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The Impacts and Experiences of Corequisite Remediation for Latinx Students

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Abstract

Colleges across the United States are now placing most or all students directly into college-level courses and providing supplementary, aligned academic support alongside the courses, also known as "corequisite remediation." Developmental education reforms like corequisite remediation could advance racial and ethnic equity in postsecondary education by facilitating early academic progression. However, there is limited evidence available on differential impacts of corequisite models by race and ethnicity. To better understand the potential for differential impacts of English corequisites for Latinx students, this study leverages data from a randomized control trial across five large urban community colleges across Texas. We also utilize student survey data to develop a deeper understanding of how corequisites shape the experiences of Latinx students in their college-level English courses. Latinx students in our study colleges saw larger benefits from taking corequisite English than non-Latinx students in terms of gateway course completion. The survey findings suggest that corequisites provided an environment where Latinx students felt less academically overwhelmed and less bored relative to patterns observed for traditional DE course enrollees. However, Latinx students in corequisites also reported being less likely to participate in class discussions and ask questions relative to their non-Latinx peers.

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Introduction

Colleges across the United States are transforming the way students gain access to college-level English and math coursework. Rather than requiring students deemed "not college ready" to take developmental education (DE) courses prior to taking college-level courses, many colleges are now placing most or all students directly into college-level courses and providing supplementary, aligned academic support alongside the courses. This approach is commonly referred to as "corequisite remediation" or "corequisites." A growing body of evidence shows that corequisites can help to improve students' early college outcomes (Boatman, 2021; Cho et al., 2012; Logue et al., 2019; Miller et al., 2022; Ran & Lin, 2022), and may improve their completion rates, particularly when paired with other interventions (Cho et al., 2012; Logue et al., 2019).

The hope is that DE reforms like corequisites could also advance equity in postsecondary education by facilitating early academic progression. However, some argue that broad-based structural reforms like corequisites are unlikely to advance equity because they have been designed and implemented without attention to the specific experiences and needs of minoritized students (Brathwaite et al., 2020; Roberts, 2021). On the other hand, there are a few reasons why structural reforms such as corequisites could disproportionally benefit students of color.

First, student groups who have been minoritized in postsecondary education, including Hispanic or Latino/a/x students (hereto referred to as "Latinx students"), are more likely to be assigned by their college to DE courses – courses that do not offer credits that count towards graduation (Alfonso, 2006; Aud et al., 2011; Bailey et al., 2010; Bettinger & Long, 2005; Chen, 2016; Park et al., 2018). Second, research finds colleges to be less effective in getting students of color to pass DE courses in comparison to White students (Fong et al., 2015). As a result of these placement and completion differences, DE reforms like corequisites may disproportionately benefit

students of color. Third, corequisite models may call for changes to the structure and content of academic support such as reduced class sizes, the use of cohorts, personalized support, and instruction around more rigorous college-level reading and writing assignments (Bahr et al., 2022; Daugherty et al., 2018; Ryu et al., 2022). Latinx students and other minoritized groups may benefit differently from these changes in how DE support is provided.

The limited evidence available on ethnic differences in the impacts of accelerated models of English and math instruction suggest that Latinx students may be equally or more likely to benefit relative to their non-Latinx peers. An experimental study of corequisites and math pathways in CUNY showed similar impacts for Latinx and non-Latinx students (Logue et al., 2016). Quasi-experimental research in Florida shows that the elimination of DE requirements increased the cohort-based passing rates of gateway courses in math and English to a greater degree for Latinx students (Park et al., 2018). These studies focused on impacts and did not attempt to explain how or why Latinx students might have seen different impacts.

Between fall 2016 and fall 2018, we conducted a randomized control trial (RCT) across five large urban community colleges across Texas, assigning students who placed into developmental reading and writing to either an English corequisite or a traditional standalone DE reading and writing course. Using data collected from this RCT, we then examined the differences between Latinx and non-Latinx students' experiences in corequisite remediation in two ways. First, we investigated the impacts of English corequisites on academic outcomes including completion of college-level English courses and persistence by ethnic background. Next, we examined ethnic patterns in student survey responses. The descriptive analysis of self-reported data

allows us to develop a deeper understanding of how corequisites might be advancing equity for Latinx students.

We find that the impacts of corequisite remediation on completion of college-level English courses were larger for Latinx students relative to non-Latinx students; the intervention had disproportionately positive impacts on likelihood of passing a college-level English course for Latinx students relative to non-Latinx students. These findings align with some of the prior evidence and suggest that corequisites were advancing equity in gateway course completion for Latinx students in the five Texas colleges participating in the study. On the other hand, we did not find impacts of corequisite remediation on *persistence* for Latinx or non-Latinx students. This suggests that additional supports and reforms may be needed to move the needle on these outcomes and address inequities in completion.

The next section provides additional background on the existing body of evidence on DE and Latinx students. We also describe the Texas context for DE reform and the corequisites being implemented across the five institutions. We then provide an overview of our experimental study and our approach to analysis of administrative and student survey data. We conclude by presenting results and discussing how to interpret these results.

Background

The findings in this paper build on an extensive literature documenting college and developmental education experiences for Latinx students, as well as the burgeoning literature on the efficacy of corequisites. These findings are also set within the Texas higher education context, which has been implementing major DE reforms over the last decade.

College and Developmental Education Experiences of Latinx Students

The literature detailing the experiences of Latinx students in college is extensive and documents a wide range of academic and nonacademic factors that shape postsecondary progress for Latinx students (see Crisp, Taggart, & Nora, 2015 for a systematic review of studies on the experiences of Latinx students associated with academic outcomes). However, much of this research is descriptive and does not speak to specific academic practices or programs that uniquely benefit Latinx students.

Generally, research indicates that colleges have been less effective in retaining and graduating Latinx students in comparison to their non-Latinx peers (Flores et al., 2017; Fry, 2004; Swail et al. 2004). Moreover, DE has played an important role in the college experience for many Latinx students. Studies indicate that Latinx students are disproportionately likely to be placed in DE given their lower average scores on standardized placement tests (Alfonso, 2006; Aud et al., 2011; Bailey et al., 2010; Bettinger & Long, 2005; Chen, 2016; Park et al. 2018). Qualitative research documents the Latinx student experience in DE courses and describes how pedagogical practices could be adapted to better support minoritized groups (e.g., Acevedo-Gil et al., 2015).

Many Latinx students have diverse language backgrounds, and this factor could also shape their DE experiences. For example, research suggests that the DE assessment and placement processes can act as a particular barrier for English Learner (EL) students (Bunch & Panayotova, 2008). English language instruction has largely been provided through non-credit courses that are distinct from college DE programs and college courses. But some institutions have developed alternative sequences of credit-bearing reading and writing support for EL students and separate processes for assessing language proficiency alongside DE assessment and placement (Razfar & Simon, 2011). These English as a second language (ESL) tracks are often longer than

traditional DE tracks and less subject to reforms such as acceleration, which raises concerns that they may be acting as barriers to college success rather than supports for EL students (Hodara, 2015). Given that ESL assessment and participation in alternative tracks is typically voluntary for EL students who are not on international student visas, only a small number of students participate in these programs, and traditional DE sequences are where many Latinx students start their college English and math instruction.

It is worth noting that DE policies and programs at the state and institutional levels have largely been designed and implemented without explicit attention to minoritized groups, and Latinx students in particular. Institutions and faculty members often tailor courses to student populations, but the structure and content of the reforms are generally agnostic to ethnic background. One exception to this was the Puente program. The Puente program was explicitly designed to serve Latinx communities by providing validating counseling and mentoring and as well as intensive English instruction with a focus on Latinx culture and identity (McGrath & Galaviz,1996). While evidence of the efficacy of the Puente program is limited, it is a rare example of a promising program with a DE component explicitly designed to improve outcomes for Latinx students (Laden, 1999; Rendón, 2002).

Corequisite Remediation and Latinx Students

While recent evidence suggests that corequisites can reduce barriers to college success for all students, there is limited evidence examining differences in impacts of corequisites and student experiences for minoritized groups and Latinx students (Cho et al., 2012; Logue et al., 2019; Miller et al., 2022; Ran & Lin, 2022). The reform is relatively new, so the evidence base is growing, and while corequisite studies are often conducted in diverse, open-access institutions, few have been sufficiently powered to

examine differences across student groups. There are two studies that have explicitly tested for differences in impacts for Latinx and non-Latinx students. A randomized study of a blended corequisites and math pathways reform in CUNY did not find statistically significant differences in completion rates for Latinx students relative to non-Latinx students (e.g., Logue et al., 2019). A quasi-experimental study of Florida's elimination of DE requirements found a higher positive impact on the likelihood of passing a math or English gateway course for Latinx students relative to White students (Park et al., 2018).

Features of broad-based DE reforms present in some corequisite approaches could also shape experiences differently for Latinx students and other minoritized groups in ways that address equity gaps. For example, particular approaches to corequisite remediation that create learning communities, cohort models, or collaborative learning may contribute to building strong social relationships for students. In turn, these stronger social relationships could lead to better academic experiences and outcomes (Edgecombe, 2011; Karp, 2011). Studies also suggest that culturally responsive pedagogy is important to effectively supporting Latinx students (Acevedo-Gil et al., 2015; Rendón, 2002). Although there is theory suggesting that culturally responsive pedagogy and social relationships might be valuable for minoritized populations, there is no rigorous research demonstrating the value of structures or instructional components for Latinx students.

There also may be concerns about corequisite requirements "crowding-out" other college-level coursework (Kane et al., 2019) and Latinx students may be particularly vulnerable to corequisite course crowd-out. The additional time and financial commitment for coursework in a single subject may be challenging for Latinx students given evidence that they are more likely to face time and financial constraints

given their off-campus work schedules, family responsibilities, and lack of financial supports (Crisp & Nora, 2015; Nora et al., 1996). The role of language proficiency and the ability of English corequisites to effectively support students with diverse language backgrounds will also be relevant to the student experience for some Latinx students.

Texas Context

Expansion of Corequisite Remediation

Texas is home to the second largest community college system in the country with 60 public two-year college systems serving more than 700,000 students as of fall 2017 (NCES, 2019; NCES, 2021). In 2011, Texas legislature passed Senate Bill 162, which required the Texas Higher Education Coordinating Board (THECB) to develop a statewide plan for DE reform that encouraged the adoption and scaling of evidence-based best practices to improve student academic success. The THECB's plan required all public institutions to implement at least one accelerated strategy by 2015, with corequisites being one of the focal acceleration strategies.

In June 2017, the Texas governor signed House Bill (HB) 2223, requiring institutions across the state to scale corequisite models. The law mandated a three-year progressive scale-up of student enrollment in corequisite remediation to 25% of students in DE by fall 2018, 50% by fall 2019, and 75% by fall 2020.[4] Although our study took place during these policy changes, between fall 2016 and fall 2018, all study participants entered college before statewide scaling under HB 2223 began.

State guidance around HB 2223 and prior DE reform policy required that students be co-enrolled in a credit-bearing course and a DE support in the same subject

[4] Some groups of students were exempt from the HB 2223 requirements, including students assessed with academic skills below the ninth-grade level and students in English courses for speakers of other languages.

area and in the same semester. However, the DE support in corequisite models could be offered as a traditional course, or it could be offered as a non-course-based option (e.g., mandatory attendance at the writing center, labs with modularized computer-adaptive instruction). Students received up to four hours of additional weekly instructional time tied to their college-level course (e.g., students would enroll in a three-hour English course and between one and four credit hours of Integrated Reading and Writing support). Texas colleges had considerable flexibility over the design and implementation of corequisites in terms of structure, content, pedagogy, and student eligibility.[5]

The Five Study Colleges and their English Corequisites

This study was conducted at five institutions that were among the largest community colleges in Texas. Colleges participating in the study were all located in urban and suburban regions of Texas. One of the five colleges had a student population that was almost entirely Latinx, while the other four colleges had smaller, but substantial populations of Latinx students. The colleges all served substantial populations of low-income students. All colleges assigned large proportions of incoming students to DE.

All participating colleges volunteered to participate in the study and had established their own approaches to corequisite remediation prior to participation. For these reasons, the lessons learned from this study may not extend to all Texas community colleges. Further, these institutions were very early in designing and implementing their corequisite models, so these initial models we examined may not be

[5] State policy required that all public colleges use the same assessment and threshold score to determine college readiness, but colleges could determine the range of test scores below the threshold for entry into corequisite remediation and the use of other supplementary measures to determine eligibility.

the same as those that they scaled when adapting corequisites to serve more students. The instructors teaching corequisites typically volunteered or were selected by the institution prior to the study, so we are unable to disentangle teacher quality from the impacts of the corequisite model.

The various DE approaches used, and their respective time commitments, varied slightly across Texas colleges. The traditional (non-corequisite) approach to DE instruction was a standalone Integrated Reading and Writing DE course that was mandated as the highest-level DE course in reading and writing statewide. Instructional hours for the course varied across the study colleges from three to five hours of instruction. The corequisite approach we examined consisted of a three credit-hour English composition course across colleges, paired with an additional, required academic support that ranged from one to three additional hours of weekly reading and writing support. The five colleges in our study implemented slightly different models of corequisites that fell into three categories:

1. *Extended instructional time model:* One institution implemented this model. The DE support was built as an extension of time for the college-level course, with the DE support and college course indistinguishable to students as two separate components and scaffolding embedded throughout the course (i.e., a 4-hour English course rather than a 3-hour course). The college course and DE support were taught by the same instructor and focused on a common set of coursework, and sections of the corequisite were populated entirely by students required to take DE.
2. *Accelerated Learning Program (ALP) models:* Three of the colleges in the study implemented ALP models, a common approach to corequisites that was among

the first to be scaled in reading and writing DE.[6] Under the ALP model, a small cohort of students assigned to DE (10 to 15) were co-enrolled in the English course with "college-ready" students, and those assigned to DE were required to participate in an aligned DE support course session as a learning community/cohort. The same instructor taught both the college course and the support. The DE support portion aimed to provide additional support around the college coursework, typically utilizing the same textbook but often supplementing the assignments for the English course with some additional assignments.

3. *Academic support service models:* Two of the colleges offered academic support service models. In these models, students assigned to DE were co-enrolled with "college-ready" students in the college course. Rather than the course-based support typically offered for the ALP model, these corequisites structured the DE support as a non-course-based support, requiring the student to make weekly use of an existing college support service (e.g., tutoring in the writing center or participation in instructor office hours). The school with a tutoring model used writing center staff to oversee the corequisite DE support, while office-hour models relied on the college course instructor to provide the support. The academic support centered on the college coursework, although occasionally instructors assigned some small amounts of additional coursework to provide students with practice or targeted guidance on a particular skill.

While this paper does not evaluate student experiences by the different types of corequisite models, a prior paper from this research study describes consistent results on

[6] The third college to implement ALP only did so in fall 2018 (cohort 4), which is not included in the analysis for this paper.

early academic impacts across the various corequisite models (Miller et al., 2022). The experiences specific to Latinx students could differ across corequisite models. However, our small sample size does not allow us to examine potential differences with certainty.

A prior report from the study also describes the contrasts in student experiences for students assigned to corequisites and traditional DE at these five colleges based on survey and qualitative data (Daugherty et al., 2019). Relative to students enrolled in standalone DE courses, students taking corequisites, across all models, received more hours of reading and writing instruction within the first semester, and more of this coursework was credit-bearing. Students enrolled in corequisite courses experienced smaller class sizes compared to traditional DE courses. Students enrolled into corequisite sections had peers with higher average reading and writing assessment scores.

The report also documented student perspectives about their course enrollment, and self-reported time spent on different activities based on survey data. Students assigned to corequisites in the five colleges were less likely to report their coursework as too easy, repetitive, or boring; less likely to know they were in DE and less likely to feel embarrassed about their course; and reported spending less time on individual desk work (Daugherty et al., 2019). The report did not examine differences between Latinx and non-Latinx students in corequisite experiences.

Methodology

Research Design and Empirical Specification

To investigate the causal impact of corequisite remediation on the academic outcomes of students, we conducted a student-level randomized controlled trial. Students were randomly assigned to either an English corequisite or the traditional

semester-long Integrated Reading and Writing DE course that was required prior to entering college-level English. We refer to the set of students randomized to corequisite remediation as the "treatment group" and those randomized to the stand-alone Integrated Reading and Writing course as the "control group."[7] In most cases, students had a 50% chance of being assigned to the treatment condition.[8] The study was implemented with fidelity and had relative low rates of non-compliance.[9]

To estimate the intent-to-treat (ITT) effect of randomizing students into the treatment (i.e., college-level English Composition I course paired with a concurrent reading and writing DE support), we estimated the following regression model:

$$Y_{ci} = \delta_c + \psi X_{ci} + \theta S_{ci} + \eta R_{ci} + u_{ci} \qquad (1)$$

where Y_{ci} is the outcome for student i at college c (either persistence to the third semester or passing the first college-level writing course), X_{ci} is a vector of student demographic characteristics, and δ_c is a college-by-cohort fixed effect. The variable of primary interest in this study is R_{ci}, the random assignment indicator, which was equal to 1 if the student is assigned to treatment and 0 otherwise. The coefficient associated with this variable, η, captures the ITT of corequisite English instruction. Because of the randomized controlled design, controlling for covariates such as demographics and assessment scores was not necessary to obtain unbiased estimates. However, including

[7] Prior to the intervention, students eligible for our study would have been placed into the highest level of stand-alone DE courses, which consisted of an Integrated Reading and Writing course. This course was mandated as the highest-level reading and writing DE offering for all public colleges in Texas as of spring 2015. Therefore, the traditional DE course in which control students enrolled was the same across the participating colleges.

[8] Because one of the community colleges participating in the study wanted to scale up corequisite remediation more quickly, we used a higher treatment probability of 75% for Cohort Three at that college.

[9] For more information on study implementation, see Miller et al. (2022).

these controls allowed us to improve statistical precision.[10]

Data Sources and Sample

The experimental study focused on first-time-in-college students at five community colleges in Texas with diverse student populations. The study took place between fall 2016 and fall 2018, as the five colleges were testing and beginning to scale corequisite models. The findings in this paper focus on the fall 2016 and fall 2017 cohorts.[11] All five colleges used the state's placement exam (the Texas Success Initiative Assessment) to determine study eligibility and allowed students to participate in the study if they tested into the range eligible for the highest level of DE course.[12]

Administrative Data

To assess student achievement in Texas community colleges, we used administrative data from the Texas Higher Education Coordinating Board. These files include extensive information on demographic characteristics (e.g., race and ethnicity, gender, and age), information on enrollment (e.g., full/part-time status and degree sought), and course enrollment and grades. These data were used for our outcomes and tests for heterogeneity across outcomes. We describe the outcomes and these variables in more

[10] Control variables include age, economic disadvantage, gender, part-time status, type of secondary degree (high school diploma or GED), whether English is the student's first language, whether the student is the first in their family to attend college, and individual dummy variables for missing information on race and ethnicity, economic disadvantage, gender, first language, part-time status, high school degree type, and parents' education. We also included fixed effects variables for cohort and college attended. We ran models with and without these controls and obtained similar results.

[11] Cohorts excluded from the analysis in this paper come from spring 2017 and fall 2018.

[12] Students can be exempted from placement testing by demonstrating readiness through other test scores (e.g., SAT, end-of-course exams) Or falling into special categories (e.g., veterans).

detail in the subsequent sections. Our sample was restricted to students who took the baseline survey and could be found in the administrative data.

Student Baseline Survey Data

At the time of recruitment into the randomized study, we asked all students from all cohorts (fall 2016, spring 2017, fall 2017, and fall 2018) consenting to study participation to complete an online baseline survey. The baseline survey captured detailed background information on students, including demographic information (e.g., race and ethnicity, parents' education, marital status, has children, languages spoken at home), pre-college academic characteristics (e.g., high school/GED completion, high school curriculum opportunities and performance), academic attitudes and expectations (e.g., opinions about how their high school prepared them for college, intentions for college enrollment and achievement, expectations about their own performance in college, motivations for attending college, approaches to schoolwork), and other factors that could shape their college experiences (e.g., transportation challenges, work situation, study behaviors). We used this information to assess the composition of our treatment and control samples, control for differences between groups in the impact analysis, and examine differential effects for student populations of interest.

Student Follow-Up Survey Data

We conducted a follow-up survey approximately seven months after study participants first enrolled in college. The follow-up surveys include self-reports of students' experiences in English courses (e.g., academic rigor, opportunities for student-centered learning, support for success skills, and exposure to stigma) and other early college experiences (e.g., sense of belonging, learning strategies, academic perseverance, and academic behaviors). The survey was fielded only with the fall cohorts in the study. For

the fall 2016 and fall 2017 cohorts, the study team randomly sampled a subset of the overall randomized student sample for the follow-up survey.[13]

Sample

In this study, we focus on the fall 2016 and fall 2017 cohorts (cohorts 1 and 3) for all analyses. These cohorts had the most robust samples and survey data; only one college participated in fall 2018, and we had no survey data for the spring 2017 cohort. The analyses in this paper center on two distinct analytic samples:

1. Impact analysis – The impact analysis sample includes 1,021 students that were randomized in their respective cohorts (fall 2016 & fall 2017), enrolled in college that fall, and had their baseline survey information matched to administrative data.
2. Student experiences analysis – This analysis relies on study participants from the fall 2016 and fall 2017 cohorts who took the baseline survey and responded to the follow-up survey (n=505). This sample is weighted to reflect demographic make-up of the larger sample (weighted n=941).

Background characteristics on students in each of our analytic samples are shown in Tables 1 and 2. About 6 in 10 students in both analytic samples self-identify as Latinx. On average, Latinx students in both analytic samples are slightly younger and have higher rates of economic disadvantage than their non-Latinx peers. More than half of Latinx students across samples are female and about a third attend college at part-time status. About half of Latinx students are first in their family to attend college, whereas a

[13] Response rates were 69 percent across these two cohorts. Students were also surveyed in fall 2018, but given that only one college participated and we had low response rates (32 percent), we chose to focus on the earlier cohorts.

quarter of non-Latinx students are first in their family to attend college. Nearly 6 in 10 Latinx students report that English is their first language, whereas 8 in 10 non-Latinx report English as their first language.

[Table 1 near here]

Although not shown in Table 1, there are additional characteristics of the analytic samples worth mentioning. First, students from the first cohort in the study are overrepresented in the two analytic samples (Impact and Student Experiences sample), particularly for Latinx students and students in the control group.[14] In addition, Latinx students are overrepresented in one of the participating colleges such that over a quarter of Latinx study participants attended that college in comparison to less than 5% of non-Latinx study participants attended that same college. The overrepresentation of Latinx students in one college and in the first cohort could have implications for interpreting the results of the analyses of student experiences.

[Table 2 near here]

Outcomes

Academic Achievement

We examine multiple academic outcomes in this study, including passing English Composition I, the common entry-level college composition course in Texas public colleges, passing English Composition II, passing a college-level reading course, continued enrollment and/or completion in subsequent semesters (defined in the paper

[14] In the Impact Analysis sample, 62% of non-Latinx students in the control group were in Cohort 1 whereas 81% of Latinx students in the control group, 55% of non-Latinx students in the treatment group, and 65% of Latinx students in the treatment group were. In the Student Experience sample, 65% of non-Latinx students in the control group were in Cohort 1 whereas 77% of Latinx students in the control group, 55% of non-Latinx students in the treatment group, and 64% of Latinx students in the treatment group were.

as "persistence"). We examine these academic outcomes for up to five fall/spring semesters to allow sufficient time to observe outcomes for entering students.

We coded each academic outcome as a binary variable, so coefficients can be interpreted as the change in the probability of attaining the outcome. Once students passed a first college-level course, we considered them as having achieved this milestone for every subsequent semester. For persistence, our outcome accounts only for the enrollment in the semester of interest; for example, a student who enrolls in fall 2016, does not enroll in spring 2017, but does enroll in fall 2017 is marked as achieving the persistence enrollment milestone for the third semester, but not for the second semester. Students who were currently enrolled in another Texas community college, had transferred upward to a Texas four-year college at any time in the past, or had completed a degree or certificate at any time in the past were also counted as having persisted.

Student Experiences

Survey responses on students' academic experiences were grouped into four contrast areas: academic rigor, opportunities for student-centered learning, support for success skills, and exposure to stigma (see Table 3). Survey responses were then aggregated into binary categories expressed as above/below a threshold Likert scale score. Later results represent the values above the Likert scale threshold. Chi-square tests were used to determine statistical significance of group differences. We used chi-square tests to assess differences in the proportion of students endorsing a statement between students who took corequisites and those who did not.

[Table 3 near here]

Results

Findings on How Placement into Corequisite Remediation Affects Academic Outcomes

In this section, we present findings on key differences in academic outcomes for students placed into corequisite remediation by ethnicity. As shown in Table 4, the intervention had a larger, positive effect on the likelihood of passing English Composition I and English Composition II for Latinx students compared to non-Latinx students. This pattern was consistent across academic terms. In other words, students in the control group, Latinx or non-Latinx, did not appear to catch up to their counterparts in the treatment group. In addition, the intervention had a disproportionately positive impact on the likelihood of taking English Composition II for Latinx students relative to non-Latinx students. We did not detect differential impacts of the intervention by ethnic background on other academic outcomes like passing college-level reading courses or persistence.

Findings on Student Experience by Whether Student Took Corequisite Remediation

In this section, we present findings on students' self-reported course experiences by type of course taken and ethnic background (Table 5). Differences in how Latinx students perceived their courses and their experiences in corequisites can potentially shed light on how the reform was helping to improve Latinx course progression.

Many of the findings were similar for Latinx and non-Latinx students, but Latinx students in corequisites had more favorable patterns in a few areas. Latinx students were much more likely than non-Latinx students to report feeling overwhelmed by courses when enrolled in traditional DE (70.5% versus 52.4%), but this Latinx/non-

Latinx difference was smaller and no longer statistically significant for students in corequisites (59.7% versus 51.0%). Latinx students taking a corequisite were less likely than non-Latinx students to report feeling bored in their course (14.7% vs 26.8%), while there was no statistically significant difference between the two groups when enrolled in traditional DE. And looking at just those in corequisites, Latinx students were more likely than non-Latinx students to report the instructor presenting course materials in an engaging way (90.6% versus 79.0%).

There were also less favorable findings for Latinx students in one area, active participation in discussion. Latinx students taking the corequisites were less likely to report asking questions frequently relative to than their non-Latinx peers (37.3% versus 60%) and less likely to report frequent participation in class discussions (57.8% versus 84.5%). These same gaps in participation rates were not seen for students enrolled in traditional DE courses.

Discussion

This is one of the first studies demonstrating that Latinx students benefit more than others from a major structural DE reform, namely corequisite remediation in English. This suggests that structural DE reforms, particularly corequisites, have the potential to help ameliorate equity gaps in the path to college success for students of color, particularly Latinx students.

Specifically, Latinx students in our study colleges saw larger benefits from taking corequisite English than non-Latinx students in terms of gateway course completion. The literature suggests that passing gateway courses are critical stepstones to college success (Calcagno et al., 2007; Leinbach & Jenkins, 2008), so this evidence is promising. In addition, our survey data helped to provide some understanding around

student experiences in corequisites and traditional DE courses and how they might differ for Latinx students. The findings suggest that corequisites provided an environment where Latinx students felt less academically overwhelmed and less bored relative to patterns observed for traditional DE course enrollees. Latinx students were also more likely to feel that course material was presented by instructors in an engaging way in the corequisite. On the other hand, Latinx students reported being less likely to participate in class discussions and ask questions relative to their non-Latinx counterparts, and this pattern was unique to corequisites. This raises concerns that corequisite environments may not have provided sufficient venues for participation by Latinx students or may have otherwise discouraged participation.

There are features of the corequisites that may have contributed to lower rates of boredom and feelings of being academically overwhelmed among Latinx students, and/or may have discouraged participation Latinx students. The corequisite sections had fewer students per instructor, which may have offered more opportunities for personalized support relative to the standalone DE course. Students had more instructional time to devote almost exclusively to scaffolding around the college English course assignments. Students also reported less time on individual deskwork, and devoted course time to essay and reading assignments that were longer and potentially more complex. The cohort-based design of the models may have contributed to feelings of cohesion with other students assigned to DE, but the mixed levels of academic preparation in the college-level English courses may have detracted from feelings of cohesion with the students deemed "college-ready" and not required to take the support. Our study design does not, however, allow us to determine how these features of structure or pedagogy might have contributed to the favorable findings around Latinx student experiences in the corequisite.

While we found promising results on early metrics in students' postsecondary paths in terms of passing gateway and second-year English courses, we did not find impacts on persistence for any students, including Latinx students. This suggests that the corequisite reforms in these five colleges did not fully address the factors that were driving student dropout after completing DE or corequisites. To move the needle on college completion rates and advance priorities around equity, corequisites are insufficient. Other researchers suggest that incorporating corequisites as part of a more holistic intervention approach may be a promising approach to advancing equity (Miller & Martorell, 2022). Additional reform and support may be needed to design college environments that effectively serve students through to completion.

It is important to note that corequisite models varied across institutions, the context for traditional DE differed, and teacher quality and distribution across courses varied. Latinx students were disproportionately concentrated in a college that demonstrated the largest impacts, and this may be driving the differences in estimates. There are several possible explanations for the large impacts at this institution that are unrelated to the large Latinx population: the corequisite model offered more individualized support (i.e., one-on-one office hours rather than course-based support), corequisite instructors had to participate in training, and the traditional DE course requirements for students were particularly burdensome. In other words, our findings of larger benefits could be driven by design of the corequisite model or wider disparities in teacher quality across standalone DE courses that drove the differences in impacts and experiences.

There are several other limitations to the study. First, the results may not be generalizable, as the study was set in a limited number of community colleges not representative of most colleges in Texas or across the nation. In addition, it is worth

noting that our study sample tested just below the score threshold used to determine DE placement. Thus, our findings may not be generalizable to students scoring far below this range. Moreover, the corequisite approaches examined are only a subset of possible corequisite models and findings may not apply to other corequisite approaches. Finally, we did not have a large enough sample of students to examine differences in academic outcomes or experiences across corequisite models or colleges.

More research is needed to unpack the implications of DE reforms like corequisites for equity. For example, this study does not examine issues of intersectionality. There is likely variation in the academic outcomes and experiences of Latinx students taking corequisites by other factors like gender, socioeconomic status, immigrant background, fluency with English, and national origin. Future studies should consider the use of a sample size that would allow for further exploration of how these corequisite interventions affect students differently by other aspects of their background.

Conclusion

While we agree with researchers and other stakeholders who have argued that the potential for structural reforms such as corequisites to improve equity is significantly hampered due to their broad-based nature and lack of intentional focus on achieving equity, we are encouraged by findings that demonstrate that the core features of this increasingly popular structural reform is likely to move the needle on equity on early postsecondary outcomes on its own accord. We encourage researchers and practitioners to collaborate to build and refine DE approaches that incorporate the core features of corequisites while also focusing on addressing equity gaps explicitly. DE reforms such as Puente and culturally responsive student success approaches such as the Men of Color Academic Achievement (MoCCA) project at Community College of Baltimore

County or Mentoring to Achieve Latino Educational Success (Project MALES) run by the University of Texas at Austin may be particularly suited towards adaptation to incorporate broader structural reforms such as corequisite remediation.

References

Acevedo-Gil, N., Santos, R. E., Alonso, Ll., & 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. https://doi.org/10.1177/1538192715572893

Alfonso, M. (2006). Hispanic educational attainment in sub-baccalaureate programs. *New Directions for Community Colleges*, 133, 17-25. https://doi.org/10.1002/cc.224

Aud, S., Hussar, W., Kena, G., Bianco, K., Frohlich, L., Kemp, J., & Tahan, K. (2011). *The condition of education 2011*. NCES 2011-033. National Center for Education Statistics. https://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2011033

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. https://doi.org/10.1016/j.econedurev.2009.09.002

Bahr, P. R., Boeck, C. A., & Cummins, P. A. (2022). Is age just a number? A statewide investigation of community college students' age, classroom context, and course outcomes in college math and English. *Research in Higher Education*, 63(4), 631-671. https://doi.org/10.1007/s11162-021-09660-w

Bettinger, E. P., & Long, B. T. (2005). Remediation at the community college: Student participation and outcomes. *New Directions for Community Colleges*, 2005(129), 17-26. https://doi.org/10.1002/cc.182

Boatman, A. (2021). Accelerating college remediation: Examining the effects of math course redesign on student academic success. *The Journal of Higher Education*, 92(6), 927-960.

Brathwaite, J. R., Fay, M. P., & Moussa, A. (2020). *Improving developmental and college-level mathematics: Prominent reforms and the need to address equity*. Community College Research Center, Columbia University. https://doi.org/10.7916/d8-8msm-3y40

Bunch, G.C., & Panayotova, D. (2008). Latinos, language minority students, and the construction of ESL: Language testing and placement from high school to community college. *Journal of Hispanic Higher Education*, 7(6), 6-30. https://journals.sagepub.com/doi/10.1177/1538192707310507

Calcagno, J. C., Crosta, P., Bailey, T., & Jenkins, D. (2007). Stepping stones to a degree: The impact of enrollment pathways and milestones on community college student outcomes. *Research in Higher Education*, 48(7), 775-801. https://doi.org/10.1007/s11162-007-9053-8

Chen, X. (2016). *Remedial coursetaking at us public 2-and 4-year institutions: Scope, experiences, and outcomes. Statistical analysis report. NCES 2016-405*. National Center for Education Statistics. https://files.eric.ed.gov/fulltext/ED568682.pdf

Cho, S. W., Kopko, E., Jenkins, D., & Jaggars, S. S. (2012). *New evidence of success for community college remedial English students: tracking the outcomes of students in the Accelerated Learning Program (ALP)*. CCRC Working Paper No. 53. Community College Research Center, Columbia University. https://doi.org/10.7916/D8JS9ZTP

Crisp, G., Taggart, A., & Nora, A. (2015). Undergraduate Latina/o students: A systematic review of research identifying factors contributing to academic success outcomes. *Review of Educational Research*, 85(2), 249-274. https://doi.org/10.3102/0034654314551064

Daugherty, L., Gomez, C. J., Carew, D. G., Mendoza-Graf, A. C., & Miller, T. (2018). *Designing and implementing corequisite models of developmental education: Findings from Texas community colleges* (RR-2337-IES). Santa Monica, CA: RAND Corporation. https://www.rand.org/content/dam/rand/pubs/research_reports/RR2300/RR2337/RAND_RR2337.pdf

Daugherty, L., Mendoza-Graf, A., Gehlhaus, D., Miller, T., & Gerber, R. (2019). *Student experiences in English corequisite remediation versus a standalone developmental education course: findings from an experimental study in Texas community colleges.* Santa Monica, CA: RAND Corporation, 2021. https://www.rand.org/pubs/research_reports/RRA810-1.html.

Edgecombe, N. (2011). *Accelerating the academic achievement of students referred to developmental education*. CCRC Working Paper No. 30. Community College Research Center, Columbia University. https://doi.org/10.7916/D8T44297

Flores, S. M., Park, T. J., & Baker, D. J. (2017). The racial college completion gap: Evidence from Texas. *The Journal of Higher Education*, 88(6), 894-921. https://doi.org/10.1080/00221546.2017.1291259

Fong, K. E., Melguizo, T., & Prather, G. (2015). Increasing success rates in developmental math: The complementary role of individual and institutional characteristics. *Research in Higher Education*, 56(7), 719-749. https://doi.org/10.1007/s11162-015-9368-9

Fry, R. (2004*). Latino youth finishing college: The role of selective pathways*. Pew Hispanic Center. https://www.pewresearch.org/wp-content/uploads/sites/5/reports/30.pdf

Hodara, M. (2015). The effects of English as a second language courses on language minority community college students. *Educational Evaluation and Policy Analysis*, 37(2), 243-270. https://doi.org/10.3102/0162373714540321

Kane, T. J., Boatman, A., Kozakowski, W., Bennett, C., Hitch, R., & Weisenfeld, D. (2019). *College remediation goes back to high school: Evidence from a statewide program in Tennessee* (No. w26133). National Bureau of Economic Research. https://www.nber.org/papers/w26133

Karp, M. M. (2011). *Toward a new understanding of non-academic student support: Four mechanisms encouraging positive student outcomes in the community college*. CCRC Working Paper No. 28. Assessment of Evidence Series. Community College Research Center, Columbia University. https://doi.org/10.7916/D8R78PFD

Laden, B. V. (1999). Socializing and mentoring college students of color: The Puente Project as an exemplary celebratory socialization model. *Peabody Journal of Education*, 74(2), 55-74. https://doi.org/10.1207/s15327930pje7402_6

Leinbach, D. T., & Jenkins, D. (2008). *Using Longitudinal Data to Increase Community College Student Success: A Guide to Measuring Milestone and Momentum Point Attainment*. CCRC Research Tools No. 2. Community College Research Center, Columbia University. https://doi.org/10.7916/D8736NZX

Logue, A. W., Watanabe-Rose, M., & Douglas, D. (2016). Should students assessed as needing remedial mathematics take college-level quantitative courses instead? A randomized controlled trial. *Educational Evaluation and Policy Analysis*, 38(3), 578-598. https://doi.org/10.3102/0162373716649056

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. https://doi.org/10.3102/0162373719848777

McGrath, P., & Galaviz, F. (1996). The Puente project. *About Campus*, 1(5), 27-30. https://teachersinstitute.yale.edu/pubs/A20/mcgrath-galaviz.html

Miller, T., Daugherty, L., Martorell, P., & Gerber, R. (2022). Assessing the effect of corequisite English instruction using a randomized controlled trial. *Journal of Research on Educational Effectiveness*, 15(1), 78-102. https://doi.org/10.1080/19345747.2021.1932000

Miller, T., & Martorell, P. (2022). *Using corequisite remediation to help students progress to college-level courses*. MDRC. https://www.mdrc.org/publication/using-corequisite-remediation-help-students-progress-college-level-courses

Nora, A., Cabrera, A., Serra Hagedorn, L., & Pascarella, E. (1996). Differential impacts of academic and social experiences on college-related behavioral outcomes

across different ethnic and gender groups at four-year institutions. *Research in Higher Education*, 37(4), 427-451. https://doi.org/10.1007/BF01730109

Park, T., Woods, C., Hu, S., Bertrand Jones, T., Cig, O., & Tandberg, D. (2018). Developmental education reform and the racial/ethnic achievement gap: The case of first-semester gateway course passing rates when Florida made developmental education optional. *Teachers College Record*, 120(12), 1–24. http://files.eric.ed.gov/fulltext/ED610595.pdf

Razfar, A., & Simon, J. (2011). Course-taking patterns of Latino ESL students: Mobility and mainstreaming in urban community colleges in the United States. *TESOL Quarterly*, 45(4), 595-627. https://doi.org/10.5054/tq.2011.268060

Ran, F. X., & Lin, Y. (2022). The effects of corequisite remediation: Evidence from a statewide reform in Tennessee. *Educational Evaluation and Policy Analysis*, 44(3), 458-484. https://doi.org/10.3102/01623737211070836

Rendón, L. I. (2002). Community college Puente: A validating model of education. *Educational Policy*, 16(4), 642-667. https://doi.org/10.1177/0895904802016004010

Roberts, M. T. (2021). *Reforming developmental education reforms*. Center for the Analysis of Postsecondary Readiness. https://postsecondaryreadiness.org/reforming-developmental-education-reforms/

Ryu, W., Schudde, L. & Pack, K. (2022). Constructing corequisites: How Texas community colleges structure corequisite math coursework and the implications for student success. *AERA Open,* 8(1), 1-13. https://doi.org/10.1177%2F23328584221086664

Swail, W. S., Cabrera, A. F., & Lee, C. (2004). *Latino youth and the pathway to college.* Pew Hispanic Center. https://www.pewresearch.org/wp-content/uploads/sites/5/reports/31.pdf

U.S. Department of Education, National Center for Education Statistics. (2019). Table 317.20. Degree-granting postsecondary institutions, by control and classification of institution and state or jurisdiction: 2016-17. In U.S. Department of Education, National Center for Education Statistics (Ed.), *Digest of Education Statistics* (2017 ed.). https://nces.ed.gov/programs/digest/d17/tables/dt17_317.20.asp

U.S. Department of Education, National Center for Education Statistics. (2021). Table 304.60: Total fall enrollment in degree-granting postsecondary institutions, by control and level of institution and state or jurisdiction: 2017 and 2018. In U.S. Department of Education, National Center for Education Statistics (Ed.), *Digest of Education Statistics* (2019 ed.). https://nces.ed.gov/programs/digest/d19/tables/dt19_304.60.asp

Table 1. Student Background Characteristics by Treatment Assignment and by Ethnic Background (Impact Analysis Sample, n=1,021)

	Control Group (Assigned to Development Education Course)				Treatment Group (Assigned to College-Level English Course + Corequisite)			
	Non-Latinx (n=164)		Latinx (n=284)		Non-Latinx (n=211)		Latinx (n=362)	
	Mean/%	SD	Mean/%	SD	Mean/%	SD	Mean/%	SD
Age	22.16	7.49	19.02	2.95	21.80	7.71	19.17	3.09
Economic disadvantage	0.30	0.46	0.38	0.49	0.30	0.46	0.40	0.49
Black	0.51	0.50	0.00	0.00	0.54	0.50	0.00	0.00
White	0.28	0.45	0.00	0.00	0.27	0.45	0.00	0.00
Female	0.50	0.50	0.54	0.50	0.54	0.50	0.56	0.50
Part-time	0.27	0.44	0.34	0.47	0.25	0.43	0.37	0.48
High school diploma	0.88	0.33	0.93	0.25	0.87	0.33	0.93	0.26
GED	0.09	0.28	0.04	0.18	0.09	0.29	0.05	0.22
First language English	0.82	0.39	0.57	0.50	0.83	0.38	0.57	0.50
First generation	0.24	0.43	0.45	0.50	0.25	0.43	0.52	0.50

Notes: Data from this table are drawn from administrative and baseline survey data.

Table 2. Student Background Characteristics by Whether Student Took a Corequisite Course and by Ethnic Background (Student Experience Sample, n=941)

	Took Developmental Education		Took College-Level Course + Corequisite	
	Non-Latinx (n=187)	Latinx (n=285)	Non-Latinx (n=151)	Latinx (n=291)
	Mean/%	Mean/%	Mean/%	Mean/%
Age	22.80	19.29	20.47	19.07
Economic disadvantage	0.37	0.37	0.32	0.44
Black	0.43	0.00	0.47	0.00
White	0.31	0.00	0.25	0.00
Female	0.50	0.59	0.66	0.59
Part-time	0.28	0.31	0.21	0.34
High school diploma	0.93	0.92	0.87	0.97
GED	0.06	0.05	0.09	0.01
First language English	0.81	0.59	0.80	0.56
First generation	0.23	0.48	0.23	0.50

Notes: Data from this table are drawn from administrative and baseline survey data. Sample sizes reported in this table reflect weighted survey sample.

Table 3. Student-Level Measures of Academic Experience

Contrast Area	Student-Level Measure
Rigor	Course felt "academically overwhelming" at the end of the semester.
	Course repeated things I learned in high school half time or more.
	Course was too easy half time or more.
	Course was boring half time or more.
Opportunities for student-centered learning	The instructor gave me individual attention half time or more.
	The instructor encouraged me to participate in discussions.
	I asked questions in class half time or more.
	I participated in class discussions half time or more.
	I discussed course material, a group project, activity, or assignment with my classmates outside of class half time or more. The instructor presented course materials in an engaging way.
Support for success skills	The instructor believed in my potential to succeed academically half time or more.
	The instructor helped me improve my learning strategies (e.g., study skills, time management, notetaking, class participation) half time or more.
	The instructor gave me individual attention half time or more.
	The instructor gave me feedback on progress half time or more.
	The instructor made himself/herself available to discuss course materials, assignments, or questions outside of class time
Exposure to stigma	Reflecting on the course, it felt not at all embarrassing to take it.

Table 4. Intent-to-Treat Effect of Corequisite Placement (Impact Analysis Sample)

Outcome variable	**Treatment Coefficient (Non-Latinx)**		**SE**	**Interaction Coefficient (Treatment x Latinx)**		**SE**
Pass English Comp 1 in first year	0.148	**	0.049	0.141	*	0.062
Pass English Comp 1 in first 2 years	0.084		0.048	0.129	*	0.060
Take English Comp 2 in first 2 years	0.074		0.050	0.150	*	0.063
Pass English Comp 2 in first 2 years	-0.009		0.048	0.140	*	0.059
Pass English Comp 2 in first 3 years	-0.028		0.049	0.145	*	0.062
Pass College Reading in first year	0.081		0.050	-0.003		0.062
Pass College Reading in first 2 years	-0.022		0.049	0.057		0.061
Persist through year 2	-0.028		0.051	0.032		0.063
Persist through year 3	-0.083		0.051	0.062		0.064

p* < 0.05; ** p < 0.01.

Notes: Data from this table are drawn from administrative and baseline survey data. Each row in this table reflects a separate OLS model. Control variables include age, economic disadvantage, gender, part-time status, type of secondary degree (high school diploma or GED), whether English is the student's first language, whether the student is the first in their family to attend college, and individual dummy variables for missing information on race and ethnicity, economic disadvantage, gender, first language, part-time status, high school degree type, and parents' education. We also included fixed effects variables for cohort and college attended. We ran models with and without these controls and obtained similar results.

Table 5. End-of-Course Survey Results by Ethnic Background and Whether Student Took a Corequisite Course (Student Experience Sample)

	Took Development Education			Took College-Level Course + Corequisite		
	Non-Latinx	Latinx		Non-Latinx	Latinx	
Rigor						
I felt academically overwhelmed at least somewhat	52.4	70.5	**	51.0	59.7	
Course repeated things I learned in high school at least half of the time	52.0	42.8		39.2	32.8	
Course was too easy at least half of the time	52.3	46.8		26.6	32.8	
Course was boring at least half of the time	35.8	27.8		26.8	14.7	*
Opportunities for student-centered learning						
Instructor gave me individual attention at least half of the time	73.0	68.6		64.9	71.9	
Instructor encouraged me to participate in discussions at least half of the time	80.5	86.8		88.5	85.0	
I asked questions at least half of the time	54.9	46.4		60.0	37.4	**
I participated in class discussions at least half of the time	73.1	70.8		84.5	57.8	**
I discussed coursework with classmates outside of class at least half of the time	67.3	50.9	*	69.5	58.6	
Instructor presented course materials in engaging way at least half of the time	86.9	91.6		79.0	90.6	*
Support for success skills						
Instructor believed in my potential at least half of the time	88.0	92.7		83.9	90.9	
Instructor helped me improve at least half of the time	87.1	86.7		87.1	87.9	
Instructor gave me feedback on progress at least half of the time	91.3	85.3		83.0	88.0	
Instructor was available to discuss coursework outside of class at least half of the time	86.9	84.4		84.1	89.3	
Exposure to stigma						
I felt embarrassed at least somewhat	26.4	26.3		19.2	13.8	

Notes: Data from this table are drawn from the follow-up survey data and are reported using survey weights.