day. And I'm just going to be honest, our students at HCC are stressed out. They're exhausted. **This world that we're living in is anxiety-inducing and it's not conducive to being a college student at all."**
>
> – English Faculty

> "If there are quizzes or anything, she's there to help. I remember the first week, we had a quiz or something—assignment—and I missed it because I didn't look or whatever. She opened it for me, so **she's really helpful and I was like, she actually cared."**
>
> – Math Student

HOW TO HELP STUDENTS WHO DO NOT PASS GET BACK ON TRACK

Even with the best course design features and the most effective faculty, some students still do not pass corequisite courses. In this section, we highlight what happens to these students and what can be done to help them get back on track to success.

What happens after students fail a corequisite course?

- Re-enrollment or stop-out
- Major change/degree objective change
- Transfer
- Re-enrollment in corequisite and/or college level the next semester and/or later

What students say about when they don't pass

We heard from students who did not pass the corequisite course. As previously highlighted, students shared how what was happening in the classroom—faculty pedagogy and behaviors/mindset—impacted their success in the course. On page 36 are student perspectives regarding challenges with the corequisite courses.

Lecture only – Faculty not breaking things down

> He wasn't very encouraging and he didn't like questions. He likes to just run through his lesson for the day and then the last 10 minutes was [like], "What do you have questions about?" And I've already forgotten what questions I have in the first problem."

– Math Student

Unresponsive and unsupportive faculty

> Yes. I just emailed her a few times about it but, like I said, sometimes there was no response. It was a lot, so I kind of had to just let it be, as well. Well, she's not doing anything and I can't do anything from my side."

– English Student

Content moved too fast – Not enough time

> You had maybe three days to learn that chapter and then there was a quiz the next day. I counted the days. It's three to four days at the most to learn the subject, and you have to take the quiz or a test that day."

– Math Student

STUDENT RESILIENCY

Which students re-enroll in the Corequisite courses?

Students demonstrated resiliency when they did not pass the corequisite course their first time. Though they experienced challenges in the classroom and at home, many students did not let this experience derail their academic and career goals. Almost two-thirds of students who failed a corequisite re-enrolled in the course.

Re-enrollment

Student demographic characteristics did not predict re-enrollment.

Students were more likely to re-enroll if they were:

- Taught by full-time faculty
- Attending part-time

Students were less likely to re-enroll:

- Attending full-time
- If the failure occurred in their first semester at HCC

Transfer

Only 7% of students who failed the corequisite transferred to another two or four-year institution, and these were equally likely. Female students and students who were deemed as less prepared for college-level coursework were more likely to transfer to other two-year institutions. Students from zip codes with higher median incomes were also more likely to transfer to another two-year institution after failing INRW 0300. Transfer was also more likely when the math co-requisite was misaligned with student major (for example, a Business major taking a math corequisite other than Math 0324/1324, the corequisite math pathway designed for Business majors. Taking the mathematics courses aligned with their program/major may have allowed the faculty to contextualize the concepts, possibly leading to greater commitment to the major and institution.

Students Who Do Not Pass Showing Resiliency

> It just makes me want to get out of here faster [laughter] because I was like, "Oh my God. It delayed my graduation time." So, no. It just makes me want to do it faster and get it over with, so I can do what I want to do."
>
> – Math Student

> That is definitely the plan [to become a counselor]. I still feel like that's something that I want to do. I think I have my heart set on it. I'm still fully pledged on going in for that career."
>
> – English Student

> Though at least I've learned from that experience. **Now, I know what more I need from myself to succeed in the next math class** that I'm going to have to take. At least I know what to look for in an instructor...At least I know I'm going to have to also take tutorials and make more time for it."
>
> – Math Student

> **Now that I know what that coreq class entails, I can take advantage of it** for this coming math class that I'm going to have to take."
>
> – Math Student

> This whole academic year I had a goal. My goal is to get my GPA high enough, so I can transition smoothly into U of H because that's where I want to be. That's my goal. I don't take too kindly to the complications and the obstacles, but you know there's always going to be an obstacle... **If anything, it drives me to go even harder especially this spring semester.**"
>
> – Math Student

RECOMMENDATIONS

BRIDGING RESEARCH TO PRACTICE

In this section:

Inside the Corequisite Classroom,

Professional Development for Corequisite Faculty,

Institutional Strategies to Maximize the Effectiveness of Corequisite Support

&

Advancing Developmental Education Reforms

Inside the Corequisite Classroom

Our results underscore the critical role a student's initial corequisite course performance has on their likelihood of completing college. While policy reform at the state system and institutional level is certainly important, our findings suggest improving learning environments within corequisite classrooms may hold the greatest potential for improving outcomes for developmental education students. Our recommendations below focus on approaches that can improve teaching and learning environments within corequisite courses. When these conditions were present inside corequisite classrooms, students were more likely to succeed.

Teaching and Designing Corequisite Courses

Building students' confidence and sense of belonging

- Faculty teaching corequisite courses need to have more equity-minded[30], asset-based ways of thinking about racially-minoritized students where faculty believe students can excel and faculty pedagogy is tailored to the specific needs of developmental Math and English students. This includes recognizing that the needs of racially-minoritized corequisite students may not align with those students deemed not college-ready. Students in their first semester are particularly vulnerable, so focus on the progress that they have made. Develop efficacy, motivation, and a growth mindset in the classroom and when giving feedback. Once students see they can be successful, their confidence grows, and they become more engaged in the course content.

Relationship-building between corequisite faculty and students

- When students feel faculty care about their success and who they are outside the classroom (e.g., parents, caregiver, sole income provider), students are more likely to ask for help and communicate when outside challenges are impacting their academic progress. Faculty are then able to better guide students and refer them to different support services. Faculty should use teaching strategies that engage students personally and create collaborative classroom communities.

One instructor preferred over two instructors

- Having the same instructor for both courses provides continuity between the two courses allowing the instructor to build stronger relationships with students. Faculty are also able to keep better track of students' progress in both courses.

Two-instructor corequisite model requires good communication

- If there are two instructors, more time is needed for communication and collaboration before the term begins and throughout. Both instructors need to have clear communication about what is being taught in the college-level course to better assist students in the support course. This includes communicating about the progress of individual students (e.g., "could you check on Sami today?"). Expectations between faculty for the support course and college-level course should be aligned. Consider discussing or establishing norms between departments or paired faculty. Faculty can also co-teach to develop supportive relationships with each other.

Explanation of corequisite as a six credit-hour course

- Ensure advisors can communicate the benefits of corequisite sequences and how they are aligned mathematics sequences. Early academic advising should help students understand the course load of taking two classes that are often scheduled back-to-back. This needs to be explained clearly especially to students who work full-time and might have to take time-off work.

Explanation of how two courses are connected

- On the first day of class, corequisite faculty should spend time explaining how the corequisite model works and what the support course will look like throughout the term—as a space where they can receive extra help, develop more skills, and ask questions.

Corequisite course completion in first semester of enrollment

- Corequisite courses help students develop other skills that will help them in future college-level courses which ultimately helps with student persistence and graduation.

> "In listening to other faculty and their experience—like if they're only teaching the college [level] or if they're only teaching the coreq [support course]. There seems to be some disconnect there, but because I teach both I'm able to transfer and understand the learning of my students and where their skill set is, so I can transfer that to the college-level and make the adjustments where necessary."
>
> – Math Faculty

COURSE DESIGN FEATURES

Teaching Strategies in Corequisite Courses: What Worked?

From the faculty and student interviews, we identified teaching strategies that worked well in the corequisite classroom.

RECOMMENDED

COLLABORATIVE LEARNING
Practice skills in class with classmates

OPEN COMMUNICATION
Asking students where they need help

DEVELOP OTHER LEARNING SKILLS
Activities to improve study skills, note-taking, time management, use of technology

CONNECTIONS TO COLLEGE GATEWAY COURSE
Support course assignments connect with college gateway course

NOT RECOMMENDED

LECTURE ONLY
No opportunity to practice skills in class

LACK OF COMMUNICATION
No opportunity to ask questions in class and unresponsive to student concerns

LACK OF ADDITIONAL ACADEMIC SUPPORT
No guidance on resources or outside support to improve other skills

TWO SEPARATE COURSES AND WORKLOAD
Homework and assignments are not connected and double the workload

Professional Development for Corequisite Faculty

Our findings and other studies consistently expose how racially minoritized students and students from low-income backgrounds are more likely to not pass developmental coursework. Though skill-based development is important, the faculty working closely with corequisite students must also recognize the human element where they truly understand the students they are working with. Faculty pedagogy and mindsets play a central role in students' ability to succeed in corequisite courses. If faculty are not changing their ways of thinking about students deemed academically underprepared, then, regardless of what reform efforts are proposed, we will likely see the same results.

We view this as a promising finding of this study, as these attributes can be acquired through learning and personal/professional growth. Our recommendations below can be used to design professional development opportunities for corequisite faculty that equip them with the knowledge and skills to better support students from racially and socioeconomically diverse backgrounds.

What Corequisite Faculty Described as Useful Professional Development

- Class observations to learn from other corequisite (highly-effective) faculty.
- Shared resources (handouts, lesson plans, class exercises) and teaching strategies with one another in-person and through an internal online database/repository.
- Trainings from K-12 math and English teachers on how to teach basic skills and concepts.
- Faculty led communities of practice to share successes and challenges teaching corequisite courses.

> In regard to professional development, I would say diversity, equity and inclusion, and individuals being more knowledgeable of what they're saying and doing within courses because the impact that it has on students could be a lot more long-lasting than what they may think."
>
> – English Faculty

> I think that it's important for teachers to understand something as simple as learning styles. I used to teach in the College of Education where you're teaching teachers how to teach, so my orientation is just a little bit different than my colleagues that are pure mathematicians. So, I say that to say we really need to understand how people—how adults learn."
>
> – Math Faculty

> Administration a lot of times want these professional development things on—they want to have a speaker and then there's no room for our voice in there. It's really frustrating and I think that we learn best from each other and the best professional development we could do is just allowing us the space to talk."
>
> – English Faculty

For Those Designing and Leading Professional Development

Campus-wide trainings on equity-minded practices[31]

- Corequisite faculty, advisors, and other student service staff would benefit from year-round trainings that require self-reflection on being race conscious and aware of ones' own race-neutral knowledge, practices, and assumptions. These professional development opportunities can provide faculty and staff with a greater understanding of equity-minded ways of thinking and practices that can be applied in corequisite courses and campus-wide.

Faculty trainings on culturally inclusive pedagogy[32]

- Math and English departments can host trainings for corequisite faculty providing teaching strategies like culturally inclusive pedagogy where faculty learn asset-based teaching strategies to better support racially minoritized students and students from low-income backgrounds in their corequisite courses.

Faculty trainings from K-12 Math and English instructors

- Faculty assigned to teach both sections of the corequisite course sequence may not be familiar with how to teach basic math or English skills. Many are more content experts in their field. Faculty could learn teaching strategies from K-12 math and English instructors to help students grasp critical skills that will help them as they continue into more college-level coursework. This also includes learning strategies on how to get students on track for success.

Develop a mentorship program

- Provide structured opportunities where highly-effective corequisite faculty can work with faculty who are not as effective. Highly-effective faculty could also be paired with faculty new to teaching the corequisite sequence.

Faculty led communities of practice

- Faculty can learn the most from each other where they can share successes and challenges teaching corequisite courses. This also creates a space where they can share resources (handouts, lesson plans, class exercises) and teaching strategies with one another, which can include an online database.

Institutional Strategies to Maximize the Effectiveness of Corequisite Support

Our findings suggest simply changing traditional developmental education to the corequisite model will not necessarily improve student outcomes. Institutional leaders must bring together academic departments and other student services to make sure a clear, streamlined strategy is in place to support students enrolled in corequisite courses. This also involves strong communication among departments where corequisite student success data is shared for everyone to stay informed. These recommendations offer ways in which institutional leaders can create more intentional support systems for corequisite students.

Provide corequisite faculty, advisors, and students with clear information on the purpose, goals, and benefits of the corequisite model

- Faculty and advisors are often the first individuals students engage with at community colleges. Being well informed allows faculty and advisors to better support students who do not understand why they are in corequisite courses and what their options are if they do not pass. Corequisite conferences or forums are also successful in providing information to those working with corequisite students.

Identify faculty who exhibit highly-effective pedagogies and behaviors and assign to corequisite courses

- Faculty play an important role in building students' confidence and helping them be successful in corequisite courses. Highly-effective faculty should be identified by looking at not only success in the support course, but also success in the college-level course, especially those taught by two instructors. Departments need to be intentional about who is assigned to teach corequisite courses. Corequisite faculty should demonstrate equity-minded[33] practices, cultural inclusive teaching, patience, and care for students who may have academic and personal challenges. Faculty with these characteristics must also be rewarded for the skills they have developed on their own or through trainings to encourage more faculty to acquire these skill sets.

Provide a systematic approach of targeted outreach and interventions for students who do not pass or withdraw from corequisite course

- Advisors assigned to corequisite students should identify students in danger of not passing and transition opportunities before the term ends. Advisors should maintain communication throughout the term. For students who do not pass, they should be encouraged to immediately retake the course and re-enroll with an instructor identified as highly-effective. Some students may be unclear about their academic goals or plans following not passing. Advising offices could encourage students to complete career interest inventories to help inform and guide their next steps.

Develop more holistic and wrap-around services between corequisite faculty and student services like advising, counseling, and tutoring

- Corequisite faculty connecting with non-academic services can assist with non-academic challenges students may face (e.g., challenges with hunger, housing, finances, transportation, childcare). Building these relationships early can help corequisite faculty know who to contact when students come to them with different needs and challenges.

Share disaggregated student data on developmental education pass rates by race, ethnicity, and gender

- Math and English departments can share student data with corequisite faculty and student services to have a clearer picture of who is struggling the most. Is there a pattern of students struggling in a specific corequisite section or with a particular instructor? This awareness of data can lead to targeted interventions with faculty and support services to address students' needs in those sections. This data can also identify placement patterns that might unintentionally 'track' students away from STEM fields, and other fields paying a living wage. With data sharing, corequisite faculty and advisors are able to stay informed and develop an understanding of equity issues in developmental education and corequisite courses.

Review student data and consider long-term measures of student success.

- Math and English departments should review student success data after completing the corequisite sequence. Students passing their corequisite course should not be the only measure of success. Did the student pass their next college-level course? This will help measure student persistence and retention. Long-term measures of student success also help identify highly-effective faculty and faculty who need to make adjustments.

> "To me, the statistic that would show us whether or not we're doing well is how many of them [our coreq students] passed the English 1302 [the second college-level English course] because there's no coreq with that. They're on their own. They're in another class focusing on writing. If the majority of them pass that, then we did great."
>
> – English Faculty

Advancing Developmental Education Reforms

Overall, the currently available evidence suggests that for most students, the corequisite model is more effective than traditional forms of developmental education. But corequisite support is not a silver bullet solution. Despite increases in overall developmental/college-level course pass rates, these gains do not necessarily translate into increased persistence, graduation, and/or four-year transfer rates. Moreover, many of the groups not well-served by traditional developmental education are the same groups more likely to struggle under the corequisite model. These trends corroborate how even the most promising reform efforts can continue to produce inequitable outcomes for historically underserved and minoritized students like Black and Latinx students. We offer the following recommendations and potential next steps for policymakers, higher education system leaders, and philanthropic organizations dedicated to advancing developmental education reform.

Invest in Professional Development for Corequisite Faculty

- Our findings highlight the need to invest in professional development for corequisite faculty. Highly-effective faculty are better able to meet corequisite students where they are and help students build confidence and affective outcomes for success.

Support for Students Who Do Not Initially Pass Corequisite Courses

- Many students still do not pass the corequisite course sequence and there is limited data on where these students go. A system should be in place where students who do not pass are identified early and provided integrated support services to help them get back on track. For example, adaptive platforms have been used to pinpoint student weakness to target further interventions. Future work might focus on potential secondary interventions, which have been understudied due to the focus on primary intervention.

Develop Open-Access Repository of Corequisite Learning Resources

- Faculty benefit from shared sense-making and communities of practice. Policy supporting open and accessible instructional resources would benefit corequisite instruction. These resources, such as those provided by the **Strong Start to Finish Knowledge Center** may particularly benefit faculty and students at institutions unable to support robust professional development efforts.

CONCLUSION

The success of corequisite reform efforts is highly dependent upon what happens on campuses, in classrooms, between faculty and students. Regardless of the corequisite subject area or course design features, our findings made one thing crystal clear: faculty exerted the strongest influence over whether a student excels in, and beyond, developmental education. Many of the teaching strategies exhibited by the highly effective corequisite faculty in our study are supported by empirical research and consistent with culturally responsive teaching. Policy reforms at the state, system, and campus level are certainly important – but what happens inside corequisite classrooms remains at the heart of efforts to improve equity in developmental education.

As corequisite supports continue to expand across the country, it is critical to identify the classroom practices, institutional strategies, and public policies that maximize successful completion of corequisite English and math courses for all students, especially those historically disadvantaged by traditional developmental education models. Our findings and recommendations are aimed at ensuring developmental education empowers, rather than derails, millions of students from eventually realizing their goals of college graduation.[34]

APPENDIX I
GLOSSARY OF TERMS

Glossary of Terms

Developmental Education:

Non-credit-bearing courses in reading, writing, and math that are below college-level for students deemed as academically underprepared through standardized placement tests. These courses are found more often at community colleges because of their open-access mission.[35]

Corequisite Courses:

A reform strategy used to reduce the length of developmental course sequences. Students in corequisite courses are enrolled directly into a college-level gateway course their first semester along with a developmental education support course. Corequisite courses help students transition more quickly into earning college credit towards a degree or credential saving students time and money.[36]

College-level Course:

The college-level course in the corequisite course model where students are enrolled with both college-level and corequisite students—often half college-level students, half corequisite students.

Equity:

Equity refers to achieving parity in student educational outcomes, regardless of race and ethnicity. It moves beyond issues of access and places success outcomes for students of color at center focus. Achieving parity in educational outcomes for students of color requires that practitioners critically assess and change their practices to advance student equity.[37]

Support Course:

The developmental education course in the corequisite course model that is held directly before or after the college gateway course. It provides additional support to students while taking the college gateway course.

Texas House Bill 2223:

In June 2017, Texas Governor Greg Abbott signed into law the use of corequisite remediation as a required model for students in developmental education courses. The law requires Texas public higher education institutions to implement a corequisite model under which a student concurrently enrolls in a developmental-level course and college-level course in the same subject area. This requirement is only for first-time-in-college students that place in developmental coursework in either English or Math.[38]

APPENDIX II

DATA AND ANALYSIS

Qualitative Data and Analysis

The UH research team presented information about our study at math and English department meetings to recruit faculty participants for the Research Question 1 (RQ1). Faculty participants received a $25 gift card after completing their interview. For Research Question 2 (RQ2), we used the following criteria to identify "highly-effective" faculty who have a demonstrated record of success teaching corequisite courses: 1) course evaluations; 2) percentage of students who pass both sections of the corequisite course; 3) percentage of developmental education students who pass the college-level section; 4) and nominations from department chairs. Employee IDs were then used to run an analysis and cross-referenced with nominations. Faculty who met our criteria were invited to participate in our study. Faculty who consented to participate completed two individual interviews and one focus group interview. RQ2 faculty were also asked to submit learning materials (e.g., lesson plans, activities, assignments, resources) that they found to be the most effective in helping students in their corequisite courses. Faculty who completed all tasks received a $600 stipend as compensation. Course syllabi for both RQ1 and RQ2 faculty were collected for document analysis purposes.

Students who did not pass the corequisite course sequence in the fall 2020 and spring 2021 academic semesters were contacted by email to participate in our study for RQ1. In spring 2021, we asked RQ2 faculty participants to forward a recruitment email to students who had shown success in their corequisite courses to participate in our study for RQ2. All student participants received a $40 gift card.

Student success deans are found at each HCC campus and oversee the academic advising and support services provided to corequisite students. They also played a central role in the implementation of the corequisite model. Student success deans were nominated by HCC research team members. Personal emails were sent to them inviting them to participate in the study. They received a $25 gift card after completing their interview.

The qualitative data included interviews and focus groups (FG) conducted across the 2020-21 academic year. Interviews were conducted virtually via Zoom due to COVID-19 pandemic limitations. The interview protocol was developed from previous literature on developmental education.[39] To increase trustworthiness, team members from HCC and UH co-constructed the interview protocols. Individual interviews ranged from 30-45 minutes while focus groups lasted approximately 60 minutes. All interviews were conducted by a UH research team member. Interviewers also wrote memos after each interview to capture initial thoughts about the interview, preliminary themes, and other aspects of the interview to help with future interviews.

APPENDIX II

DATA AND ANALYSIS

Our final individual interview numbers included 42 students, 36 faculty, and 3 student success deans. We also conducted one math student focus group (4 students) and 6 math faculty focus groups (18 faculty), and 5 English faculty focus groups (17 faculty). See Appendix III for more descriptive information on all of our participants.

The individual interviews were audio-recorded and transcribed. The transcription data were de-identified and reviewed by the entire research team to have a shared meaning of the raw data. Coding procedures recommended by Miles et al., (2014) and Saldaña (2015) were utilized to assign initial deductive codes to each transcript referring back to the interview protocols.[40] A second cycle of coding was used to combine and revise codes. A third cycle of coding identified patterns and themes among the students, faculty, and student success deans data. The themes were peer-debriefed to make meaning of the data individually and collectively by the research team.

Quantitative Data and Analysis

The quantitative data extracted from the HCC student record system included students enrolled in corequisite sequences (English and Math) for the first time in Fall 2019 through summer 2021, as well as student grade history. Students enrolled in 12 credit hours or more in fall or spring were considered full time, and 6 credit hours in summer, consistent with financial aid policy. 4,430 students were enrolled in the INRW sequence, 1241 in the ESOL sequence, and 8,168 in the math sequences.

A, B, and C grades were considered successful attempts, as well the “P” (pass) grades assigned at the beginning of the pandemic. A “D” is not considered a passing grade in a corequisite course; students who earn this grade are not considered “college ready” by the State of Texas and must retake the course or retake a placement test. If incompletes had been resolved at the time of analysis, they were given the assigned grade. Unresolved incompletes were treated as unsuccessful attempts. Incompletes accounted for less than 1% of the grades. “IP” designates “in progress” and is assigned more frequently than “F” in developmental coursework, but also designates an unsuccessful attempt. Student transfer data was extracted from the National Student Clearinghouse.

APPENDIX II

DATA AND ANALYSIS

Annually, roughly 35% of HCC's undergraduate population receive a Pell grant. However, considering the demographics of area school districts, this number likely underestimates the economic disadvantage of HCC students. Given the primary reason that students did not receive Pell is that they had not filed a FAFSA, income data derived from the American Community Survey (ACS) was used as an additional proxy for household income. Using zip code, each student was matched to the 2016-2020 five-year estimate of the median household income for their zip code. Income quartiles were then calculated for analysis. Variables were screened for multicollinearity then both Pell and ACS indicators were used in the analyses.

Faculty data was extracted from the course evaluation system and the faculty workload reports for all courses taught since the implementation of the corequisite. These reports include faculty status (full-time versus part-time) and workload. Faculty and student data was merged with class schedule data to determine the number of instructors, the class schedule, the relative timing of the corequisite and college level, and the instructional mode (in-person vs. online).

The quantitative analysis occurred in two phases. First, we used descriptive statistics (means, frequencies) to compare pass rates for English and math corequisite courses by key student demographic and academic variables. Variable selection was informed by prior research on developmental education student success and included all students who attempted corequisite courses in the three semesters under investigation. Next, we conducted a series of logistic regression models that examined differences between students who initially passed the corequisite and those who did not pass English or Math. The goal of this analysis was to understand, within a multivariate context, the independent variables that predict passing the corequisite.

Because of the differences in the populations who enroll in the course sequences, a separate regression was run for each of the two English sequences (INRW and ESOL) and each of the four math sequences. The History, Humanities, and Sociology sequences were not included because very few of these corequisite sequences had been offered.

Analogous descriptive analyses and logistic regressions were run for re-enrollment and transfer outcomes for the set of students who failed the corequisite. It is extremely rare to fail the corequisite but pass the college level, as the corequisite supports the student learning objectives of the college level course. Additionally, if the college level is passed the corequisite does not need to be retaken. Thus, only students who failed both the corequisite and college level were included in these regressions.

APPENDIX III

QUANTITATIVE SAMPLE

English and Math Corequisite Student Demographic Characteristics

		SUBJECT			
		English		Math	
Enrollment	**Full time**	1746	54.9%	3520	58.9%
	Part-time	1434	45.1%	2459	41.1%
Ethnicity	**Multiracial/Other**	105	3.3%	236	3.9%
	Asian	214	6.7%	361	6.0%
	Black	1340	42.1%	2173	36.3%
	Hispanic/Latinx	1319	41.5%	2643	44.2%
	White	202	6.4%	566	9.5%
Gender	**Female**	2061	64.8%	3778	63.2%
	Male	1119	35.2%	2201	36.8%
Age Group	**19 and under**	1291	42.6%	1672	30.0%
	20-29	1419	46.9%	3093	55.5%
	30 and up	317	10.5%	807	14.5%
Pell	**No Pell**	995	31.3%	2625	43.9%
	Pell	2185	68.7%	3354	56.1%
Area of Study	**Other Workforce**	306	9.6%	387	6.5%
	Business	496	15.6%	1183	19.8%
	Health Sciences	890	28.0%	1171	19.6%
	Liberal Arts, Humanities, and Education	674	21.2%	1577	26.4%
	Social & Behavioral Sciences	109	3.4%	231	3.9%
	STEM	705	22.2%	1430	23.9%

APPENDIX IV

RESEARCH QUESTION 1: STUDENT PARTICIPANTS

The information presented in this table spans pages 55 - 56

Participant Label	Math or English Corequisite	Working FT or PT
RQ1 English Students		
RQ1 EngStudent 1	ENGL 1301/INRW 0300	Part-time
RQ1 EngStudent 2	ENGL 1301/INRW 0300	Full-time
RQ1 Eng/MaStudent 3	ENGL 1301/INRW 0300; Math 1332/0332	Full-time
RQ1 Eng/MaStudent 4	ENGL 1301/INRW 0300; Math 1332/0332	Not working
RQ1 EngStudent 5	English	Part-time
RQ1 EngStudent 6	ENGL 1301/INRW 0300	Part-time
RQ1 Eng/MaStudent 7	ENGL 1301/INRW; Math 1332/0332	Full-time
RQ1 EngStudent 8	ENGL 1301/INRW	Full-time
RQ1 EngStudent 9	ENGL 1301/INRW	Not working
RQ1 Eng/MaStudent 10	Math and English	Prefer not to answer
RQ1 Math Students		
RQ1 MaStudent 1	Math 0314/1314	Full-time
RQ1 MaStudent 2	Math 0324/1324	Prefer not to answer
RQ1 MaStudent 2.2	Math 0324/1324	
RQ1 MaStudent 3	Math 0332/1332	Full-time
RQ1 MaStudent 4	Math 0314/1314	Full-time
RQ1 MaStudent 5	Math 0314/1314	Not working
RQ1 MaStudent 6	Math 1332/0332	Not working
RQ1 MaStudent 7	Math 1342/0342	Part-time
RQ1 MaStudent 8	Math	Part-time
RQ1 MaStudent 9	Math	Not working
RQ1 MaStudent 10	Math	Full-time
RQ1 MaStudent 11	Math	Full-time
RQ1 MaStudent 12	Math	Part-time
RQ1 MathFG Student 1	Math 1342 + Math 0342	Part-time
RQ1 MathFG Student 2	Math 0324 + Math 1324	Prefer not to answer
RQ1 MathFG Student 3	Math 0314 + Math 1314	Not working
RQ1 MathFG Student 4	Math 0332P + Math 1332	Full-time

APPENDIX IV

RESEARCH QUESTION 1: STUDENT PARTICIPANTS

The information presented in this table spans pages 55 - 56

Participant Label	Credit Hours	Race/Ethnicity	Gender	Age Range
RQ1 English Students				
RQ1 EngStudent 1	15 +	Black	Woman	18-19
RQ1 EngStudent 2	9-11	Two or more	Woman	31-40
RQ1 Eng/MaStudent 3	12-14	Black	Woman	20-24
RQ1 Eng/MaStudent 4	15 +	Latinx	Man	20-24
RQ1 EngStudent 5	12-14	Latinx	Woman	18-19
RQ1 EngStudent 6	12-14	Black	Woman	18-19
RQ1 Eng/MaStudent 7	9-11	Black	Woman	51-60
RQ1 EngStudent 8	6-8	Black	Woman	60+
RQ1 EngStudent 9	3-5	Black	Woman	31-40
RQ1 Eng/MaStudent 10	6-8	White	Woman	20-24
RQ1 Math Students				
RQ1 MaStudent 1	9-11	Two or more	Man	25-30
RQ1 MaStudent 2	3-5	Latinx	Woman	31-40
RQ1 MaStudent 2.2				
RQ1 MaStudent 3	9-11	Black	Woman	41-50
RQ1 MaStudent 4	3-5	Black	Woman	25-30
RQ1 MaStudent 5	9-11	Latinx	Woman	31-40
RQ1 MaStudent 6	12-14	Black	Woman	20-24
RQ1 MaStudent 7	15 +	Black	Woman	18-19
RQ1 MaStudent 8	12-14	Latinx	Man	31-40
RQ1 MaStudent 9	15+	Black	Woman	25-30
RQ1 MaStudent 10	6-8	Black	Woman	31-40
RQ1 MaStudent 11	12-14	Black	Man	25-30
RQ1 MaStudent 12	None	White	Woman	25-30
RQ1 MathFG Student 1	15 +	Black	Woman	18-19
RQ1 MathFG Student 2	3-5	Latinx	Woman	31-40
RQ1 MathFG Student 3	9-11	Latinx	Woman	31-40
RQ1 MathFG Student 4	9-11	Black	Woman	41-50

APPENDIX IV

RESEARCH QUESTION 2: STUDENT PARTICIPANTS

The information presented in this table spans pages 57 - 58

Participant Label	Math or English Corequisite	Working FT or PT
RQ2 English Students		
RQ2 EngStudent 1	ENGL 1301/INRW 0300	Part-time
RQ2 EngStudent 2	ENGL 1301/INRW 0300	Full-time
RQ2 EngStudent 3	ENGL 1301/INRW 0300	Full-time
RQ2 EngStudent 4	ENGL 1301/ESOL 0370	Not working
RQ2 EngStudent 5	ENGL 1301/ESOL 0370	Not working
RQ2 EngStudent 6	ENGL 1301/ESOL 0370	Prefer not to answer
RQ2 EngStudent 7	ENGL 1301/INRW 0300	Not working
RQ2 EngStudent 8	ENGL 1301/ESOL 0370	Full-time
RQ2 EngStudent 9	ENGL 1301/ESOL 0370	Full-time
RQ2 EngStudent 10	ENGL 1301/INRW 0300	Not working
RQ2 EngStudent 11	ENGL 1301/INRW 0300	Full-time
RQ2 EngStudent 12	ENGL 1301/ESOL 0370	Not working
RQ2 EngStudent 13	ENGL 1301/ESOL 037	Not working
RQ2 Math Students		
RQ2 MaStudent 1	Math 1332/0332	Full-time
RQ2 MaStudent 2	Math	Not working
RQ2 MaStudent 3	Math	Full-time
RQ2 MaStudent 4	Math	Full-time
RQ2 MaStudent 5	Math 1314/0314	Full-time
RQ2 MaStudent 6	Math 1332/0332	Full-time
RQ2 MaStudent 7	Math	Not working

APPENDIX IV

RESEARCH QUESTION 2: STUDENT PARTICIPANTS

The information presented in this table spans pages 57 - 58

Participant Label	Credit Hours	Race/Ethnicity	Gender	Age Range
RQ2 English Students				
RQ2 EngStudent 1	6-8	Latinx	Woman	20-24
RQ2 EngStudent 2	3-5	Latinx	Man	25-30
RQ2 EngStudent 3	12-14	Black	Woman	51-60
RQ2 EngStudent 4	12-14	Asian	Woman	18-19
RQ2 EngStudent 5	15 +	Latinx	Woman	25-30
RQ2 EngStudent 6	12-14	Asian	No Answer	31-40
RQ2 EngStudent 7	6-8	Black	Woman	18-19
RQ2 EngStudent 8	6-8	Latinx	Man	31-40
RQ2 EngStudent 9	15+	Asian	Man	20-24
RQ2 EngStudent 10	12-14	Black	Woman	25-30
RQ2 EngStudent 11	9-11	Black	Woman	41-50
RQ2 EngStudent 12	12-14	White/Asian	Man	18-19
RQ2 EngStudent 13	12-14	Asian	Woman	18-19
RQ2 Math Students				
RQ2 MaStudent 1	3-5	Black	Man	41-50
RQ2 MaStudent 2	3-5	Black	Woman	18-19
RQ2 MaStudent 3	6-8	Black	Woman	25-30
RQ2 MaStudent 4	6-8	Black	Woman	51-60
RQ2 MaStudent 5	6-8	Black	Woman	20-24
RQ2 MaStudent 6	3-5	Latinx	Woman	31-40
RQ2 MaStudent 7	6-8	Black	Woman	51-60

APPENDIX IV

RESEARCH QUESTION 1: FACULTY PARTICIPANTS

The information presented in this table spans pages 59 - 60

Participant Label	HCC Campus	FT/Adjunct	DevEd or College Level
RQ1 English Faculty			
RQ1 EngFaculty 1	Northwest	Full-time	Both
RQ1 EngFaculty 2	Southwest	Full-time	College-level
RQ1 EngFaculty 3	Northwest	Full-time	Both
RQ1 EngFaculty 4	Southeast/Online	Full-time	Both
RQ1 EngFaculty 5	Northwest/Online	Full-time	Both
RQ1 EngFaculty 6	Central/Online	Full-time	Both
RQ1 EngFaculty 7	Southwest/Online	Adjunct	College-level
RQ1 EngFaculty 8	Southwest	Adjunct	Both; College-level
RQ1 English Faculty			
RQ1 EnglishFG1 Faculty 1	Northwest	Full-time	Both
RQ1 EnglishFG1 Faculty 2	Central/ Northwest/Online	Full-time	Both
RQ1 EnglishFG1 Faculty 3	Online	N/A	College-level
RQ1 EnglishFG1 Faculty 4	Northwest/ Southwest	Adjunct	DevEd
RQ1 EnglishFG2 Faculty 1	Northwest	Adjunct	DevEd
RQ1 EnglishFG2 Faculty 2	Central/Northwest/ Northeast/ Southwest	Adjunct	DevEd
RQ1 EnglishFG2 Faculty 3	Northwest	Full-time	DevEd

APPENDIX IV

RESEARCH QUESTION 1: FACULTY PARTICIPANTS

The information presented in this table spans pages 59 - 60

Participant Label	Corequisite Pairing	Race/Ethnicity	Gender	Age Range
RQ1 English Faculty				
RQ1 EngFaculty 1	ENGL 1301/ESOL 0370	White	Man	40-49
RQ1 EngFaculty 2	ENGL 1301/INRW 0300	Black	Woman	40-49
RQ1 EngFaculty 3	ENGL 1301/INRW 0300; ENGL 1301/ESOL 0370	Black	Woman	50-59
RQ1 EngFaculty 4	ENGL 1301/INRW 0300	Black	Woman	30-39
RQ1 EngFaculty 5	ENGL 1301/INRW 0300; HIST 1301/INRW 0301	Black	Man	40-49
RQ1 EngFaculty 6	ENGL 1301/ESOL 0370	White	Man	60+
RQ1 EngFaculty 7	ENGL 1301/ESOL 0370	White	Woman	50-59
RQ1 EngFaculty 8	ENGL 1301/INRW 0300	Asian	Woman	40-49
RQ1 English Faculty				
RQ1 EnglishFG1 Faculty 1	ENGL 1301/INRW 0300	White	Woman	40-49
RQ1 EnglishFG1 Faculty 2	ENGL 1301/ESOL 0370	White	Woman	50-59
RQ1 EnglishFG1 Faculty 3	ENGL 1301/INRW 0300	Black	Man	60+
RQ1 EnglishFG1 Faculty 4	ENGL 1301/INRW 0300; HUMA 1301/INRW 0302	Black	Woman	40-49
RQ1 EnglishFG2 Faculty 1	ENGL 1301/INRW 0300; HUMA 1301/INRW 0302	White	Man	50-59
RQ1 EnglishFG2 Faculty 2	ENGL 1301/INRW 0300	Black	Man	50-59
RQ1 EnglishFG2 Faculty 3	ENGL 1301/INRW 0300; HIST 1301/INRW 0301	Two or more	Woman	60+

APPENDIX IV

RESEARCH QUESTION 1: FACULTY PARTICIPANTS

The information presented in this table spans pages 61 - 62

Participant Label	HCC Campus	FT/Adjunct	DevEd or College Level
RQ1 Math Faculty			
RQ1 MaFaculty 1	Southeast	Full-time	Both
RQ1 MaFaculty 2	Southwest	Full-time	DevEd
RQ1 MaFaculty 3	Northwest	Full-time	DevEd
RQ1 MaFaculty 4	Southeast/ Southwest	Full-time	Both
RQ1 MaFaculty 5	Southwest	Full-time	Both
RQ1 MaFaculty 6	Southwest	Full-time	Both
RQ1 MaFaculty 7	Online	Adjunct	Both
RQ1 MaFaculty 8	Northwest	Adjunct	Both
RQ1 Math Faculty			
RQ1 MathFG1 Faculty 1	Northwest/ Online	Adjunct	DevEd
RQ1 MathFG1 Faculty 2	Central/ Southwest/Online	Adjunct	Both
RQ1 MathFG1 Faculty 3	Central/Coleman/ Northeast/ Northwest/Online	Adjunct	Both
RQ1 MathFG2 Faculty 1	Central		Both
RQ1 MathFG2 Faculty 2	Online		Both
RQ1 MathFG3 Faculty 1	Northwest	Full-time	Both
RQ1 MathFG3 Faculty 2	Northwest	Adjunct	Both
RQ1 MathFG3 Faculty 3	Northwest	Adjunct	College-level

APPENDIX IV

RESEARCH QUESTION 1: FACULTY PARTICIPANTS

The information presented in this table spans pages 61 - 62

Participant Label	Corequisite Pairing	Race/Ethnicity	Gender	Age Range
RQ1 Math Faculty				
RQ1 MaFaculty 1	Math 1324/0324; Math 1332/0332	Middle Eastern	Man	60+
RQ1 MaFaculty 2	Math 1314/0314	Black	Woman	60+
RQ1 MaFaculty 3	Math 1314/0314; Math 1324/0324; Math 1332/0332; Math 1342/0342	White	Man	60+
RQ1 MaFaculty 4	Math 1314/0314; Math 1324/0324; Math 1332/0332	Asian	Woman	50-59
RQ1 MaFaculty 5	Math 1324/0324; Math 1332/0332	Black	Man	40-49
RQ1 MaFaculty 6	Math 1332/0332	Asian	Woman	50-59
RQ1 MaFaculty 7	Math 1314/0314	White	Woman	30-39
RQ1 MaFaculty 8	Math 1332/0332	Latinx	Man	60+
RQ1 Math Faculty				
RQ1 MathFG1 Faculty 1	Math 1314/0314; Math 1332/0332; Math 1342/0342	Black	Woman	50-59
RQ1 MathFG1 Faculty 2	Math 1314/0314; Math 1324/0324; Math 1332/0332	White	Man	60+
RQ1 MathFG1 Faculty 3	Math 1314/0314; Math 1332/0332; Math 1342/0342	White	Man	60+
RQ1 MathFG2 Faculty 1	Math 1314/0314	White	Woman	50-59
RQ1 MathFG2 Faculty 2	Math 1314/0314; Math 1332/0332	White	Woman	60+
RQ1 MathFG3 Faculty 1	Math 1314/0314; Math 1332/0332	Asian	Woman	40-49
RQ1 MathFG3 Faculty 2	Math 1314/0314; Math 1342/0342	Latinx	Woman	40-49
RQ1 MathFG3 Faculty 3	Math 1332/0332	Latinx	Man	60+

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RESEARCH QUESTION 2: FACULTY PARTICIPANTS

The information presented in this table spans pages 63 - 64

Participant Label	HCC Campus	FT/Adjunct	DevEd or College Level
RQ2 English Faculty			
RQ2 EngFaculty 1	Northwest	Full-time	Both
RQ2 EngFaculty 2	Online	Full-time	DevEd
RQ2 EngFaculty 3	Northwest	Full-time	Both/College-level
RQ2 EngFaculty 4	Southeast	Full-time	Both
RQ2 EngFaculty 5	Central/Online	Full-time	Both/College-level
RQ2 EngFaculty 6	Southwest/Online	Full-time	Both
RQ2 EngFaculty 7	Central	Full-time	Both
RQ2 EngFaculty 8	Northwest/ Southwest	Full-time	Both
RQ2 EngFaculty 9	Online	Full-time	Both/College-level/ESOL
RQ2 EngFaculty 10	Central/Northeast/ Southwest	Full-time	Both
RQ1 English Faculty			
RQ2 EnglishFG1 Faculty 1	Online	Full-time	Both/College-level/ESOL
RQ2 EnglishFG1 Faculty 2	Northwest/ Southwest	Full-time	Both
RQ2 EnglishFG1 Faculty 3	Central/Online	Full-time	Both/College-level
RQ2 EnglishFG1 Faculty 4	Northwest	Full-time	Both/College-level
RQ2 EnglishFG2 Faculty 1	Northwest	Full-time	Both
RQ2 EnglishFG2 Faculty 2	Southwest/Online	Full-time	Both
RQ2 EnglishFG2 Faculty 3	Central	Full-time	Both
RQ2 EnglishFG2 Faculty 4	Central/Northeast/ Southwest	Full-time	Both
RQ2 EnglishFG3 Faculty 1	Southeast	Full-time	Both
RQ2 EnglishFG3 Faculty 2	Online	Full-time	DevEd

APPENDIX IV

RESEARCH QUESTION 2: FACULTY PARTICIPANTS

The information presented in this table spans pages 63 - 64

Participant Label	Corequisite Pairing	Race/ Ethnicity	Gender	Age Range
RQ2 English Faculty				
RQ2 EngFaculty 1	ENGL 1301/ESOL 0370	No answer	Woman	40-49
RQ2 EngFaculty 2	ENGL 1301/INRW 0300	White	Woman	60+
RQ2 EngFaculty 3	ENGL 1301/INRW 0300	Black	Woman	50-59
RQ2 EngFaculty 4	ENGL 1301/INRW 0300	Latinx	Man	30-39
RQ2 EngFaculty 5	ENGL 1301/INRW 0300	White	Woman	50-59
RQ2 EngFaculty 6	ENGL 1301/ESOL 0370	Arab American	Woman	40-49
RQ2 EngFaculty 7	ENGL 1301/ESOL 0370	White	Woman	40-49
RQ2 EngFaculty 8	ENGL 1301/INRW 0300	No answer	No answer	No answer
RQ2 EngFaculty 9	ENGL 1301/INRW 0300	Black	Woman	No answer
RQ2 EngFaculty 10	ENGL 1301/ESOL 0370	White	Woman	50-59
RQ1 English Faculty				
RQ2 EnglishFG1 Faculty 1	ENGL 1301/INRW 0300	Black	Woman	No answer
RQ2 EnglishFG1 Faculty 2	ENGL 1301/INRW 0300	No answer	No answer	No answer
RQ2 EnglishFG1 Faculty 3	ENGL 1301/INRW 0300	White	Woman	50-59
RQ2 EnglishFG1 Faculty 4	ENGL 1301/INRW 0300	Black	Woman	50-59
RQ2 EnglishFG2 Faculty 1	ENGL 1301/ESOL 0370	No answer	Woman	40-49
RQ2 EnglishFG2 Faculty 2	ENGL 1301/ESOL 0370	Arab American	Woman	40-49
RQ2 EnglishFG2 Faculty 3	ENGL 1301/ESOL 0370	White	Woman	40-49
RQ2 EnglishFG2 Faculty 4	ENGL 1301/ESOL 0370	White	Woman	50-59
RQ2 EnglishFG3 Faculty 1	ENGL 1301/INRW 0300	Latinx	Man	30-39
RQ2 EnglishFG3 Faculty 2	ENGL 1301/INRW 0300	White	Woman	60+

APPENDIX IV

RESEARCH QUESTION 2: FACULTY PARTICIPANTS

The information presented in this table spans pages 65 - 66

Participant Label	HCC Campus	FT/Adjunct	DevEd or College Level
RQ2 Math Faculty			
RQ2 MaFaculty 1	Southwest	Adjunct	Both
RQ2 MaFaculty 2	Southeast	Full-time	Both
RQ2 MaFaculty 3	Southeast/Online	Adjunct	Both
RQ2 MaFaculty 4	Central/Southwest	Adjunct	Both
RQ2 MaFaculty 5	Southwest	Adjunct	Both
RQ2 MaFaculty 6	Northwest/Online	Full-time	Both
RQ2 MaFaculty 7	Central/Northeast/ Southeast/Online	Full-time	Both
RQ2 MaFaculty 8	Northwest	Full-time	Both
RQ2 MaFaculty 9	Northwest	Adjunct	College-level
RQ2 MaFaculty 10	Southwest/Online	Full-time	DevEd
RQ2 Math Faculty			
RQ2 MathFG1 Faculty 1	Southwest	Adjunct	Both
RQ2 MathFG1 Faculty 2	Northwest/Online	Full-time	Both
RQ2 MathFG1 Faculty 3	Central/Northeast/ Southeast/Online	Full-time	Both
RQ2 MathFG1 Faculty 4	Southeast/Online	Adjunct	Both
RQ2 MathFG2 Faculty 1	Central/Southwest	Adjunct	Both
RQ2 MathFG2 Faculty 2	Southwest	Adjunct	Both
RQ2 MathFG3 Faculty 1	Northwest	Full-time	Both
RQ2 MathFG3 Faculty 2	Northwest	Adjunct	College-level
RQ2 MathFG3 Faculty 3	Southeast	Full-time	Both

APPENDIX IV

RESEARCH QUESTION 2: FACULTY PARTICIPANTS

The information presented in this table spans pages 65 - 66

Participant Label	Corequisite Pairing	Race/ Ethnicity	Gender	Age Range
RQ2 Math Faculty				
RQ2 MaFaculty 1	Math 1314/0314	White	Woman	30-39
RQ2 MaFaculty 2	Math 1324/0324	White	Man	60+
RQ2 MaFaculty 3	Math 1324/0324	White	Man	30-39
RQ2 MaFaculty 4	Math 1314/0314	Latinx	Man	40-49
RQ2 MaFaculty 5	Math 1324/0324	Black	Woman	40-49
RQ2 MaFaculty 6	Math 1314/0314	Black	Man	60+
RQ2 MaFaculty 7	Math 1332/0332	Black	Man	40-49
RQ2 MaFaculty 8	Math 1314/0314	Black	Woman	50-59
RQ2 MaFaculty 9	Math 1314/0314; Math 1332/0332	White	Woman	60+
RQ2 MaFaculty 10	Math 1314/0314	Black	Woman	60+
RQ2 Math Faculty				
RQ2 MathFG1 Faculty 1	Math 1324/0324	Black	Woman	40-49
RQ2 MathFG1 Faculty 2	Math 1314/0314	Black	Man	60+
RQ2 MathFG1 Faculty 3	Math 1332/0332	Black	Man	40-49
RQ2 MathFG1 Faculty 4	Math 1324/0324	White	Man	30-39
RQ2 MathFG2 Faculty 1	Math 1314/0314	Latinx	Man	40-49
RQ2 MathFG2 Faculty 2	Math 1314/0314	White	Woman	30-39
RQ2 MathFG3 Faculty 1	Math 1314/0314	Black	Woman	50-59
RQ2 MathFG3 Faculty 2	Math 1314/0314; Math 1332/0332	White	Woman	60+
RQ2 MathFG3 Faculty 3	Math 1324/0324	White	Man	60+

ENDNOTES 3 - 8

3 **Ganga, E., Mazzariello, A., & Edgecombe, N. (2018)**. Developmental Education: An Introduction for Policymakers. *Education Commission of the States.*

4 E**mblom-Callahan, M., Burgess-Palm, N., Davis, S., Decker, A., Diritto, H., Dix, S., Parker, C., & Styles, E. (2019).** Accelerating student success: The case for corequisite instruction. *Inquiry: The Journal of the Virginia Community Colleges, 22* (1).

Ganga, E., Mazzariello, A., & Edgecombe, N. (2018).

5 **Complete College America (2021).** *No room for doubt: Moving corequisite support from idea to imperative*. https://completecollege.org/article/coreq-report/

Logue, A. W., Douglas, D., & Watanabe-Rose, M. (2019). Corequisite mathematics remediation: Results over time and in different contexts. *Educational Evaluation and Policy Analysis, 41*(3), 294-315.

6 **Fong, K. E., Melguizo, T., & Prather, G. (2015).** Increasing success rates in developmental math: The complementary role of individual and institutional characteristics. R*esearch in Higher Education, 56*(7), 719-749.

Logue, A. W., Douglas, D., & Watanabe-Rose, M. (2019).

Schudde, L., & Meiselman, A. Y. (2019). Early Outcomes of Texas Community College Students Enrolled in Dana Center Mathematics Pathways Prerequisite Developmental Courses. Research Brief. *Center for the Analysis of Postsecondary Readiness.*

7 **Center for Urban Education.** (n.d.). Equity and student success.

8 **Complete College America (2021).**

Daugherty, L., Gomez, C. J., Gehlhaus, D., Mendoza-Graf, A, & Miller, T. (2018). Designing and implementing corequisite models of developmental education. *RAND Corporation.*

9 - 13 ENDNOTES

9 **Bailey, T., Jeong, D. W., & Cho, S. W. (2010).** Referral, enrollment, and completion in developmental education sequences in community colleges. *Economics of Education Review, 29*(2), 255-270.

10 **Complete College America (2021).**

Vandal, B. (2014). Promoting gateway course success: Scaling corequisite academic support. *Complete College America.*

11 **Brand, E.C. (2018).** The Oregon model for improving student completion through developmental education reform. *New Directions for Community Colleges, 2018*(182), 39–48.

Brower, R., Bertrand Jones, T., Tandberg, D., Hu, S., & Park, T. (2017). Comprehensive developmental education reform in Florida: A policy implementation typology. *The Journal of Higher Education (Columbus), 88*(6), 809–834.

Daugherty, L., Gomez, C. J., Gehlhaus, D., Mendoza-Graf, A, & Miller, T. (2018).

Edgecombe, N., Cormier, M., Bickerstaff, S., & Barragan, M. (2013). Strengthening developmental education reforms: Evidence on implementation efforts from the scaling innovation project. CCRC Working Paper No. 61. *In Community College Research Center, Teachers College, Columbia University.* Community College Research Center.

12 **D'Antonio, M. (2020).** Pedagogy and identity in the community college developmental writing classroom: A qualitative study in three cases. *Community College Journal of Research and Practice, 44*(1), 30-51.

Henry, L., & Stahl, N. (2017). Dismantling the developmental education pipeline: Potent pedagogies and promising practices that address the college readiness gap. *Journal of Adolescent & Adult Literacy, 60(*6), 611–616.

Nabb, K. & Murawska, J. (2020). Mathematical knowledge for teaching developmental courses at the community college: An unexplored terrain. *Community College Journal of Research and Practice, 44*(8), 563-583.

Richardson, C. (2021). Corequisite mathematics toolkit: Tools and resources for the design and implementation of equitable and effective support courses. *The Charles A. Dana Center at The University of Texas at Austin and Strong Start to Finish.* https://strongstart.org/deepening-understanding/resource-library/corequisite-mathematics-toolkit

13 **Cox, R. (2018).** Persistent pedagogical challenges in developmental education reform. *New Directions for Community Colleges, 2018* **(**182), 93–99.

ENDNOTES 13 - 20

Rutschow, E. Z., Cormier, M. S., Dukes, D., & Cruz Zamora, D. E. (2019). *The changing landscape of developmental education practices: Findings from a national survey and interviews with postsecondary institutions.* New York, NY: Center for the Analysis of Postsecondary Readiness.

14 **Flynn, J., James, R., Mathien, T., Mitchell, P., & Whalen, S. (2017).** The overlooked context: Pedagogies for engagement and empowerment at the community college. *Curriculum & Teaching Dialogue, 19*(1/2), 69–87.

Henry, L., & Stahl, N. (2017).

15 **Cox, R. D. (2015).** "You've Got to Learn the Rules": A classroom-level look at low pass rates in developmental math. *Community College Review, 43*(3), 264–286.

Grubb,W. N., & Gabriner, R. (2013). *Basic skills education in community colleges: Inside and outside of classrooms.* New York, NY: Routledge.

Logue, A. W., Douglas, D., & Watanabe-Rose, M. (2019).

Rutschow, E. Z. (2018). *Making it through: Interim findings on developmental students' progress to college math with the Dana Center Mathematics Pathways.* New York, NY: Center for the Analysis of Postsecondary Readiness.

16 **Cox, R. D. (2009).** "It Was Just That I Was Afraid": Promoting success by addressing students' fear of failure. *Community College Review, 37*(1), 52–80.

17 **Gomez, K., Gomez, L. M., Rodela, K. C., Horton, E.S., Cunningham, J., & Ambrocio, R. (2015).** Embedding language support in developmental mathematics lessons: Exploring the value of design as professional development for community college mathematics instructors. *Journal of Teacher Education, 66*(5), 450–465.

18 **Crisp, G., & Taggart, A. (2013).** Community college student success programs: A synthesis, critique, and research agenda. *Community College Journal of Research and Practice, 37*(2), 114-130.

19 **Bickerstaff, S., & Edgecombe, N. (2019).** *Teaching matters and so does curriculum: How CUNY Start reshaped instruction for students referred to developmental mathematics* (CCRC Working Paper No. 110). New York, NY: Columbia University, Teachers College, Community College Research Center.

20 **Steele, C. M., & Aronson, J. (1995).** Stereotype threat and the intellectual test performance of African Americans. *Journal of Personality and Social Psychology, 69*(5), 797–811. https://doi.org/10.1037/0022-3514.69.5.797

20 - 28 ENDNOTES

21 **Acevedo-Gil, N., Santos, R. E., Alonso, L., & Solorzano, D. G. (2015).** Latinas/os in community college developmental education increasing moments of academic and interpersonal validation. *Journal of Hispanic Higher Education, 14*(2), 101-127. doi:10.1177/1538192715572893

Brathwaite, J., Fay, M. P., & Moussa, A. (2020). Improving developmental and college-level mathematics: Prominent reforms and the need to address equity. CCRC Working Paper No. 124. In *Community College Research Center, Teachers College, Columbia University.* Community College Research Center.

Roberts, M. T. (2020). Racism in remediation: How Black students navigate stereotypes to achieve success in developmental mathematics. *Community College Journal of Research and Practice, 44*(10-12), 701-721.

22 **Brathwaite, J., Fay, M. P., & Moussa, A. (2020).**

Roberts, M. T. (2020).

23 **ACUE [Association of College and University Educators] & Sova (2021).** *Success & equity through quality instruction: bringing faculty into the student success movement.* https://strongstart.org/deepening-understanding/resource-library/success-equity-through-quality-instruction-bringing

24 **Acevedo-Gil, N., Santos, R. E., Alonso, L., & Solorzano, D. G. (2015).**

Roberts, M. T. (2020).

25 **Cox, R. (2018)**, p. 93.

26 **Houston Community College, Fact Book 2020-2021.** https://www.hccs.edu/about-hcc/institutional-research/hcc-fact-book/

27 **Texas Higher Education Coordinating Board [THECB] (2018).** HB 2223 Implementation. https://reportcenter.highered.texas.gov/agency-publication/miscellaneous/faq-hb-2223-tsi-de/

28 **Daugherty, L., Gomez, C. J., Gehlhaus, D., Mendoza-Graf, A, & Miller, T. (2018).**

Texas Higher Education Coordinating Board [THECB] (2018).

29 **Daugherty, L., Gomez, C. J., Gehlhaus, D., Mendoza-Graf, A, & Miller, T. (2018).**

ENDNOTES 29 - 38

30 **Bensimon, E. M. (2018).** *Reclaiming racial justice in equity.* Change, 50(3-4), 95-98

31 **Bensimon, E. M. (2005).** *Closing the achievement gap in higher education: An organizational learning perspective.* New Directions for Higher Education, 131, 99–111.

Bensimon, E. M. (2018).

32 **Gay, G. (2018).** *Culturally responsive teaching: Theory, research, and practice* (3rd ed.). Teachers College Press.

33 **Bensimon, E. M. (2018).**

34 **Capt, R. L. & Oliver, D. E. (2012).** Student-centered learning and an emergent developmental student taxonomy. *Community College Journal of Research and Practice, 36*(10), 793-807.

Flynn, J., James, R., Mathien, T., Mitchell, P., & Whalen, S. (2017).

Kuh, G. D., Kinzie, J., Schuh, J. H., & Whitt, E. J. (2005). *Student success in college: Creating conditions that matter.* Jossey-Bass.

Tinto, V. (2010). From theory to action: Exploring institutional conditions for student retention. In M. B. Paulsen (Ed.), *Higher education: Handbook of theory and research* (pp. 51–89). Springer.

35 **Brower, R., Bertrand Jones, T., Tandberg, D., Hu, S., & Park, T. (2017).**

Ganga, E., Mazzariello, A., & Edgecombe, N. (2018).

36 **Daugherty, L., Gomez, C. J., Gehlhaus, D., Mendoza-Graf, A, & Miller, T. (2018).**

37 **Center for Urban Education. (n.d.).** Equity and student success.

38 **HCC Co-Requisite Acceleration Program:** https://www.hccs.edu/programs/hcc-co-requisite-acceleration-program/hcc-co-requisite-acceleration-program-faculty/

39 **CCRC [Community College Research Center] (2014).** *What we know about developmental education outcomes. Research overview.* Teachers College, Columbia University. https://ccrc.tc.columbia.edu/media/k2/attachments/what-we-know-about-developmental-education-outcomes.pdf

38 - 39 ENDNOTES

Cox, R. (2018).

Edgecombe, N., Cormier, M., Bickerstaff, S., & Barragan, M. (2013).

40 **Miles, M. B., Huberman, A. M., & Saldaña, J. (2014).** *Qualitative data analysis: A methods sourcebook* (3rd ed.). Thousand Oaks, CA: Sage.

Saldaña, J. (2015). *The coding manual for qualitative researchers* (3rd ed.). Thousand Oaks, CA: Sage.

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