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For more information about this study, please contact Dr. Toby J Park-Gaghan via tjpark@fsu.edu.



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Executive Summary

An increasing number of higher education institutions and state systems are adopting corequisite developmental education (DE) models, which involve students taking remedial courses alongside introductory college-level English or math courses. This departure from the traditional approach of completing all DE courses before advancing to college-level courses has shown promising results. Numerous studies have revealed that corequisite models lead to significant improvements, with a likelihood of successfully completing gateway courses in math or English increasing by ten percentage points or more within the first year compared to traditional DE models (Cho et al., 2012; Denley, 2015; Logue et al., 2019; Miller et al., 2020; Ran & Lin, 2019).

After the implementation of statewide corequisite DE reform in Texas, our previous research has demonstrated that more students are enrolling in and passing college-level English and math courses since corequisite courses became mandatory for DE instruction. Moreover, we discovered that this acceleration effect was most pronounced among Black and Hispanic community college students (Park-Gaghan & Mokher, 2021). Consequently, we now aim to delve deeper into the corequisite courses to uncover the factors contributing to this increase in student success.

Specifically, Texas allows individual institutions to determine how they offer corequisite course options, encompassing both the structure and intensity of the courses. Regarding structure, institutions have the flexibility to offer the course (a) concurrently or paired with the associated introductory college-level course, (b) sequentially where students complete the DE portion before the college-level portion (within the same semester), or (c) through a non-course competency-based option (NCBO) such as lab hours, tutoring, or other formats. In terms of intensity, institutions also have the discretion to decide the number of credits assigned to the courses, ranging from 0 to over 4 credit hours.

In this report, we present findings from the second year of a multi-year study that investigated (1) how student success in integrated reading and writing (IRW)/English and math may vary by sex, race/ethnicity, and income status, (2) how strategies were implemented and how students are advised into different corequisite DE structures and intensities, and (3) the extent to which course content varied by structure and intensity. Our main findings include:

Variation in Student Success by Race/Ethnicity, and Income Status

- Overall, roughly 75% of students taking an IRW corequisite course enrolled in a concurrent model; however, 80% of Black students enrolled in concurrent models compared to 70% of white students.
- In math, Hispanic students enrolled in a two credit corequisite at higher rates (27%) compared to Black students (20%) and white students (19%).
- Low-income students tended to enroll in more credit hours for both IRW and math than non-low-income students.

- Sequential IRW course models (compared to concurrent models) may be beneficial for students overall, but this structure may be less beneficial for Hispanic students.
- Taking less than one hour of a math corequisite is associated with earning more college-level credits in the first year, and this relationship is even stronger for Hispanic students compared to white students.
- Both low-income and non-low-income students enrolled in NCBOs tend to earn fewer credits in the first year compared to other course structures, though the negative relationship is not as strong for low-income students.
- Regarding credit accumulation, there is a positive effect for taking less than one credit for students in general; however, this is not the case for low-income students in IRW.

Design, Implementation, and Advising for Corequisite Courses

- Institutions offered a continuum of corequisite designs and practices including course offerings, advising, and placement
- NCBOs typically delivered efficient and targeted course content and instruction to nearly college-ready students, as determined by the statewide placement exam, while concurrent/paired course-based options frequently delivered more intensive and fundamental instruction for students who were less college-ready.
- Where course-based corequisite credit hours varied, greater credit hour intensities usually supported students who were less college-ready or needed specific course pairings based on subject matter or discipline (i.e, STEM students).
- Advisors, including faculty and professional staff advisors, shared course information with students and guided them toward appropriate course options. Student placement sometimes occurred through multiple measures: directed self-placement, which allowed for greater student autonomy and choice, and single-measure placement, which provided more prescriptive pathways.

Variation in Corequisite Course Content

- Distinctions in learning objectives, topics, and classroom activities by type of corequisite or number of credit hours were difficult to distinguish.
- Corequisites of less than three credit hours tended to have lower-order learning objectives relative to corequisites for three or more credit hours.
- Many syllabi provided incomplete or unclear information about the purpose of the corequisite course, the criteria for assignment to the course, the relationship between the developmental and college-level components, or the requirements for becoming TSI-complete.

Section I

Study Overview

Open-access colleges have faced a significant challenge in addressing the needs of underprepared students for college-level work. Traditionally, these students have been assigned to developmental (DE) courses in math, reading, and writing for one or more semesters. However, most students who take these courses either do not pass or fail to progress to subsequent college-level courses in math or English (Clotfelter et al., 2015; Scott-Clayton & Rodriguez, 2015). To address this issue, colleges are increasingly adopting a popular approach known as corequisite reform, which breaks away from the sequential nature of DE courses.

Under corequisite reform, underprepared students can enroll directly in a college-level course during the same term as a corequisite DE course, which offers targeted support. Corequisite formats can include mandatory companion classes alongside the main course or non-course-based options such as additional lab sessions or other required learning supports (Edgecombe, 2011). Implementing corequisite DE brings about structural and instructional changes that yield benefits. Firstly, it reduces the number of potential exit points compared to traditional DE sequences, ensuring a smoother progression for students. Additionally, it enhances alignment between the content covered in DE courses and the college-level course, providing a more seamless transition (Jaggars et al., 2015; Ran & Lin, 2019).

Recent research indicates that corequisite models have significantly improved completion rates of first-year college-level math and English courses, with increases of ten percentage points or more when compared to traditional developmental models (Cho et al., 2012; Denley, 2015; Logue et al., 2019; Miller et al., 2020; Ran & Lin, 2019). Moreover, evidence from Tennessee suggests that the corequisite model is cost-effective, resulting in a 50% reduction in the average cost per successful student in math and an 11% reduction in writing compared to traditional developmental education (Belfield et al., 2016). Given the promising findings regarding the effectiveness of corequisite models, educational leaders are seeking more information on the optimal implementation of these models to enhance student success. Specifically, there is a need to explore how institution-level decisions regarding the structure and intensity of corequisite courses relate to student outcomes.

Changes to DE policy also have the potential to reduce gaps in attainment among disadvantaged student subgroups. Students from underrepresented racial and ethnic groups may face even greater challenges in DE due to issues of discrimination and racism, structural inequalities, and a failure of institutions to support their unique social and cultural values. Given that prior research has found that Black, Hispanic, and low-income students are more likely to be assigned to DE and more likely to be harmed by this assignment (Bahr, 2010; Bailey, Jeong, & Cho, 2010; Bettinger, Boatman, & Long, 2013), they also stand to benefit more if the DE reform is effective. Our ongoing evaluation of Florida's DE reform found that the statewide implementation of several DE reforms, including corequisite instruction, has significantly reduced racial disparities in completion rates of gateway courses (Park et al., 2018; in press). The reform has also helped to reduce racial/ethnic gaps in the short-term outcome of gateway course completion (Mokher, Park-Gaghan, & Hu, in press). Yet more research is needed to understand differential responses

to corequisite structures by race. For example, Wood, Harris, and White (2015) found that required tutoring sessions (similar to the group intervention model in Texas) may be beneficial for men of color in community colleges. Mandatory tutoring sessions provided academic support, and helped participants to develop a sense of belonging, build relationships with peers, and allowed students to see the campus as a safe place. While these strategies may benefit all students, men of color may particularly benefit as they face increased societal pressures, external life challenges, racial-gender stereotypes, and alienating campus climates.

Overview of Texas' Reform

Texas holds the distinction of being the first state to enforce corequisites as the primary approach to developmental education in all public institutions. This makes it an ideal setting to examine how institutions make decisions regarding implementation. Back in 2009, Texas conducted an experiment with NCBOs, which involved mandatory participation in computer-assisted instruction, prescribed hours in a writing center or computer lab aimed at providing support to underprepared students in subjects like reading, writing, and math outside of the traditional classroom setup.

The implementation of corequisite developmental instruction gained momentum in Texas after the passage of Senate Bill (SB) 162 in 2011. The bill entrusted the Texas Higher Education Coordinating Board (THECB) with the responsibility of devising a statewide plan to facilitate faster progression of students into college-level courses. Consequently, a few institutions in Texas began offering either concurrent developmental courses alongside college-level courses or developmental courses through NCBOs. In 2017, the enactment of House Bill (HB) 2223 mandated a gradual expansion of corequisite developmental instruction from fall 2018 to fall 2021 for students who demonstrated a lack of college readiness on the TSIA (Texas Success Initiative Assessment). Although certain students may be exempt from corequisites based on specific criteria, as determined by THECB in 2018, the legislation stipulated that 100% of non-exempt students in developmental education must receive corequisite instruction by fall 2021.

HB 2223 allowed institutions considerable flexibility in implementing corequisite options, providing a unique opportunity to explore the conditions contributing to student success. Three key dimensions in which implementation may vary among institutions are the intensity, delivery method, and structure of the corequisite component. The intensity of the course can range from fewer than one credit hour to four credit hours. The delivery methods permitted include face-to-face, hybrid, or synchronous/asynchronous online courses. Moreover, colleges have the freedom to implement corequisites through one of three possible structures: (1) the concurrent/paired course model, where students simultaneously enroll in a college-level course and a linked developmental course, (2) the sequential course model, wherein students first enroll in a developmental course followed by an accelerated college-level course within the same semester, and (3) the group or self-paced NCBO, in which students engage in a non-course competency-based option like independent instruction, tutoring, or supplemental instruction. These three structural variations are visually depicted in Figure 1 below.

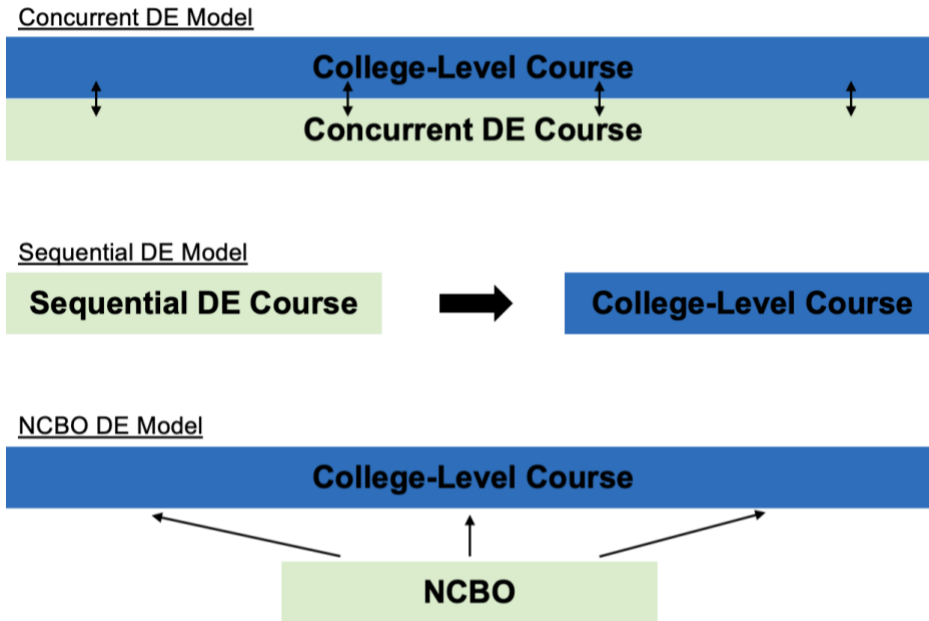


Figure 1. Different structures of corequisite DE courses

This Report

This report provides findings from the second year of a mixed-methods evaluation of Texas' corequisite reform. Our research approach aimed to provide a rich and nuanced understanding of the relationship between the different corequisite DE models and student outcomes in college. In particular, we intended to uncover whether there is variation in these relationships by student characteristics (Creswell & Clark, 2011). As such, we conducted our qualitative and quantitative analyses simultaneously, and this report integrates the findings to fully understand how outcomes might vary by student characteristics and/or course structure and intensity (Morse, 2003). The following research questions guided our investigation:

1. What is the relationship between corequisite DE course structure/intensity and short-/long-term student outcomes? (RQ1)
2. To what extent do these relationships differ based on students' sex, race/ethnicity, or income status? (RQ2)
3. How do corequisite content and instruction differ by course structure and intensity? (RQ3)
4. How are students advised and placed into various corequisite developmental offerings? (RQ4)
5. What are faculty and advisor perceptions about the effectiveness of corequisites for different student populations? (RQ5)
6. How do topics, learning objectives, and classroom activities vary across each corequisite format? (RQ6)

We begin by presenting the findings from our quantitative analysis designed to answer RQ1 and RQ2. We then present the findings from our qualitative analysis designed to answer RQ3, RQ4, and RQ5. We conclude with our syllabus analysis designed to answer RQ6.

Section II

Quantitative Analysis

In this section, we present the results from the quantitative analysis exploring the relationship between DE course structure and intensity with student outcomes over the course of the first year of college. To begin, we describe our data and sample. We then provide a descriptive portrait, disaggregating the sample by sex, race/ethnicity, and low-income status. Then, we describe our analytic approach, which consists of a series of second differenced regression analyses aimed at determining whether there is variation among student subgroup and the relationship between course structure/intensity and academic outcomes. We then present our findings through a series of tables.

Data & Sample

Our data consist of student-level records collected by the Texas Higher Education Coordinating Board and maintained and made available by the University of Texas at Dallas Education Research Center (ERC). These records contain information on student demographic characteristics, test score data, prior academic preparation, enrollment patterns, and course taking/passing data. We included four cohorts of first-time-in-college (FTIC) students who enrolled in a corequisite math or IRW course in their first term of study during the fall 2018, fall 2019, fall 2020, or fall 2021 semester. We then tracked student outcomes into their first year in college to assess their academic success. In particular, we examined three specific academic outcomes: (1) passing the corequisite course in the first term, (2) passing the associated college-level math or English course within the first year, and (3) the number of college-level credits earned by the end of the first year. Our sample is drawn from all public two-year and four-year colleges and universities in Texas.

Descriptive Portrait

We began by examining descriptive statistics for the sample as a whole and then disaggregating by sex, race/ethnicity, and income status. We focused on enrollment patterns by course structure and intensity and whether these patterns varied by student characteristics. In particular, we explored patterns for male and female students (the existing, dichotomous structure in the data), Hispanic, Black, and white students (the three largest racial/ethnic categories in the data), and income status (a dichotomous indicator of economic disadvantage collected by the THECB based on income and/or participation in an economic assistance program such as WIC or Pell programs). Table 1 provides sample descriptive statistics with these student demographic characteristics.

Table 1. Demographic characteristics of students enrolled in corequisite courses, by subject area

| | Integrated Reading & Writing | Math |
|--------------|------------------------------|--------|
| Male n | 25,284 | 29,241 |
| Male % | 39.65% | 39.20% |
| Hispanic n | 36,644 | 37,962 |
| Hispanic % | 57.46% | 50.89% |
| Black n | 10,966 | 11,482 |
| Black % | 17.20% | 15.39% |
| White n | 10,620 | 19,553 |
| White % | 16.65% | 26.21% |
| Other n | 5,542 | 5,606 |
| Other % | 8.69% | 7.51% |
| Low-Income n | 29,118 | 26,375 |
| Low-Income % | 45.66% | 35.35% |
| Total N | 63,772 | 74,603 |

Across the four cohorts, a total of 63,772 students enrolled in an IRW corequisite course and 74,603 students enrolled in a math corequisite course. Enrollment patterns for male students was similar across subject areas, with males comprising roughly 39% of the students in both subject areas. By race/ethnicity, there is some variation in enrollment patterns. For example, Hispanic students comprise 57% of the students in IRW, but only 51% of the students in math. There is also variation in the enrollment patterns of low-income students, who comprise 46% of the IRW sample, but only 35% of the math sample.

We also explored how enrollment patterns across course structure and intensity varied by student demographic characteristics. Table 2 provides this information for course structure (sequential, NCBO, or concurrent). Overall, roughly 75% of students taking an IRW corequisite course enrolled in a concurrent model, 20% enrolled in an NCBO, and 5% enrolled in a sequential model. This pattern is similar for male and female students and for students of both income groups. With respect to race/ethnicity, there is some variation with 80% of Black students enrolling in concurrent models compared to 70% of white students. For the overall corequisite math sample, 66% enrolled in concurrent models, 30% enrolled in NCBOs, and 4% enrolled in sequential models. Again, this pattern is similar for male and female students, but there is variation by race/ethnicity and income status. For example, 70% of Black students enrolled in concurrent models compared to 63% of white students, and 58% of low-income students enrolled in concurrent models compared to 71% of non-low-income students.

Table 2. Demographic characteristics of students enrolled in Integrated Reading and Writing and Math Corequisite Courses, by Course Structure =

| | Integrated Reading and Writing | | | | | | | |
|--------------|--------------------------------|---------------|-----------------|-------------------|----------------|----------------|---------------------|------------------------|
| | All Students | Male Students | Female Students | Hispanic Students | Black Students | White Students | Low-Income Students | NonLow-Income Students |
| Sequential n | 3,619 | 1,295 | 2,324 | 1,990 | 502 | 760 | 1,687 | 1,932 |
| Sequential % | 5.67% | 5.12% | 6.04% | 5.43% | 4.58% | 7.16% | 5.79% | 5.58% |
| NCBO n | 12,371 | 5,107 | 7,264 | 7,336 | 1,658 | 2,332 | 6,382 | 5,989 |
| NCBO % | 19.40% | 20.20% | 18.87% | 20.02% | 15.12% | 21.96% | 21.92% | 17.28% |
| Concurrent n | 47,782 | 18,882 | 28,900 | 27,335 | 8,787 | 7,528 | 21,049 | 26,733 |
| Concurrent % | 74.93% | 74.68% | 75.09% | 74.60% | 80.13% | 70.89% | 72.29% | 77.14% |
| | Math | | | | | | | |
| | All Students | Male Students | Female Students | Hispanic Students | Black Students | White Students | Low-Income Students | NonLow-Income Students |
| Sequential n | 2,676 | 931 | 1,745 | 1,783 | 198 | 543 | 954 | 1,722 |
| Sequential % | 3.59% | 3.18% | 3.85% | 4.70% | 1.72% | 2.78% | 3.62% | 3.57% |
| NCBO n | 22,327 | 9,462 | 12,865 | 10,357 | 3,241 | 6,731 | 9,995 | 12,332 |
| NCBO % | 29.93% | 32.36% | 28.36% | 27.28% | 28.23% | 34.42% | 37.89% | 25.57% |
| Concurrent n | 49,600 | 18,848 | 30,752 | 25,822 | 8,043 | 12,279 | 15,426 | 34,174 |
| Concurrent % | 66.49% | 64.46% | 67.79% | 68.02% | 70.05% | 62.80% | 58.49% | 70.86% |

We also explored patterns in demographic characteristics of students enrolled in corequisites by course intensity (Table 3). Overall enrollment patterns in IRW show 61% of students enrolled in a three credit corequisite, 23% enrolled in one credit, 9% enrolled in two credits, 5% enrolled in four credits or more, and 2% enrolled in less than one credit. Once again, this pattern is similar for male and female students. With respect to student race/ethnicity, Black students enrolled in less than one credit at higher rates (6%) compared to Hispanic students (1%) and white students (2%). Further, Hispanic students enrolled in a two credit corequisite at higher rates (27%) compared to Black students (20%) and white students (19%). However, the most common IRW corequisite course intensity for all groups was three credits (59%, 62%, and 63% for Hispanic students, Black students, and white students, respectively). Low-income students tended to enroll in more credit hours than non-low-income students. For example, less than 1% of low-income students enrolled in less than one credit compared to 3% of non-low-income students. And, 6% of low-income students enrolled in more than four credits compared to 4% of non-low-income students.

There were similar patterns in math. Overall, 52% enrolled in three credits, 20% enrolled in one credit, 17% enrolled in two credits, 6% enrolled in four credits or more, and 5% enrolled in less than one credit. Female and male students had similar enrollment patterns. With respect to student race/ethnicity, Black students enrolled in less than one credit at higher rates (12%) compared to Hispanic students (3%) and white students (5%). Further, white students enrolled in a two credit corequisite at higher rates (21%) compared to Black students (15%) and Hispanic students (16%). However, the most common math corequisite course intensity for all groups was three credits (55%, 44%, and 51% for Hispanic students, Black students, and white students, respectively). Low-income students tended to enroll in more credit hours than non-low-income students. For example, 2% of low-income students enrolled in less than one credit compared to 6% of non-low-income students. And, 7% of low-income students enrolled in more than four credits compared to 5% of non-low-income students.

Table 3. Demographic characteristics of students enrolled in Integrated Reading and Writing by Student Characteristics

| | Integrated Reading and Writing | | | | | | | |
|-------------|--------------------------------|---------------|-----------------|-------------------|----------------|----------------|---------------------|-------------------------|
| | All Students | Male Students | Female Students | Hispanic Students | Black Students | White Students | Low-Income Students | Non Low-Income Students |
| <1 credit n | 1,255 | 505 | 750 | 293 | 693 | 177 | 91 | 1,164 |
| <1 credit % | 1.97% | 2.00% | 1.95% | 0.80% | 6.32% | 1.67% | 0.31% | 3.36% |
| 1 credit n | 15,043 | 5,873 | 9,170 | 9,738 | 2,234 | 2,002 | 7,698 | 7,345 |
| 1 credit % | 23.59% | 23.23% | 23.83% | 26.57% | 20.37% | 18.85% | 26.44% | 21.20% |
| 2 credit n | 5,517 | 2,202 | 3,315 | 3,050 | 846 | 1,162 | 2,361 | 3,156 |
| 2 credit % | 8.65% | 8.71% | 8.61% | 8.32% | 7.71% | 10.94% | 8.11% | 9.11% |
| 3 credit n | 38,743 | 15,601 | 23,142 | 21,496 | 6,808 | 6,737 | 17,229 | 21,514 |
| 3 credit % | 60.75% | 61.70% | 60.13% | 58.66% | 62.08% | 63.44% | 59.17% | 62.08% |
| 4 credit n | 3,214 | 1,103 | 2,111 | 2,067 | 385 | 532 | 1,739 | 1,475 |
| 4 credit % | 5.04% | 4.36% | 5.48% | 5.64% | 3.51% | 5.01% | 5.97% | 4.26% |
| | Math | | | | | | | |
| | All Students | Male Students | Female Students | Hispanic Students | Black Students | White Students | Low-Income Students | Non Low-Income Students |
| <1 credit n | 3,588 | 1,448 | 2,140 | 1,040 | 1,367 | 965 | 456 | 3,132 |
| <1 credit % | 4.81% | 4.95% | 4.72% | 2.74% | 11.91% | 4.94% | 1.73% | 6.49% |
| 1 credit n | 14,878 | 5,489 | 9,389 | 8,093 | 2,441 | 3,411 | 5,793 | 9,085 |
| 1 credit % | 19.94% | 18.77% | 20.70% | 21.32% | 21.26% | 17.44% | 21.96% | 18.84% |
| 2 credit n | 12,790 | 5,184 | 7,606 | 5,909 | 1,727 | 4,128 | 4,336 | 5,668 |
| 2 credit % | 17.14% | 17.73% | 16.77% | 15.57% | 15.04% | 21.11% | 16.44% | 11.75% |
| 3 credit n | 38,820 | 15,443 | 23,377 | 20,765 | 5,059 | 9,987 | 13,873 | 17,926 |
| 3 credit % | 52.04% | 52.81% | 51.53% | 54.70% | 44.06% | 51.08% | 52.60% | 51.73% |
| 4 credit n | 4,527 | 1,677 | 2,850 | 2,155 | 888 | 1,062 | 1,917 | 2,610 |
| 4 credit % | 6.07% | 5.74% | 6.28% | 5.68% | 7.73% | 5.43% | 7.27% | 5.41% |

Inferential Analysis

We utilized a series of second-differenced regression equations to explore differential relationships between corequisite models and outcomes by student characteristics. In particular, we included a series of interaction terms designed to explore whether the type of corequisite structure has a differential effect on Black and Hispanic student outcomes relative to white students. More specifically, we made use of the following model:

$$\text{Logit}(y_{ijt}) = \alpha + \beta_1(\text{SEQ}_{ijt}) + \beta_2(\text{NCBO}_{ijt}) + \beta_3(\text{Black}_{ijt}) + \beta_4(\text{Hispanic}_{ijt}) + \beta_5(\text{SEQ}_{ijt} * \text{Black}_{ijt}) + \beta_6(\text{SELF}_{ijt} * \text{Black}_{ijt}) + \beta_7(\text{SEQ}_{ijt} * \text{Hispanic}_{ijt}) + \beta_8(\text{NCBO}_{ijt} * \text{Hispanic}_{ijt}) + \theta(S_{ijt}) + \gamma(\text{HS}_{ijt}) + \lambda_t + \varepsilon_{ijt}$$

Under this specification, we estimated the likelihood of academic outcome y for student i enrolled at college j in year t using a logistic regression for corequisite course completion and gateway course completion, and linear regression for the number of college-level credits completed in the first year. The vectors S and HS are composed of measures of student demographics (other than race/ethnicity) and prior academic preparation (as measured by the TSIA score for the specific subject area) designed to capture the effect of traditional measures of human capital, while λ_t is a year (cohort) fixed. We also clustered standard errors at the college level to capture heterogeneous effects across the individual colleges.

Then, SEQ and $NCBO$ are indicators for the type of corequisite structure (the comparison group is the concurrent course model). And, $Black$ and $Hispanic$ are dichotomous indicators for student race/ethnicity (the comparison group is white students; students from other race/ethnicity groups are excluded from this analysis). We then interact the indicators for race with the structure indicators to determine whether the corequisite DE course structures had differential effects for Black or Hispanic students.

Using this modeling strategy, the estimates for $\beta_5 - \beta_8$ are second-differenced estimates that indicate whether course passing rates in different corequisite DE courses varied for Black or Hispanic students in ways that were different for white students. This strategy allows us to determine, after accounting for other demographic characteristics and prior academic achievement, whether Black, Hispanic, and white students experienced differences in passing rates across the different corequisite DE structures—differences that have the potential to alter the racial/ethnic achievement gap in terms of these specific measures.

Our modeling strategy is similar when exploring indicators for sex and income status, and is similar for modeling course intensity (in these models, the omitted group is three credit hours and there are indicators for less than one credit, two credits, and four or more credits. The only difference is that for models exploring race/ethnicity, only Black, Hispanic, and white students are included; however, all students (including students of other races/ethnicities) are included for models exploring sex and income status.

Findings

Tables 4 and 5 present the estimates of interest for the models predicting student outcomes as a function of course structure and its interaction with sex. We present odds ratios for passing the corequisite developmental education (DE) course and passing the associated college-level gateway course (GW), and we present linear regression coefficients for the number of college-level credits accumulated in the first year.

With respect to course structure, while we find no statistically significant base effects for passing DE and GW courses in IRW, we do identify a negative and statistically significant marginal effect for male students enrolled in NCBOs (OR = -0.176, $p < 0.01$) with respect to passing gateway English. Further, while we find a negative base effect of NCBOs with respect to credit accumulation, we find positive and statically significant marginal effects for males for both sequential models ($b = 0.846$, $p < .05$) and NCBOs ($b = 0.758$, $p < 0.05$) in IRW corequisites. This suggests that while both males and females earn fewer credits if they enroll in an NCBO, the negative effect for males is not as strong for females. This pattern is also observed in math, where the base effect for NCBOs is statistically significant and negative ($b = -2.044$, $p < 0.05$) the marginal effect for males is positive ($b = 1.007$, $p < 0.05$).

With respect to course intensity, the base effects for passing DE and GW courses are not statistically significant in IRW. However, the marginal effects for males enrolling in four or more credits are positive and statistically significant for both DE (OR = 0.295, $p < 0.05$) and GW (OR = 0.210, $p < 0.05$) in IRW. With regard to credit accumulation, both males and females who enroll in less than one credit of corequisite IRW coursework are more likely to earn more college-level credits ($b = 2.446$, $p < 0.01$). The marginal effects for males taking two credits and four or more credits are also statistically significant. In math, there were very few statistically significant differences by course intensity. A one-credit corequisite was associated with an increased likelihood of passing the DE course (compared to three-credit corequisites) for both males and females, and the marginal effect for males was also positive and statistically significant (OR = 0.428, $p < 0.01$). There were no differences by credit intensity for the GW passing and credit accumulation outcomes in math.

Table 4. Regressions of DE Course Structure by Sex

| | Integrated Reading & Writing | | | Math | | |
|-------------------|------------------------------|---------------------|----------------------|---------------------|-------------------|----------------------|
| | Pass DE | Pass GW | Credit Accumulation | Pass DE | Pass GW | Credit Accumulation |
| Sequential | 0.202 (0.170) | 0.282 (0.210) | 0.162 (0.420) | 0.812*** (0.190) | 0.225 (0.190) | -0.132 (0.550) |
| NCBO | -0.463 (0.310) | -0.022 (0.170) | -2.383*** (0.520) | 0.116 (0.140) | -0.300 (0.170) | -2.044*** (0.410) |
| Sequential X Male | 0.158 (0.140) | 0.057 (0.130) | 0.846* (0.390) | 0.109 (0.100) | 0.043 (0.080) | 0.558 (0.340) |
| NCBO X Male | -0.038 (0.070) | -0.176** (0.060) | 0.758* (0.370) | 0.020 (0.070) | 0.071 (0.070) | 1.007** (0.360) |

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 5. Regressions of DE Course Intensity by Sex

| | Integrated Reading & Writing | | | Math | | |
|-------------------|------------------------------|-------------------|---------------------|-------------------|------------------|---------------------|
| | Pass DE | Pass GW | Credit Accumulation | Pass DE | Pass GW | Credit Accumulation |
| <1 Credit | -0.108 (0.46) | 0.549 (0.37) | 2.446** (0.76) | -0.247 (0.57) | 0.444 (0.25) | 1.904 (0.98) |
| 1 Credit | 0.151 (0.17) | 0.366 (0.19) | 0.639 (0.68) | 0.342** (0.13) | 0.084 (0.19) | 1.257 (0.73) |
| 2 Credits | -0.334 (0.36) | 0.273 (0.24) | -0.024 (0.60) | -0.048 (0.24) | 0.208 (0.20) | 0.308 (0.62) |
| 4+ Credits | -0.191 (0.19) | 0.148 (0.29) | -0.261 (0.93) | 0.201 (0.17) | -0.568 (0.30) | -1.097 (0.56) |
| <1 Credit X Male | 0.277 (0.31) | -0.025 (0.18) | -0.071 (0.38) | 0.428** (0.15) | -0.062 (0.14) | 0.762 (0.59) |
| 1 Credit X Male | 0.005 (0.06) | -0.018 (0.05) | 0.066 (0.27) | 0.078 (0.07) | 0.065 (0.08) | 0.426 (0.40) |
| 2 Credits X Male | 0.167 (0.09) | -0.021 (0.11) | 0.975* (0.38) | 0.076 (0.11) | -0.073 (0.08) | 0.239 (0.34) |
| 4+ Credits X Male | 0.295*** (0.08) | 0.210** (0.07) | 0.746* (0.29) | 0.013 (0.06) | 0.006 (0.08) | 0.624 (0.38) |

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Tables 6 and 7 present the estimates of interest for the models predicting student outcomes as a function of course structure and its interaction with race/ethnicity. As before, we present odds ratios for passing the corequisite developmental education (DE) course and passing the associated college-level gateway course (GW), and we present linear regression coefficients for the number of college-level credits accumulated in the first year.

In IRW and with respect to course structure, across all outcomes, there was a positive base effect for sequential models (compared to concurrent). All students have positive and statistically significant estimates for passing DE (OR = 0.456, $p < 0.05$), passing GW (OR = 0.450, $p < 0.05$), and earning college-level credits ($b = 1.066$, $p < 0.05$). But, at the same time, Hispanic students have negative marginal effect for all three. This suggests that while sequential IRW course models (compared to concurrent models) may be beneficial for students overall, this structure may be less beneficial for Hispanic students. Math, however, tells a slightly different story. While the base effect for both course structures is not statistically significant, the marginal effects for Hispanic students with respect to passing the GW math course is positive and statistically significant for sequential models (OR 0.739, $p < 0.01$) and negative and statistically significant for NCBOs (OR = -0.465, $p < 0.001$). This suggests that sequential math models (compared to concurrent) may be beneficial for Hispanic students, while NCBOs (again, compared to concurrent models) may be less helpful.

In terms of course intensity, some limited variation also emerged. Compared to three-credit corequisites, taking either a one-credit or a two-credit IRW corequisite has a positive statistically significant effect on passing the GW course for Black students (OR = 0.338, $p < 0.01$ for one credit; OR = 0.409, $p < 0.01$ for two credits) relative to white students. And in math, compared to three-credit corequisites, taking four or more corequisite credits has a negative statistically significant effect on passing the GW course for both Black students (OR = -0.723, $p < 0.01$) and Hispanic students (OR = -0.886, $p < 0.001$) relative to white students. Furthermore, the base effect for taking less than one credit for the math corequisite and credit accumulation is positive and statistically significant ($b = 2.531$, $p < 0.01$), so is the marginal effect for Hispanic students ($b = 2.337$, $p < 0.05$). This suggests that taking less than one hour of a math corequisite is associated with earning more college-level credits in the first year and that this relationship is even stronger for Hispanic students, compared to white students.

Table 6. Regressions of DE Course Structure by Race/Ethnicity

| | Integrated Reading & Writing | | | Math | | |
|-----------------------|------------------------------|-----------|---------------------|----------|-----------|---------------------|
| | Pass DE | Pass GW | Credit Accumulation | Pass DE | Pass GW | Credit Accumulation |
| Sequential | 0.456* | 0.450* | 1.066* | 0.731*** | 0.019 | -1.195** |
| | (0.200) | (0.200) | (0.540) | (0.180) | (0.180) | (0.420) |
| NCBO | -0.201 | -0.189 | -1.427 | 0.167 | -0.054 | -1.137* |
| | (0.160) | (0.160) | (0.730) | (0.150) | (0.110) | (0.460) |
| Sequential X Black | -0.204 | -0.096 | -0.432 | 0.159 | 0.207 | 1.543*** |
| | (0.130) | (0.130) | (0.460) | (0.180) | (0.160) | (0.440) |
| NCBO X Black | -0.445 | 0.148 | -0.772 | -0.006 | -0.286* | -0.350 |
| | (0.380) | (0.130) | (0.700) | (0.150) | (0.140) | (0.410) |
| Sequential X Hispanic | -0.449** | -0.499*** | -2.075** | 0.097 | 0.739** | 1.944* |
| | (0.140) | (0.140) | (0.760) | (0.220) | (0.260) | (0.900) |
| NCBO X Hispanic | -0.008 | -0.083 | -0.884 | -0.210 | -0.465*** | -1.859** |
| | (0.130) | (0.140) | (0.740) | (0.140) | (0.140) | (0.700) |

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 7. Regressions of DE Course Intensity by Race/Ethnicity

| | Integrated Reading & Writing | | | Math | | |
|-----------------------|------------------------------|-------------------|---------------------|-------------------|---------------------|---------------------|
| | Pass DE | Pass GW | Credit Accumulation | Pass DE | Pass GW | Credit Accumulation |
| <1 Credit | -0.235 (0.61) | 0.029 (0.41) | 1.117 (0.89) | -0.245 (0.81) | 0.750** (0.25) | 2.531** (0.91) |
| 1 Credit | -0.062 (0.15) | 0.092 (0.20) | -0.451 (0.83) | 0.316** (0.12) | 0.156 (0.19) | 0.876 (0.71) |
| 2 Credits | -0.538 (0.41) | 0.006 (0.21) | -0.128 (0.60) | -0.168 (0.19) | 0.126 (0.17) | 0.021 (0.60) |
| 4+ Credits | -0.084 (0.14) | -0.036 (0.21) | -0.059 (0.81) | 0.253 (0.20) | -0.016 (0.25) | -0.345 (0.65) |
| <1 Credit X Black | 0.058 (0.33) | 0.082 (0.30) | 0.108 (0.99) | -0.159 (0.30) | -0.456* (0.18) | -1.081 (0.80) |
| 1 Credit X Black | 0.260 (0.21) | 0.338** (0.13) | 1.231* (0.57) | 0.049 (0.18) | -0.061 (0.13) | 0.264 (0.69) |
| 2 Credits X Black | 0.429 (0.24) | 0.409* (0.17) | 0.687 (0.54) | 0.214 (0.18) | 0.139 (0.12) | 0.813 (0.49) |
| 4+ Credits X Black | 0.112 (0.21) | 0.366 (0.22) | 0.137 (0.85) | -0.022 (0.19) | -0.723** (0.27) | -0.640 (0.59) |
| <1 Credit X Hispanic | 0.375 (0.54) | 0.838* (0.42) | 2.161* (0.85) | 0.656 (0.69) | -0.509* (0.22) | 0.397 (0.85) |
| 1 Credit X Hispanic | 0.258 (0.16) | 0.203 (0.15) | 1.943 (1.37) | 0.148 (0.09) | -0.097 (0.12) | 2.337* (1.15) |
| 2 Credits X Hispanic | 0.270 (0.23) | 0.099 (0.20) | 0.377 (0.82) | 0.305** (0.11) | -0.087 (0.20) | -0.174 (0.40) |
| 4+ Credits X Hispanic | -0.413* (0.19) | 0.020 (0.30) | 0.000 (0.93) | -0.107 (0.17) | -0.886*** (0.26) | -0.842 (0.59) |

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Tables 8 and 9 present the estimates of interest for the models predicting student outcomes as a function of course structure and intensity with interactions by income status. As before, we present odds ratios for passing the corequisite developmental education (DE) course and passing the associated college-level gateway course (GW), and we present linear regression coefficients for the number of college-level credits accumulated in the first year.

With respect to course structure, we observe a negative base effect of enrolling in an NCBO (compared to a concurrent structure) in terms of credit accumulation for both IRW ($b = -2.374$, $p < 0.001$) and math (-2.398 , $p < 0.001$). However, the marginal effect for low-income students in NCBOs is positive in math ($b = 1.931$, $p < 0.001$). This suggests that while NCBOs are associated with fewer credits earned in the first year for both groups of students, the negative relationship is not as strong for low-income students.

Regarding course intensity, we observe a positive base effect of enrolling in less than one credit hour of a corequisite (compared to enrolling in three credits) in terms of credit accumulation for both IRW ($b = 2.657$, $p < 0.001$) and math (2.447 , $p < 0.001$). However, the marginal effect for low-income students in IRW is negative ($b = -5.749$, $p < 0.001$). This suggests that when it comes to credit accumulation, there is a positive effect for taking less than one credit for students in general, but this is not the case for low-income students in IRW.

Table 8. Regressions of DE Course Structure by Income

| | Integrated Reading & Writing | | | Math | | |
|-------------------------|------------------------------|------------------|---------------------|--------------------|------------------|---------------------|
| | Pass DE | Pass GW | Credit Accumulation | Pass DE | Pass GW | Credit Accumulation |
| Sequential | 0.252 (0.14) | 0.349 (0.19) | 0.158 (0.42) | 0.813*** (0.18) | 0.301 (0.21) | -0.584 (0.55) |
| NCBO | -0.216 (0.18) | -0.077 (0.19) | -2.374*** (0.65) | 0.118 (0.15) | -0.232 (0.17) | -2.398*** (0.45) |
| Sequential X Low-Income | 0.021 (0.21) | -0.103 (0.21) | 0.681 (0.59) | 0.116 (0.25) | -0.171 (0.23) | 1.902* (0.88) |
| NCBO X Low-Income | -0.515 (0.31) | -0.042 (0.14) | 0.603 (0.64) | 0.016 (0.21) | -0.100 (0.12) | 1.931*** (0.55) |

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 9. Regressions of DE Course Intensity by Income

| | Integrated Reading & Writing | | | Math | | |
|-------------------------|------------------------------|------------------|---------------------|------------------|------------------|---------------------|
| | Pass DE | Pass GW | Credit Accumulation | Pass DE | Pass GW | Credit Accumulation |
| <1 Credit | 0.008 (0.46) | 0.581 (0.32) | 2.657*** (0.58) | -0.151 (0.61) | 0.505* (0.23) | 2.337** (0.81) |
| 1 Credit | 0.051 (0.13) | 0.231 (0.20) | 0.003 (0.82) | 0.283* (0.12) | 0.166 (0.16) | 1.478 (0.85) |
| 2 Credits | -0.642 (0.51) | 0.185 (0.27) | 0.086 (0.79) | -0.236 (0.25) | 0.188 (0.20) | 0.142 (0.71) |
| 4+ Credits | -0.228 (0.14) | 0.051 (0.25) | -1.420 (1.08) | 0.197 (0.15) | -0.512 (0.33) | -1.323 (0.68) |
| <1 Credit X Low-Income | -0.640 (0.58) | -1.017 (0.56) | -5.749*** (1.12) | 0.298 (0.70) | -0.534 (0.32) | -1.150 (1.52) |
| 1 Credit X Low-Income | 0.213 (0.19) | 0.265* (0.13) | 1.354 (0.70) | 0.243 (0.21) | -0.154 (0.17) | -0.136 (1.03) |
| 2 Credits X Low-Income | 0.887 (0.53) | 0.183 (0.24) | 0.630 (0.84) | 0.634* (0.30) | -0.026 (0.23) | 0.759 (0.77) |
| 4+ Credits X Low-Income | 0.287 (0.25) | 0.337 (0.33) | 2.715* (1.33) | 0.046 (0.19) | -0.132 (0.13) | 1.132* (0.51) |

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Section II

Qualitative Analysis on Corequisite Implementation

For the qualitative portion of this evaluation, we conducted virtual site visits at seven institutions during the fall 2022 and spring 2023 semesters. This multi-site case study (Yin, 2014) included a combination of semi-structured focus groups and individual interviews wherein we met with 22 IRW department chairs and faculty members, 28 math department chairs and faculty members, 24 directors of advising and advisors, and 9 students who were currently enrolled in or had recently completed corequisite courses. We held separate focus groups for IRW and math, as we anticipated variation in the practices and perspectives by subject area. We were not able to meet with one math department and students at every institution, though we met with IRW and advisors at every institution. In total, we conducted seven IRW faculty focus groups, six math faculty focus groups, seven advisor focus groups/interviews, and three student focus groups/interviews to answer the following research questions:

- How do corequisite content and instruction differ by course structure and intensity?
- How are students advised and placed into various corequisite developmental offerings?
- What are faculty and advisor perceptions about the effectiveness of corequisites for different student populations?

Qualitative Data Sample, Collection, and Analysis

When selecting institutions to recruit for participation in this evaluation, we intentionally sought public institutions from various economic regions in Texas and a mix of two- and four-year institutions. We sampled institutions from seven of the 12 economic regions in Texas. Table 10 shows the seven economic regions represented in our sample, the sector of the institutions, and the pseudonyms that we use to refer to institutions throughout this report.

Table 10
2022-2023 Sampled Institutions for the Qualitative Analysis

| College Pseudonym | Economic Region | College Sector |
|--------------------------|------------------------|-----------------------|
| Quail College (QC) | Upper Rio Grande | Two-year college |
| Monarch College (MC) | Upper East | Two-year college |
| Western College (WC) | Southeast | Two-year college |
| Cardinal College (CC) | Capital | Four-year college |
| Plains University (PU) | Alamo | Four-year university |
| Star University (SU) | Northwest | Four-year university |
| Cowboy University (CU) | Metroplex | Four-year university |

Focus groups were centered on corequisite design, implementation, and placement. Questions we asked department chairs and faculty members included, “Can you tell us more about the content of your different corequisite courses? If your department offers corequisite courses with different credit hours, how is the additional time spent in the courses with more credit hours?” Advisors were asked questions such as, “How did you learn about HB 2223? Did you receive any training on the legislation and its requirements?” Finally, students were asked questions such as, “How effective was the developmental support course in terms of preparing you for the next college-level course in that subject? Could the developmental course have done anything better to prepare you for the college-level course?” Interview protocols are provided in full in appendices A, B, and C.

After data collection, we sent audio recordings for professional transcription, and sensitive or identifying information was redacted. We then conducted subsequent data analysis in multiple phases using the computer-assisted qualitative data analysis software Dedoose. Our team of three researchers engaged in pattern coding (Corbin & Strauss, 2015; Miles et al., 2014) to identify central themes using a comprehensive coding framework.

We revised the coding framework from our first year of the research project (2021-2022) to include additional codes necessary to capture themes identified in the focus groups with advising staff. We made minor edits to other codes, such as clarifying or adding more detail to definitions. Broad codes such as “advising” and “curricula” and more specific themes such as “collaboration between advisors and faculty” and “advantage(s) of corequisite strategy” were also included in the coding framework. Using Dedoose’s “test” feature, the lead researcher and remaining researchers engaged in reliability tests to achieve strong inter-rater reliability. After establishing reliability, researchers used the revised coding framework to code all transcripts.

Qualitative Findings

Findings from data analysis suggest that NCBOs typically, though not always, differed from course-based options in both IRW and math in that they frequently delivered course content to students who were nearly college ready for college-level courses. Although multiple institutions used NCBOs in lab or computer-based formats where content and instruction were more student-driven with less instructor involvement, the lines were sometimes blurred. In some instances, DE courses titled NCBOs functioned like concurrent/paired corequisite structures with more intensive instruction to simultaneously support the college-level courses, like traditional course-based options at other institutions. Where credit hours varied in course-based corequisites, institutions offered a spectrum of ways to deliver content and instruction with less credit hours more often than not provided to students who were deemed more college-ready.

With the support of faculty and professional advisors, students selected courses based on their test scores, prior grades and coursework, academic pathways, and general course delivery or modality, among other pertinent individual, cultural, and social factors. Finally, perceptions of corequisite effectiveness for students from different student populations varied among faculty, staff, and students.

Comparing Corequisite Course Offerings

We begin our presentation of qualitative findings by first discussing how corequisite content and instruction differed by course structure and intensity in both IRW and math, with course structure referring to the type of corequisites offered and intensity addressing the number of credit hour options. Then, we transition to findings on how students were advised and placed into various corequisite options before concluding with faculty and advisor perceptions of corequisite effectiveness for various student populations.

Developmental English Offerings

Table 11

Developmental English Structures

| | SU | CU | MC | WC | CC | PU | QC |
|-------------------------------------|----|----|----|----|----|----|----|
| Concurrent/Paired | X | X | X | | X | X | X |
| Sequential | | | | | | | |
| NCBO | X | | | X* | | X | |
| Traditional DE (non-corequisite) | | | X | X | X | | X |

*The interviewees referred to this as an NCBO, but described a concurrent/paired corequisite

Content and Instruction for NCBOs Compared to Course-Based Options. In this section, we review course structures for developmental English and consider the content and instruction of these courses. The institutions represented in this year’s focus groups offered a variety of IRW corequisite course options, but like last year, concurrent/paired structures were the most popular. Additionally, we did not meet with any institutions offering sequential corequisites, and some schools still offered traditional, non-corequisite DE in the form of standalone courses that preceded corequisite options. For this reason, we primarily compare content and instructional differences between NCBOs and concurrent/paired corequisite courses in developmental English.

Less than half of the seven schools utilized NCBOs along with concurrent/paired corequisite course options at their institutions, while the remaining institutions chose not to implement NCBOs. At two institutions, NCBOs aligned with THECB’s definition of NCBOs. A faculty member at SU stated that students would enroll in a “self-paced online class, which was really not a class. I mean it has an instructor of record, but it is self-paced and computerized online, where they go through like grammar lessons and things like that, tailored to their deficiencies.” PU’s NCBO was zero credit hours and held during summer. IRW faculty referred to this NCBO as a “bootcamp” and a five-week “refresher course that is at no cost to [students] over the summer.” In these instances, NCBOs acted as a means of efficiently revisiting course content—whether online or in-person during the traditional semester or summer term.

Western College was unique from these two institutions as their only corequisite option was classified as an NCBO. Upon deeper conversation with the institution’s faculty members and the department chair, we learned their NCBO operated much more like a concurrent/paired corequisite than an NCBO. While half of the grade for the class was based on a “courseware component,” the remaining portion of the grade included writing practice to “bolster [students’]

skills and support the various projects they're completing in [ENGL] 1301 as they go." An instructor explained that the NCBO and college-level content were designed in tandem with the assignments' corequisite, including editing the essays due in ENGL 1301. She noted, "So [the courses] just kind of like meshed together perfectly."

Unlike true NCBOs, traditional course-based options focused more heavily on content that concurrently supported college-level English courses rather than preparation for standalone English college-level courses, but the ways institutions offered this content diverged. At CU, for example, English faculty indicated that the corequisite course was meant to "contextualize" the college-level English course. When comparing the current corequisite to a prior standalone developmental course, one faculty member explained how the corequisite allowed students to take what they learned in the corequisite and "apply it directly to a course they're taking [college-level English]." The corequisite further provided in-depth coverage of content that was simultaneously taught in the college-level course. The same faculty member noted, "We broke down assignments more in the second class [the corequisite course following the college-level course]. We would work on specific reading passages or we would work on a particular writing skill."

Like Cowboy University, Star University also assisted students with both reading and writing course elements in the corequisite to support the college-level English course. One faculty member discussed how she employed group work to achieve this goal. She stated:

Something that I do differently, what I do with the coreq [sic] students is group work. Not the big group projects they'll eventually do at sophomore/junior/senior level, but paragraph analysis, sentence construction, and product review – whatever that product might be, starting at their very basic levels...As far as reading is concerned, I teach the reading skill of annotation, and then when they bring their reading assignments to class, once again they discuss their annotation with each other so that they can add annotation that maybe their peers found that they didn't find...[In writing] for instance, for an argument paper each group might be given one element of an argument, as in a paragraph, like a debate, but a paragraph of a paper, and then everyone aloud would present their possible paragraph. But the groups, I find that they encourage each other, they build some camaraderie, but they also build the social skill..."

Monarch College similarly offered corequisite content that enhanced the college-level class, but unlike CU and SU, their corequisite course placed more emphasis on critical thinking and reading than writing. This intentional effort to target one discipline more than another was not something other institutions identified. An IRW faculty member at MC explained their rationale for making this content choice:

Because we felt like as a whole [ENGL] 1301, you know, while that's primarily a writing course...[there] was a lot about the reading retention that they were not being successful in with their TSI scores. And so I think we kind of created the [corequisite] course looking at more of the critical thinking skills. And yes, we do discuss some of the writing aspects of it and some of the grammar as well, but to me, I kind of use [the corequisite] as

just kind of a review or a little bit extra practice on the things that we're doing in 1301 as far as the writing is concerned.

Although MC still covered the writing content, faculty deemed other IRW skills more important to improving students' college-level course outcomes in areas where instructors felt students were less successful. In the next section, we explore the content and instruction at institutions that offered more than three-hour corequisite course-based options, followed by developmental math offerings.

Content and Instruction for Corequisites with Varying Credit Hours. While almost all institutions in this year's focus groups offered a three-credit hour course-based corequisite, two out of seven institutions provided at least one other course-based corequisite worth a different number of credits. These additional credit hour options ranged from a minimum of one-credit hour to a maximum of four-credit hours, depending on the specific course. Not only did they differ in terms of credit hours, but the course content and instruction similarly changed as credit hours varied.

At Plains University, one of two institutions we met where more than a singular three-credit hour corequisite was offered, students could choose between a one-credit or three-credit hour corequisite course. The Director of IRW at the institution explained that the one-credit hour course was like a "recitation" in which students received "10 to 15 mini lessons and then a hands-on workshop with that lesson," which accompanied their college-level English course. This differed from the three-credit hour corequisite at the institution. A course instructor for that option posited, "The way I set it up this semester is those three units. So we have unit one, reading strategies. Unit two, writing strategies. Then unit three, that mini research opportunity." He further noted:

We try to focus on especially a lot of Latinx literature because our students are majority Hispanic; we're a Hispanic-Serving Institute [sic]. But also just keeping the reading list diverse. And then for the writing assignments I kind of keep it pretty – what's the word I'm looking for – I guess I try to scale it up in terms of the difficulty, where at the beginning it's focusing more on a lot of reflective writing. We have a weekly journal entry assignment...where they get a chance to reflect on their progress in the course each week. At the end of the semester there's a final exam that also is kind of like a larger version of the journal entry, where they're reflecting on their progress throughout the semester. So that's one of the big components in the course that we kept from day one, a lot of self-reflection. And I think that then extends to the analytic writing, that I think I primarily focus on with improving their writing skills, getting them ready for more intensive research projects in their other courses going forward.

The corequisite course content and instruction for both one- and three-credit hour options at this institution was also different from others we interviewed in that faculty members followed anti-racist pedagogy as identified by the faculty member. To match college-level English courses, corequisites did not use learning objectives and implemented labor-based assessment. Through this pedagogy, institutional decision-makers hoped to emphasize student academic risk-taking and the continuous improvement process while learning new material rather than solely focusing

on the outcome, a grade. According to faculty, the more effort students put into their coursework, the higher the grades they achieved.

Like Plains University, Cardinal College also offered multiple credit hour options, yet their institution showed the most variation in credit hours of any institution in the sample, providing two-, three-, and four-credit hour corequisites. At CC, the four-hour corequisite was paired with a humanities course, and the corequisite and college-level course were highly integrated. A faculty member who taught the four-hour corequisite stated, “It’s [the corequisite] essentially the same objectives and the same skeleton as our lower level [standalone] developmental reading and writing course. They take that course [the corequisite] and they take a Humanities 1301 course.” The reason for pairing with a humanities course was to offer students who were potentially averse to English another option. The corequisite was worth more credits, however, because of its content, which involved “Socratic discussions,” and the academic rigor of the college-level humanities course. The professor explained that the college-level course resembled a “classic seminar experience” and met requirements for both student success and humanities coursework. Thus, the corequisite course was designed to meet more complex college-level content needs.

The other credit hour course-based options at CC were either three-hour or two-hour corequisites. The shortened two-hour option served targeted student populations who received additional support outside the course given their participation in the special programming. For this reason, English faculty felt students did not need the same amount of time in the corequisite class as other students who were not enrolled in this university programming. As for the three-credit hour courses at this institution, these options served students who were deemed more college-ready and needed less support than the full four-hour option but who were not participants in special university programming. Like the four-hour option, three-hour course content could be paired with humanities, but it could also be paired with other academic disciplines, again to give students who wanted other options a choice.

Altogether, students at two institutions experienced opportunities to take course-based corequisites worth different credit hours. Students at nearly every institution had the option to take a three-credit hour course. The content and instruction of corequisites typically varied based on the college-level course with which the course was paired and the amount of support students needed, with greater credit hour options serving students who needed more support. Where NCBOs were offered, they typically provided preparation for students to go directly into a college-level course in the following term, while concurrent/paired options provided content and instruction that more intensively and holistically supported the simultaneous enrollment in the college-level course. The next major section likewise focuses on math developmental offerings and their differences in content and instruction.

Developmental Math Offerings

Table 12
Developmental Math Structures

| | SU | CU | MC | WC | CC | PU | QC |
|-------------------|----|----|----|----|----|----|----|
| Concurrent/Paired | X | X | | X | X | X | X* |

| | | | | |
|----------------------------------|---|---|---|---|
| Sequential NCBO | X | X | X | X |
| Traditional DE (non-corequisite) | X | X | X | X |

* The interviewees referred to this as an NCBO, but described a concurrent/paired corequisite

Content and Instruction for NCBOs Compared to Course-Based Options. In the previous sections we outlined differences in content and instruction for IRW NCBOs versus course-based options. We also described how content and instruction was both similar and different for course-based options with varying credit hours. In this first developmental math section, we similarly provide findings for developmental math NCBOs when compared to other course-based options. We then follow up in the subsequent section with comparisons of content and instruction for math corequisite course-based options of different credit hour intensities. Across colleges in this year’s focus groups, we witnessed a variety of college-level math courses connected to corequisites. These included STEM and non-STEM pathways with courses like business calculus, business economics, college algebra, contemporary math, math for business and social sciences, quantitative reasoning, and statistics. Comparable to developmental English, the concurrent/paired course structure was the predominant corequisite option offered for these courses and is the focus when compared to NCBOs.

Multiple institutions provided NCBOs, which were sometimes called NCBMs, or non-course-based math options. At times, discrepancies about whether courses were true NCBOs or course-based corequisites emerged. Although instructors at WC, for example, were unclear if the math corequisites were NCBOs, one instructor shared, “The students pretty much lead the show; I’m just there to support.” The math corequisites were “self-paced” and “in a computer lab,” where one instructor described reviewing questions from homework and, in some cases, demonstrating how to complete specific problems during class time. The instructor added, “But they’re all going at their own individual pace, so one can be asking me about section 3.2 and this one is already on section 3.4.” In these ways, it represented a traditional NCBO.

Star University faculty also felt their math NCBO was not a strict NCBO but was more of an “NCBO-type project.” The developmental math coordinator noted the use of a math computer software program for the “completely self-paced” course. It was unique, however, in that it was provided to students who had begun a concurrent/paired corequisite and college-level course, but upon doing poorly in the college-level course, would drop the college-level course, “transition to an online course” [the NCBO], and after taking a “proctored exam,” would become TSI complete if successful. This type of NCBO delivery and instruction allowed students to learn content on their own while still making progress. Thus, both WC and SU tailored NCBO content and instruction to meet students’ individual needs while worrying less about college-level content.

Two other institutions, Quail College and Cardinal College also offered NCBOs. QC math faculty stated that, unlike other institutions with which we met, all their corequisites were actually NCBOs, technically called NCBMs there. Discussions with advisors alluded to differences between these courses, however, as students took a one hour “laboratory” course

when they were on the edge of college readiness, resembling an NCBO, while less prepared students took more intense corequisite courses more closely resembling concurrent/paired corequisite course-based options. The latter will be discussed further in the next section on course-based corequisites.

Cardinal College was also unique in that, like IRW at the institution, the math department offered two tracks of math corequisites, with the “upper-level” track delivered as NCBOs, referred to there as NCBMs. The CC math chair emphasized that even though they offered NCBOs, they were more “structured” and involved some course instruction. He stated:

It's still instruction [in the NCBO], it's still very guided for the most part. So, you know, it's not a tutoring lab, it's not homework help; it's instruction. And it has its own objectives and requirements for the students. Many of them also have their, you know – they also have requirements to meet for their grade structure and everything like that. So it's definitely more structured because, well, because those students need it.

Ultimately, institutions that offered math NCBOs provided a spectrum of instructor teaching, involvement, and guidance, depending on the institution. While NCBOs could serve as a laid-back means of preparing students for eventual college-level coursework, they also provided more structured and thorough instruction. In this way, they acted more like traditional course-based corequisites than NCBOs, blurring the lines between NCBOs and course-based options.

The remaining two institutions, Cowboy University and Plains University, did not offer NCBOs of any kind. They provided only three-credit hour course-based options. CU's corequisite was a course provided outside the math department and paired with the college-level course. Corequisite content consisted of “foundational pieces that they [corequisite students] may be missing.” According to one instructor, content in the corequisite course, such as “rounding or reading inequality symbols, those sorts of things that they struggle with,” would serve as a “building block” for work concurrently completed in the college-level course. Similarly, at PU, corequisite content was designed to offer concurrent and intensive support for students in the college-level course. From an instructional perspective there was little distinction between the two courses, and faculty would “go slower” and “do more examples” in the corequisite that aligned with the college-level course. One math student at PU stated:

It didn't feel like she was teaching me two different maths; it felt like she was taking the time to dissect things I was learning in that class. So like she would start with something, help us learn it, and if we seemed to get it she'll move on, but usually she'll spend the next hour like getting to more detail on how it can get more difficult in this. And then she'll like—at the end of the day she'll just give us homework and say it'll be due next week. But it always felt like reasonably paced.

Important to note is that Star University, which offered an NCBO, provided only three-credit hour course-based options, while other institutions that offered NCBOs implemented multiple credit hour course-based options. Differences in the content and instruction of these varying credit hour course-based choices are discussed next.

Content and Instruction for Corequisites with Varying Credit Hours. While the previous section addressed content and instructional differences in math NCBOs and course-based options, this section explores content and instruction in math corequisite course-based options of different credit hour intensities. Out of the six math departments where we conducted focus groups and interviews, three institutions, when including QC, offered course-based corequisites worth varying numbers of credits. All other institutions provided course-based corequisites of three-credit hours.

The institutions to offer course-based corequisites at different credit hours were WC, CC, and QC. WC implemented both one-credit and three-credit hour corequisite options to assist students taking college-level math courses. Interestingly, the three-credit option was only paired with college algebra, and the chair of DE explained, “That was the math people [who] felt that college algebra was the most difficult of the maths and that it needed more intense assistance with that versus the other three courses, which they all felt could just be one hour.” She added, “I wonder if the three [credit hour corequisite] feels punitive and the one [credit hour corequisite] feels like help.” All other options were one-hour and paired concurrently with the respective college-level course. They delivered less comprehensive instructor guidance because they were aligned with non-college algebra courses.

In contrast, Cardinal College offered course-based corequisites for their “express” track, the avenue for students who scored lower on the TSIA, and for whom more thorough content and instruction was needed, despite their “express” name. These courses were all deemed three- or four-credit hour corequisites, and credit hour determination was made based on the subject matter of the college-level course with which it was paired. In the “express” courses, regardless of credit hour option, instructors implemented forms of active learning, foregoing lengthy lectures and incorporating group assignments. A faculty member stated:

You can't lecture at students for three hours...You can't do it, they can't do it, your brain just doesn't work. It's not designed to work like that. So we encourage instructors to spend no more than 20 minutes at a time doing sort of a lecture thing. And then to have more active learning.

Another instructor added, “There’s a culture here of trying to get people to work in group activities.” Whether working in their online software, listening to short lessons, or participating in group assignments, students in lower-level corequisite courses received the intensive support to help them with the course-based college-level class.

Like Cardinal College, Quail College offered three- and four-credit concurrent/paired course-based options. This difference between these options was again the subject matter of the college-level class with which they were simultaneously offered. At QC, however, course-based corequisites, except statistics, were three-credit hours. Faculty at QC worked hard to organize and deliver consistent content and instruction across sections of these courses. Having worked with Complete College America, the institution maintained lessons learned during their partnership, took faculty surveys to determine appropriate course content, continuously revised content, and implemented communication plans between instructors to deliver quality across college-level and corequisite courses.

Advising and Placement in Developmental English and Math

In this major section, we explore our second research question regarding student advising and placement in corequisites. In the 2022-2023 school year, we added focus groups with advisors to our data collection plan to address unanswered questions related to how advisors learned about HB 2223, how students were advised on their corequisite options, and what types of questions and concerns students had regarding corequisites. In general, full-time professional staff members mostly advised students in need of corequisites. In some instances, however, faculty members also served as advisors to help students determine which classes to take. What follows next is a review of how advisors—faculty and professional—were informed about and helped students navigate corequisite options.

Advisors typically described internal meetings or meetings with departmental representatives when asked how they learned about Texas HB 2223 and the gradual scale-up to 100% corequisite DE. In 2018, CU was already offering corequisites in at least one subject area, allowing more time to focus on developing IRW corequisites. One participant who was a Director in Academic Affairs shared that she met with the Vice President for Enrollment Management “to discuss the plans to meet the 25, 50, and 75 percents [sic]” requirements of the legislation. She added, “And then we started [working] very closely with our partners in math and English.”

Advising and placement often included the support of course placement and advising flow charts based on course options and placement measures faculty leaders determined in their respective departments. Following the legislation’s implementation, institutions in this year’s sample more often than not used the TSIA as the primary measure for placing students into college-level coursework. Unlike last year, institutions implemented aspects of multiple measures as well. Multiple measures included but were not limited to the following: students’ high school GPAs, high school coursework taken (including AP and dual enrollment classes), and different standardized test scores like the ACT or SAT. Other considerations colleges reported were students’ length of time since high school graduation, students’ immigration status, whether the student was multilingual, and more.

In IRW, in cases where institutions offered both NCBOs and course-based options, like concurrent/paired corequisites, enrollment in NCBOs was often for students who placed higher on the TSIA or for students who met or felt comfortable with multiple measures criteria for different course options. The two institutions in this subject that utilized traditional NCBOs deviated in their placement strategies. SU students who were nearly college ready based solely on their TSIA scores, enrolled in the NCBO, while students who scored lower on the TSIA took the only other option—the three-credit concurrent/paired course. One advisor simplified the advising and placement process there, saying, “We just look at the TSI scores, the Texas Success Initiative. Basically, their scores tell you where they’re going to go.” Another advisor stated that although he wished they considered more than the test score, TSIA scores made student placement more straightforward at their school. Moreover, the institution offered IRW NCBOs mostly online, leaving little room for student preference when testing into that level.

Plains University, the other institution that offered NCBOs and course-based options in English placed students into college-level coursework using multiple measures derived with support from a THECB grant. They also employed directed self-placement or “student choice” to determine what corequisite options students should complete. The director of IRW explained that IRW faculty members played an active role in advising students at new student orientation, using a detailed rubric to guide their 30-to-45-minute conversation and to track each student’s placement decision. The director of IRW shared:

[After the conversation with students,] we present them with what the passing test scores are, along with characteristics of students that are successful, and in what courses. So, we say, “This is the average test score of the person who has these characteristics who usually takes the bootcamp.” And so, we show them that, and then we ask them what [corequisite] they are comfortable with and what they’re seeking, what they need. And then we honor their choice.

Ultimately, English faculty at Plains University let students select the option they wished to try, whether the NCBO, the one-credit course for students who typically placed higher on the TSIA, or the three-credit course for students who placed lower on the TSIA. The director added that in some cases, students, often multilingual students who spoke “two, three, and four languages” but tested lower on the TSIA would still choose the one-hour course for higher placing students, knowing they could return for support if needed. In contrast, other students who had technically scored high enough to take the one-credit hour course would sometimes choose the three-credit hour option given its greater level of support.

At Cardinal College, the only other course-based option in IRW to offer classes worth varying credit hour intensities, student placement was determined through the TSIA, course subject matter pairings, and student identity. The four-credit hour corequisite was for students who were not ready for the highest level corequisite based on their TSIA scores but did not wish to take the standalone developmental option. The primary corequisite was three-credit hours for higher-placing students who were closer to college-ready, and the two-credit option was for students who participated in specific university programs based on their social identities. Notably, CC was the only college that consistently offered shorter-semester options with late starts, but they also provided many of their corequisites in online, hybrid, and face-to-face modalities. While the TSIA determined placement in either the three- or four-credit option, advisors and faculty noted that student choice was also the means through which students enrolled in course pairings like English, humanities, sociology, or speech pathology (where offered), along with modality, to meet their interests and needs.

In math, institutions were mixed in how they placed students in NCBOs versus course-based options, where the choice existed. At CC, for example, the institution advised students on their “upper level” track to take the NCBO rather than the course-based option; these students tested higher on the TSIA and were nearly college ready. NCBOs were also fewer credit hours at the institution, usually one or two credits, depending on the math pathway, and they required less time in remediation. SU, on the other hand, advised its students to take the concurrent/paired option, but students who began struggling would transition into the NCBO option for additional support. As for WC, students who scored lowest on the TSIA enrolled in the NCBO.

As for math placement when multiple credit hours existed, students usually enrolled in corequisites not only according to TSIA score but also based on their major or academic area of study. Often, STEM or non-STEM academic pathways provided different course credit hour options and trajectories. Students on the STEM track typically experienced corequisite credit hour options worth greater credit hour intensities. In fact, WC only offered all three-credit hour course-based math corequisites in every subject except college algebra. Thus, students who needed college algebra, by default, took a greater number of credit hours. At CC, for example, this was true as well. Students placed into math course-based corequisites of either three-credit or four-credit hour options, depending on the pathway. Important to note is this institution also offered NCBOs that differed in their credit hour intensities based on STEM or non-STEM pathway as well. As mentioned, NCBOs at CC were for “upper level” students, and they varied by one or two credits, rather than three or four, according to STEM or non-STEM course.

According to advisors, students and parents sometimes demonstrated confusion about corequisites and placement in more than one course in the same subject area. For example, an advisor at SU shared, “There's sometimes a little bit of a pushback because it's like, ‘Well, I just took the test and I proved I can't do math and now you're telling me my first semester I have to take two maths.’” In instances like this, where students expressed their concern, an advisor detailed how she helped manage students’ course load saying:

Usually, I tell my students “We'll adjust your schedule accordingly. So since you are in two math classes, we'll give you some of your lighter core coursework. . . . We'll give you two other classes you feel comfortable with and we'll keep you around 12 hours just to get you to the minimum of what you need [to be full-time], to not overload you with like 15 or 16 hours if you have to take two math classes at the same time.”

Cowboy University, Monarch College, and Quail College framed corequisites as a positive opportunity for students. An advisor at CU mentioned a typical conversation with students about corequisites, saying, “We do just kind of reassure them that by taking this support class along with [the college-level class], that's going to help them not just in that class, but all the ones down the road.” She added, “We do promote this as a very positive thing for them.” In this way, advisors served as positive reinforcers of corequisite course options as a means of helping students succeed. Contrastingly, a student noted:

I was extremely ill-advised, to be quite honest. I had told them, because I'm a nontraditional student and I hadn't been in school in over 22 years, that I needed to take math classes slowly. I ended up being put into the two math classes on top of chemistry, which ended up, you know, being a lot more math than I was really anticipating. So with that being said, I mean I was extremely ill-advised. . . . So it's been a bit of a struggle, and as a result I am failing.

In the next major section, we cover various stakeholder perceptions of corequisite effectiveness for students representing different populations.

Perceptions of Corequisite Effectiveness for Different Student Populations

As noted in the previous section, faculty and professional advisors guided students into corequisite courses through various means; however, as one faculty member stressed, “One-size-fits-all is not a successful education model, in general.” This section highlights participant perceptions of how corequisites were most effective for various student populations given their different social identities and lived experiences. While these findings cannot be generalized, they provide important insight into the challenges and strengths of corequisites for various student populations.

One focus of this year’s report was understanding how corequisites helped or hindered students from racially and ethnically diverse populations. Although we did not address this topic in every focus group, we heard participant perceptions that may add context for some of the quantitative findings. At multiple institutions faculty and advisors noted the racial and ethnic diversity of their corequisite courses and their institutions, traditionally as a function of their locations. At PU, one English faculty member stated, “I’m also thinking about the educational landscape of [location redacted]...virtually, like 99 or 100-percent of the students in the INRW program are minority students. I have seen like maybe three white students in my INRW classes since I started.”

In numerous focus groups, faculty and advisors also acknowledged their institutions’ status as Hispanic Serving Institutions or emerging Hispanic Serving Institutions and the importance of corequisite design for diverse populations. To meet the needs of students from multiple minoritized communities, one institution discussed how they offered corequisite courses in conjunction with race and ethnicity-based co-curricular support programs. At CC, the institution provided corequisite classes designed for students who were part of a university-wide program for Black students. The faculty director shared that students in these corequisites received “wraparound” and “embedded services” as part of their larger programming efforts. Thus, they tailored students’ corequisite course intensity as these students took a two-hour corequisite, one or two hours less than the traditional corequisite as explained in the first major section of this report and obtained additional support through their programs.

At Quail College, which primarily served Hispanic students, an institutional leader indicated the potential for piloting a corequisite course with their “ESL discipline” for English language learners, though it was only in the beginning stages. The explanation for this was to address the different language acquisition needs of corequisite students whose first language was not English. Similarly, at PU, faculty mentioned a plan to create corequisite courses for English language learners. The director of IRW relayed:

We’re also – a lot of multilingual students. We’re considering creating corequisite courses along with College of Ed that are multilingual – for multilingual students that have some TOEFL test preparation also into them. So we’ve got that in the works coming up, to at least have a section for multilingual students and to have some test support for them.

In a handful of cases, when asked directly or at other points in our focus groups, some faculty and advisors did not perceive or had not thought about differences in how corequisites benefitted

or inhibited students in terms of race or ethnicity. At WC, a faculty member stated, “I don't feel like there are any really differences as far as the race and ethnicity [of students' corequisite experiences or outcomes].” At MC, an advisor also shared, “I guess I don't notice any differences as it relates to demographics: age, gender, ethnicity.” This is not to say that differences did not exist, but that faculty and advisors had either not considered or did not believe there were differences based on student racial and ethnic identities when asked.

Faculty and advisor perspectives about corequisites for students in terms of sex or gender, socioeconomic status, and college generational status were limited in the data, yet a few participants shared their perspectives. At SU, a math faculty member noted:

One difference you can see, and I don't think it has anything to do with coreq [sic], because I was on a two-year committee with the university on the first-year experience, developing the first-year experience. And it's just the difference between males and females. And females are much more successful in their first year of college, especially their first semester, than males. I mean statistically it's quite alarming actually. And I don't think that has anything to do with whether it's a corequisite course or not.

In her experience, the perceived success of females over males in corequisites was not related to the corequisite, but rather the broader trend of female versus male success in college. In her opinion, corequisite success was also a product of students' classroom attendance rather than sex. She added, “That's the glaring thing I see, is attendance...It's attendance, are you here every day or not?”

A Western College math faculty member shared a somewhat different but related perspective. He explained that in his corequisite teaching experience, female students were more engaged and collaborative in the classroom, asking for more frequent examples of math problem solving than male students. He stated, “And guys really work more independently. I don't get asked many questions from the guys, and if they do have questions I feel like they might watch me just explain it to someone else and then they don't have to ask.” In short, corequisite experiences and effectiveness may have looked different given these differences.

As for corequisite students' generational and socioeconomic status, when asked, one participant commented on her institutions' recognition of frequency of students from these backgrounds in IRW courses when determining course offerings. She expressed that offering longer courses in terms of semester length with consistent student interaction was more effective. She explained, “50 minutes or 75 minutes at a time has been the best way to handle the instruction in those courses, because it gives everyone time to read articles, to think about planning, to do writing, to do revision.” Interestingly, this institution, CU, offered the most limited course options regarding credit intensity and modality of any institution with which we met.

The TSIA placement test was an initial barrier to IRW corequisite course placement for international students, according to one institution. The additional placement test seemed redundant for incoming international students who had completed other language proficiency exams as part of institutions' admissions requirements. Moreover, advisors were responsible for clarifying the relevance of the TSIA when this occurred. At WC, the director of advising stated:

TSI is a hard thing for international students to understand, because they already have to take the TOEFL or the ILT, you know, they have to take other tests. And then they're like, "We already did that" and we're like, "No, in Texas you have to take the TSI."

She explained that the TSIA was not an issue for some international students who transferred institutions within Texas, as these students had either taken the TSIA or were already TSIA-compliant due to meeting the requirements at their prior state institution.

At the same institution, advisors also noted difficulties with heavy course loads for international students placed into corequisites. They shared that U.S. visa regulations required international students to take a certain number of credit hours, with most of those credits offered face-to-face, although the government changed requirements during the pandemic. According to the advising director at WC, the combination of student visa regulations and corequisite coursework proved challenging when international students needed both IRW and math corequisite courses in the same semester. She stated, "So if they need both levels of developmental – so that's both levels plus they have to have you [the international student] full-time...it makes for an outrageously large course load for international students." Not only did students enroll in at least 12-credit hours, but developmental coursework in both IRW and math meant some international students took as many as 18-credit hours their first semester in college, depending on the number of corequisite course credits. This ensured international students had enough credit-bearing courses given that developmental courses were non-credit-bearing. This institution was the only one to bring up these challenges.

Another student population that merited faculty and advisor reflection in focus groups included student-athletes. At SU, an English faculty member observed that several students taking corequisites at their institution were student-athletes, however, she did not offer a rationale for why this was the case. She noted, "We all have a lot – I always get some student-athletes in my developmental class." A different faculty member at the same institution noted discrepancies in student-athlete motivation in corequisite courses. She stated it was "hit or miss," perceiving some student-athletes as the "most motivated" while others struggled with motivation to complete corequisites. In this situation, an institutional "support system" was in place to assist student-athletes with difficulties.

At Cowboy University, a noticeable challenge with corequisites for student-athletes, mainly where fewer course options existed, related to course delivery and modality. This issue was primarily a function of student-athletes' diverse scheduling needs. One faculty member explained:

Some of our athletes, that model [the five-days-a-week in-person corequisite model] might not necessarily work for, especially if they're in season. So then like, okay, do you have other options outside of [institution name redacted]? What are those? What does that look like?

When student-athletes did not have course choices that fit their schedule, the institution recommended alternative measures, such as transient enrollment at another institution, to obtain the needed corequisite course.

In this year's focus groups, faculty and advisors also shared their perceptions of how corequisite courses served non-traditional students. Participants described that much like student-athletes, non-traditional students' other obligations contributed to their corequisite course needs and experiences. One advisor at SU explained:

My older students and my non-trationals [sic] are typically more comfortable with online. Some of them, 'cause they've been in school before, it's not their first rodeo, it's not their first time they're going to be taking classes, so they're sometimes usually more open, or like you said, they work more so they like the option of being able – or have families or something, so they like the option of being able to like be at home and take care of their kids or do it at the end of the day after they're done at work.

At another institution, Cowboy University, decision-makers also considered the outside needs of non-traditional students. Eventually they opted against offering corequisite classes in a way they felt would hinder these students. A faculty member noted concerns about changing the number of weeks a course was offered too much because of “students' work schedules,” and those with “family responsibilities outside the classroom as well.”

One faculty member at Western College indicated that corequisites tended to be more effective for non-traditional students compared to traditional students, particularly those returning to school following an extended break. He explained, “I think some of my older students benefit more from the coreq [sic], because maybe they've been out of school for 20 years, and so sometimes the students who are kind of fresh out of high school, they still remember a lot of the concepts.” While traditional-aged corequisite students needed a “refresher,” non-traditional students who took an extended break from school could require more in-depth instruction. He added:

But with my older students sometimes I'm revisiting concepts altogether, like they're just like, 'I haven't been in school' you know, they like to tell me, 'I haven't been in school for 25 years.' You know, and so then I have to slow it down or break it down or give them maybe some more basic algebra resources to look at on their own.

Non-traditional students seeking academic resources were also perceived to benefit more from corequisite courses. At SU, a faculty member expressed that non-traditional students took advantage of corequisites and were more likely to ask for educational assistance. She stated, “If they need help they're going to seek help from – either from me [the faculty member] or from going to the tutoring center.” One non-traditional student at CU agreed with this faculty member's statement, saying:

I actually go to the SI [supplemental instruction] sessions weekly. I also have a tutor. And we also have a math center that I literally go to like almost every single day. It cuts

into my time at being home with my kids actually at this point, because I am trying to become successful in what I'm doing.

Conclusion

Throughout our qualitative data collection and analysis this past year, a continuum of corequisite practices emerged across institutions, including course offerings, advising, and placement. Regarding course content and instruction, NCBOs were efficient and targeted for nearly college-ready students, [as determined by the statewide placement exam](#). Concurrent/paired course-based options frequently delivered more intensive and fundamental instruction for students who were less college-ready. Where course-based corequisite credit hours varied, greater credit hour intensities usually supported students who were less college-ready or needed specific course pairings based on subject matter or discipline (i.e., STEM students).

Students in this year's sample were placed into corequisites in many different ways. Unlike last year, we witnessed students' placement through multiple measures and directed self-placement, which often allowed for greater student autonomy and choice, as well as single-measure placement, which provided more prescriptive pathways. In all cases, however, advisors, including faculty and professional staff advisors, were the liaisons for sharing course information with students and guiding them toward appropriate course options. Their feedback added valuable context for understanding institutions' choices and how well corequisite models were implemented and perceived by students, faculty, and staff at all institutions we interviewed.

Section IV

Syllabus Analysis

In this section, we explore differences in learning objectives, topics, and classroom activities by corequisite course type and intensity by conducting an analysis of syllabi from math and IRW corequisites. Course syllabi provide information about a course's intended curriculum, content, and structure. We conducted a document analysis of course syllabi from corequisite courses to assess the alignment between the topics and learning objectives in the course syllabi in different types of corequisites for math and IRW. This analysis of corequisite syllabi is particularly important for comparing differences among corequisite courses with varying credit hours. A one-credit hour class may not have time to cover the same number of topics and learning objectives as a three or four-credit hour class, so we wanted to see how the content of these courses differed. For example, do one-credit hour classes skip the more basic topics covered at the beginning of longer courses? Or do they try to cover all the topics but spend less time on each? We also examined how the instructional strategies varied among different types of corequisite courses and sought to better understand the different types of activities that may occur in NBCOs relative to course-based corequisites. The findings from the document analysis help us understand how what happens in the classroom differs among various types of corequisite courses. Any differences observed may provide insight into why some courses meet the needs of certain subgroups of students better than others. For example, some prior research suggests self-paced computer-adaptive math courses may be more effective for certain student subgroups such as females (Arroyo et al., 2013).

The THECB has established an Academic Course Guide Manual (ACGM), which includes information on all lower-division academic courses for colleges statewide. The ACGM seeks to ensure student learning outcomes are aligned between community colleges and universities and guarantees that credits completed in these courses are transferable. Each course within the manual is identified with a Texas Common Course Number and includes the number of contact and credit hours, a course description, and a list of student learning outcomes. For example, topics within the developmental math course from the course description include “study of numeracy and the real number system; algebraic concepts, notation, and reasoning; quantitative relationships; mathematical models; and problem solving.” There are also corresponding learning outcomes, such as “use algebraic reasoning to solve problems that require ratios, rates, percentages, and proportions in a variety of contexts using multiple representations.”

Texas House Bill 2504 requires all public postsecondary institutions to establish standards for syllabi adopted by the institution. These standards must include, at minimum: (a) a description of all course requirements including major assignments and examinations, (b) the measurable learning outcomes for the course, (c) a description of the subject matter for each lecture or discussion, and (d) a list of required or recommended readings. Further, the legislation states that institutions must make the syllabi for each undergraduate course available to the public on the institution's website. We collected syllabi of corequisite math and IRW courses from the same sample of institutions used in the qualitative data analysis to examine variation within and across institutions. We downloaded many of these syllabi from the institutions' websites, although in

some cases, we contacted faculty who participated in the focus groups to request a copy by email.

For each institution, we collected one syllabus for each type of corequisite structure (NCBO or course-based) and each credit hour option (e.g., one-credit hour and three-credit hour courses) for each subject area. As a result, the number of syllabi analyzed per institution differed depending on the number of corequisite options. The same institutions that participated in the focus groups in the 2021-22 and 2022-23 academic years were selected for inclusion in the syllabus analysis. The total sample includes 110 syllabi from 29 colleges for math and 87 syllabi from 31 colleges for IRW.¹

Data from the course syllabi addressed the overarching research question: How do learning objectives, topics, and classroom activities vary across corequisite syllabi for Math and IRW by course structure (NBCO versus course-based) and course intensity (number of credit hours)?

We began by reviewing the course syllabi to categorize information about the content, as summarized in Table 1. We used information on course structure and number of credits to examine differences in syllabi content among different types of corequisites.

Table 1

Content and Coding Criteria for the Document Analysis of Corequisite Course Syllabi

| Content | Coding criteria |
|--|---|
| Course description | Course title and code, instructor name, number of credits, duration in weeks, course structure (NCBO or course-based), delivery mode (face-to-face, online, or hybrid) |
| Corequisite clarity | Whether it was clear in the syllabus that the course was a corequisite (yes/no/partial) |
| Attendance mode | Whether the course was designed for a full semester, a partial semester, or flexible exit (e.g., length varies by a student's need) |
| Course structure | Whether the corequisite was concurrent/paired, sequential course within the same semester, group intervention, self-paced intervention |
| Pairing of corequisite & college-level courses | Check all that apply: technology-support instructional labs/emporium model/modularization; mandatory one-on-one support (e.g., tutoring); supplemental instruction (e.g., group support) provided by faculty; supplemental instruction provided by tutors or other instructional support staff; supplemental instruction provided by peers; structured peer/learning communities; other (describe). |
| Learning materials | List of all textbooks, reading, software, or other required materials |

¹ In math, 2 colleges were excluded because the syllabi were missing information on both course type and credit hours. In IRW, 4 colleges were excluded either because no syllabi were available, or there was information missing on course type and credit hours.

| Content | Coding criteria |
|--------------------------|---|
| Instructional strategies | Select one for the primary instructional strategy: in-person lecture with a fixed format (mandatory hours set at specific days and times), in-person lecture with a flexible format, online lectures with a fixed format (mandatory hours set at specific days and times), online lectures with flexible format, flexible format with schedule set by the instructor (e.g. office hours), flexible format with schedule set by the student (e.g. academic support center), self-paced format (e.g. students work on modules independently), recorded lectures, other (describe) |
| Grading criteria | Percent of grade assigned to homework, tests, quizzes, and other assignments |
| Assessments | Check all that apply: tests, quizzes, group assignments, participation, individual assignments, midterm exam, final exam, project, paper, homework, evaluations, discussion boards, practice assignment, other (describe) |
| Unique observations | Open text box for any unique observations about the course |

Next, we created a coding rubric with a list of topic areas and learning objectives for each course. We classified the complexity of each of the learning objectives into the six major categories in Bloom's (1956) taxonomy: knowledge, comprehension, application, analysis, synthesis, and evaluation. These classifications are hierarchical, so learners must achieve prerequisite knowledge and skills at the lower levels before progressing to learning at higher levels. The classification for each learning objective can be identified based on the verbs used to assess the mastery of the objective using the taxonomy developed by Anderson and Krathwohl (2001). For example, verbs like "list" and "define" are commonly used for the first level of "knowledge" classification. In contrast, verbs like "describe" and "summarize" tend to be used for the second level of "comprehension." We used these categorizations to calculate the percent of objectives that include verbs classified as lower-order thinking (levels 1 and 2,) medium-order thinking (levels 3 and 4), and higher-order thinking (levels 5 and 6). We calculated average percentages in each category by course structure and intensity to assess whether some corequisite courses tend to focus more on higher or lower-order skills than others.

We selected a small sample of syllabi for initial coding and assigned two research team members to each syllabus. Then we held a training session to discuss rubric items with disagreement, resolved disagreements by consensus with the larger research team, and refined the rubric to increase accuracy on subsequent scoring. After achieving adequate inter-rater reliability, the reviewers independently coded the remaining syllabi. Once the raters coded all syllabi, we summarized information on the percent of courses using high-, medium, and lower-order thinking skills by corequisite structure and course intensity. After completing the rubrics, we also created a summary sheet for each college that described similarities and differences among the different corequisite options offered at the same institution regarding course duration, instructional strategies, learning objectives, course content, and assessment methods.

Syllabi Findings

Table 2 shows the distribution of course types and credit hours among the 110 math syllabi and 87 IRW syllabi. In both subject areas, course-based corequisites were more common than NCBOs. In addition, corequisites that were three or more credits were more common than corequisites that were less than three credits. This information was not always clearly stated on the syllabi, with missing information on course type or credit hours ranging from two percent to 15 percent of syllabi.

Table 2

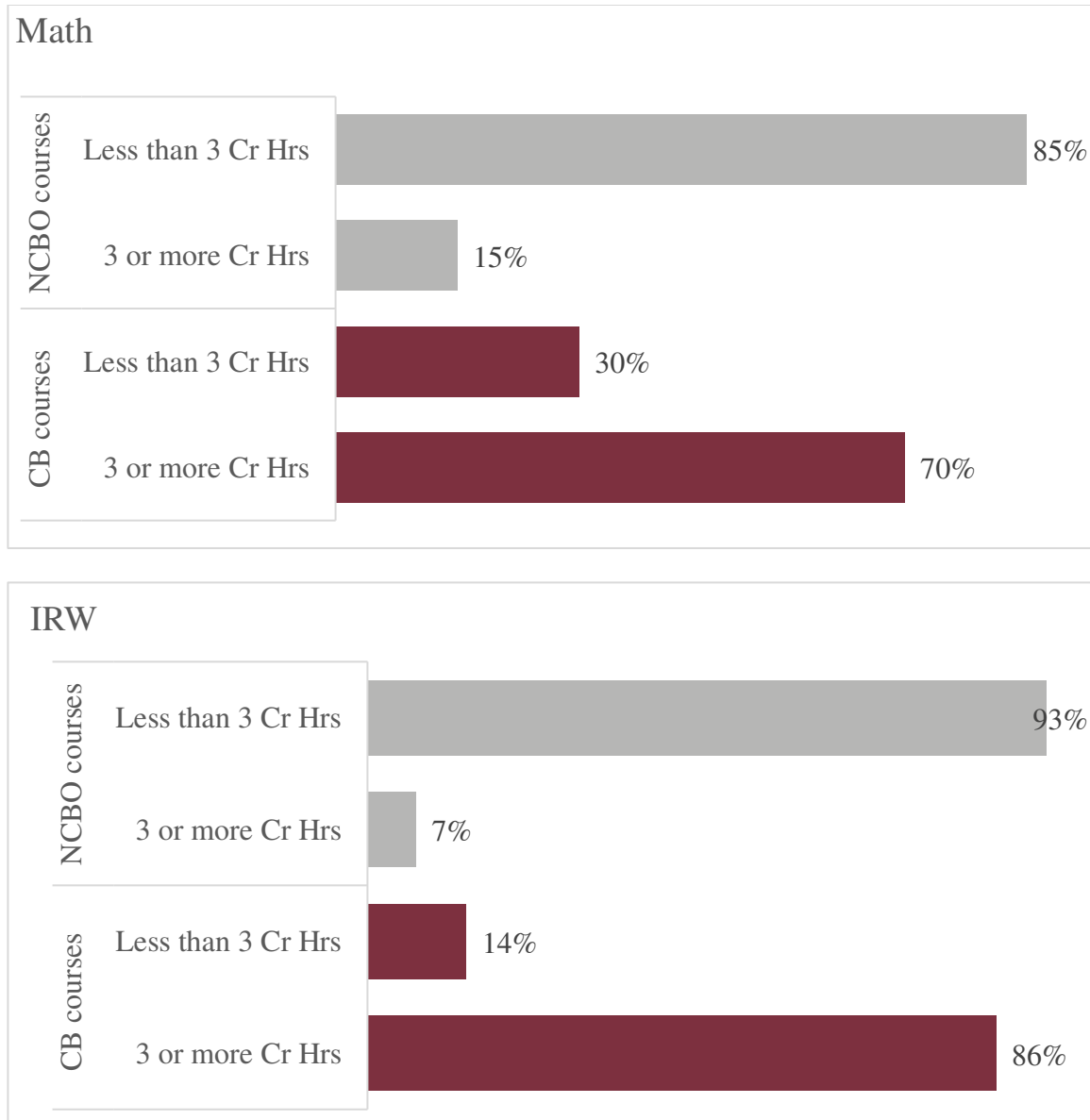
Number and Percent of Syllabi by Course Type and Credit Hours for Math and IRW

| | Math | | IRW | |
|---------------------|------|------|-----|------|
| | N | % | N | % |
| Course type: | | | | |
| Course based (CB) | 64 | 58% | 67 | 77% |
| NCBO | 44 | 40% | 18 | 21% |
| Unknown course type | 2 | 2% | 2 | 2% |
| Total | 110 | 100% | 87 | 100% |
| Credit hours: | | | | |
| Less than 3 | 43 | 39% | 22 | 25% |
| 3 or more | 62 | 56% | 52 | 60% |
| Unknown credits | 5 | 5% | 13 | 15% |
| Total | 110 | 100% | 87 | 100% |

Next, we examined how the number of credit hours differed by course type. Overall, NCBOs tend to be offered with fewer credit hours than course-based corequisites. In math, 85 percent of NCBOs are less than three-credit hours compared to 30 percent in course-based corequisites (Figure 1). Results were similar in IRW, with less than three-credit hour corequisites comprising 93 percent of NCBOs compared to 14 percent of course-based options.

Figure 1

Percent of Corequisites Less than 3 Credit Hours or More than 3 Credit Hours, by Course Type for Math and IRW



Clarity of Corequisite Information in the Syllabi

Syllabi are often considered a “contract” between the course instructor and the students, defining expectations and course policies (e.g., Parkes & Harris, 2002). We would expect that a good syllabus for a corequisite course would clearly explain to the student what a corequisite means, including who is required (or encouraged) to take the course, whether the course counts for college credit, how the developmental component relates to the college-level component, and

what is required to satisfy the TSI requirements. Yet we found that this type of information was missing from many of the syllabi in both subject areas.

When syllabi did define corequisites, information was presented as confusing or incomplete. Some descriptions were very brief, such as, “This course is a study of the basic concepts necessary for success in a college level Statistics or Quantitative Reasoning course.” Another syllabus included language stating, “This course is non-transferable and is intended to assist students who are not college ready with the material presented in MATH 1324.” Other syllabi used the term “corequisite” without explaining the purpose, such as, “This is a corequisite course and requires continuous concurrent enrollment with MATH 1314 or MATH 1324. Course pairing options will vary depending on the campus.”

Yet there were some colleges that provided a more comprehensive explanation of corequisites. For example, the math syllabus at one college described the corequisite as,

A support course for MATH 1342; includes supplemental instruction, supervision of assignments for MATH 1342, and various instructional interventions as needed. Students taking this course must also be registered for MATH 1342 during the same term. This is a non-transferable course and will not count towards any degree. This is a paired course with MATH 1342.53 offering just in time teaching of prerequisite math skills, practice assignments, and question/answer time occurring during class meetings.

Another syllabus in IRW provided the following description of the corequisite:

Intensive study of and practice in writing processes, from invention and researching to drafting, revising, and editing, both individually and collaboratively. Emphasis on effective rhetorical choices, including audience, purpose, arrangement, and style. Focus on writing the academic essay as a vehicle for learning, communicating, and critical analysis. **Requisites:** Students must have test scores to be placed into 0300. (Note: INRW is a corequisite course with ENGL 1301. When you enroll in INRW 0300, you will also be co-enrolled in ENGL 1301. You must take both courses together. Please carefully read and consider the repeater policy in the Student Handbook.

When defining the students targeted for participation in the course, some colleges used basic language such as, “This 1 contact hour NCBO course is intended for students who nearly place into a transfer-level Math course and are on a non-algebraic Math pathway.” Another syllabus stated that the course was “required of students who are not TSI complete or exempt in English” without explaining what it means to be TSI complete or exempt. There was also a syllabus that simply stated, “Prerequisite: See counselor for scores required for this course.” Other syllabi provided a more detailed explanation of eligibility criteria, such as this IRW course which stated, “This course is designed for students who scored 345-350 on the TSI Reading Assessment, or are complete in reading with a TSI writing score of 310-339 and an essay score of 1-4. It is designed to enable students to integrate critical reading and academic writing skills in order to comprehend and interact with college-level texts and to produce college-level writing.” The course description clearly provides information on the TSI scores and the course contribution towards students, which may be very helpful for the students to see their eligibility and what the

course claims to contribute towards them. Some colleges also tried to encourage students to take the course with text like, “If you have enrolled in this course having satisfied these prerequisites, you have a higher chance of success than students who have not done so.”

There were relatively few explanations in the syllabi about how the developmental course was related to college-level courses. When this topic was addressed, it was typically in terms of grading and withdrawal criteria. For example, one syllabus included a “Paired Course Policy” section that briefly explained, “This is a paired course. Students who withdraw from MATD 0414 will automatically be withdrawn from MATH 1314.” Another syllabus noted, “English 1301T is a paired course. Upon successfully completing the course, students are TSI compliant and receive credit for English 1301.”

In terms of explaining what is required to satisfy the TSI requirements, there were also varying levels of clarity. For example, the English syllabus at one college included a “course rationale” heading that said, “INRW 0230 is an exit course designed to prepare students to deal successfully with college-level reading and writing. Students who have not passed the reading and writing portion of the Texas Success Initiative (TSI) must enroll and participate in a developmental reading and writing course until they satisfy the TSI reading and writing requirement.” This explains that the course is designed to help students prepare for the college-level course and notes who is required to take it. Yet this text might still be a little confusing to students because it doesn’t explain what they must do to “satisfy the TSI reading and writing requirement. Some colleges explained that passing the college-level course satisfies the requirements, such as, “English 1301T is a paired course. Upon successfully completing the course, students are TSI compliant and receive credit for English 1301.” Other colleges explained that there were multiple options for satisfying the TSI requirements, such as, “MATH 0314 requires either that a student has passed MATH 0309 with a “C” or better OR TSIA Math Score 336-349 with Intermediate Algebra score 4-15 OR an equivalent score on a Placement Exam.”

Rigor of Learning Objectives

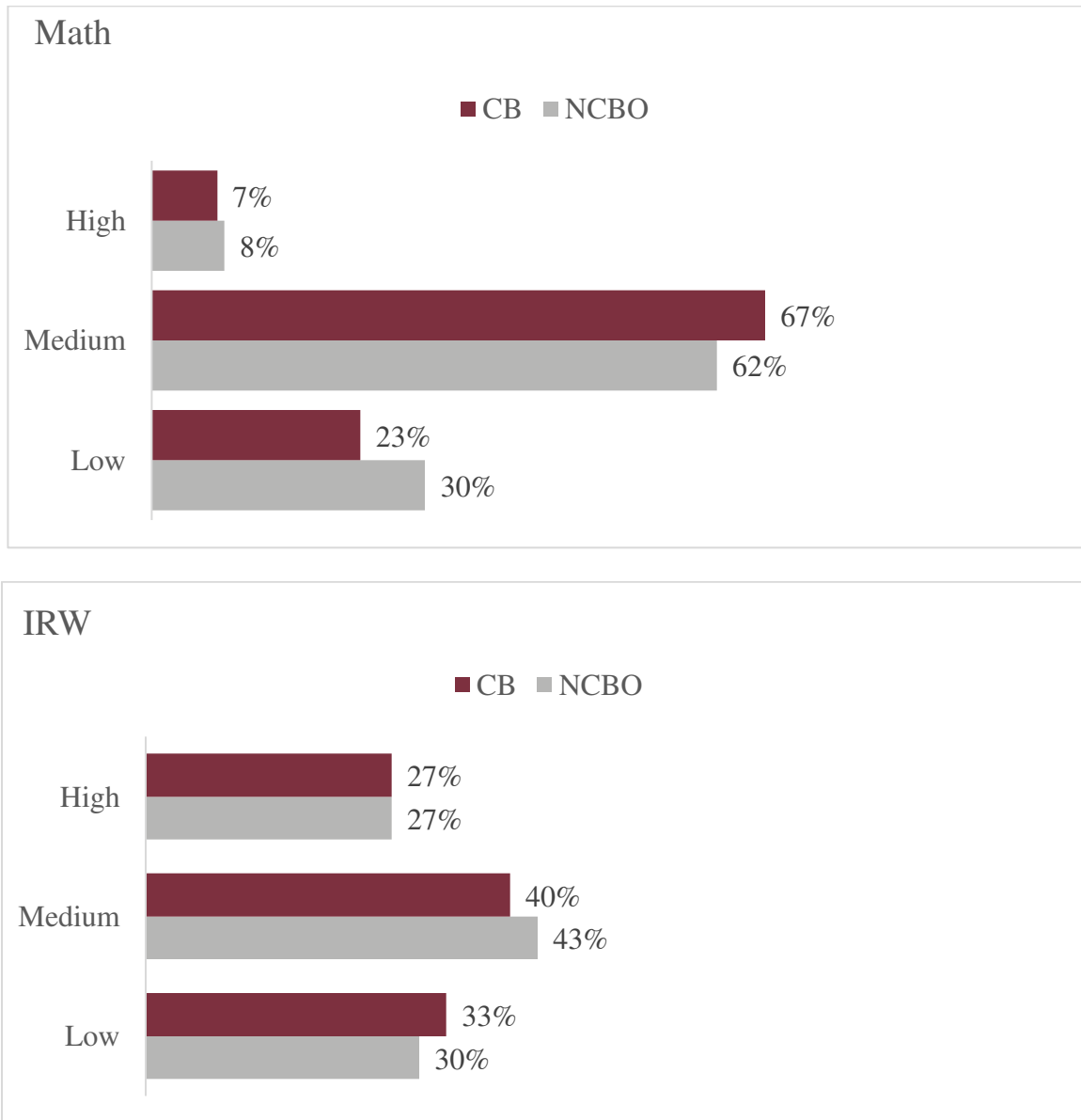
Next, we examined whether there were differences in the rigor of learning objectives based on Bloom’s taxonomy. In both subject areas, learning objectives were most commonly coded as medium rigor and least commonly coded as high rigor (Figure 2). For example, a high-rigor IRW learning objective at one college stated, “evaluate relevance and quality of ideas and information in recognizing, formulating and developing a claim.” In contrast, medium rigor learning objectives included statements like, “comprehend and use vocabulary effectively in oral communication, reading, and writing.”

There were some differences in the rigor of learning objectives by course type, but they tended to be relatively small in magnitude. In math, fewer than 10 percent of learning objectives were coded as “high” rigor in both NCBOs and course-based corequisites. But the learning objectives in course-based corequisites were slightly more likely to be at a medium level (67 percent versus 62 percent) and slightly less likely to be at a low level (23 percent versus 30 percent). In IRW, 27% of learning objectives were coded as “high” rigor in both NCBOs and course-based corequisites. The course-based corequisites had slightly fewer “medium” rigor learning

objectives (40 percent versus 43 percent), and slightly “higher” rigor learning objectives (33 percent versus 30 percent).

Figure 2

Percent of Learning Objectives Categorized as High, Medium, or Low Rigor for Math and IRW, by Course Type

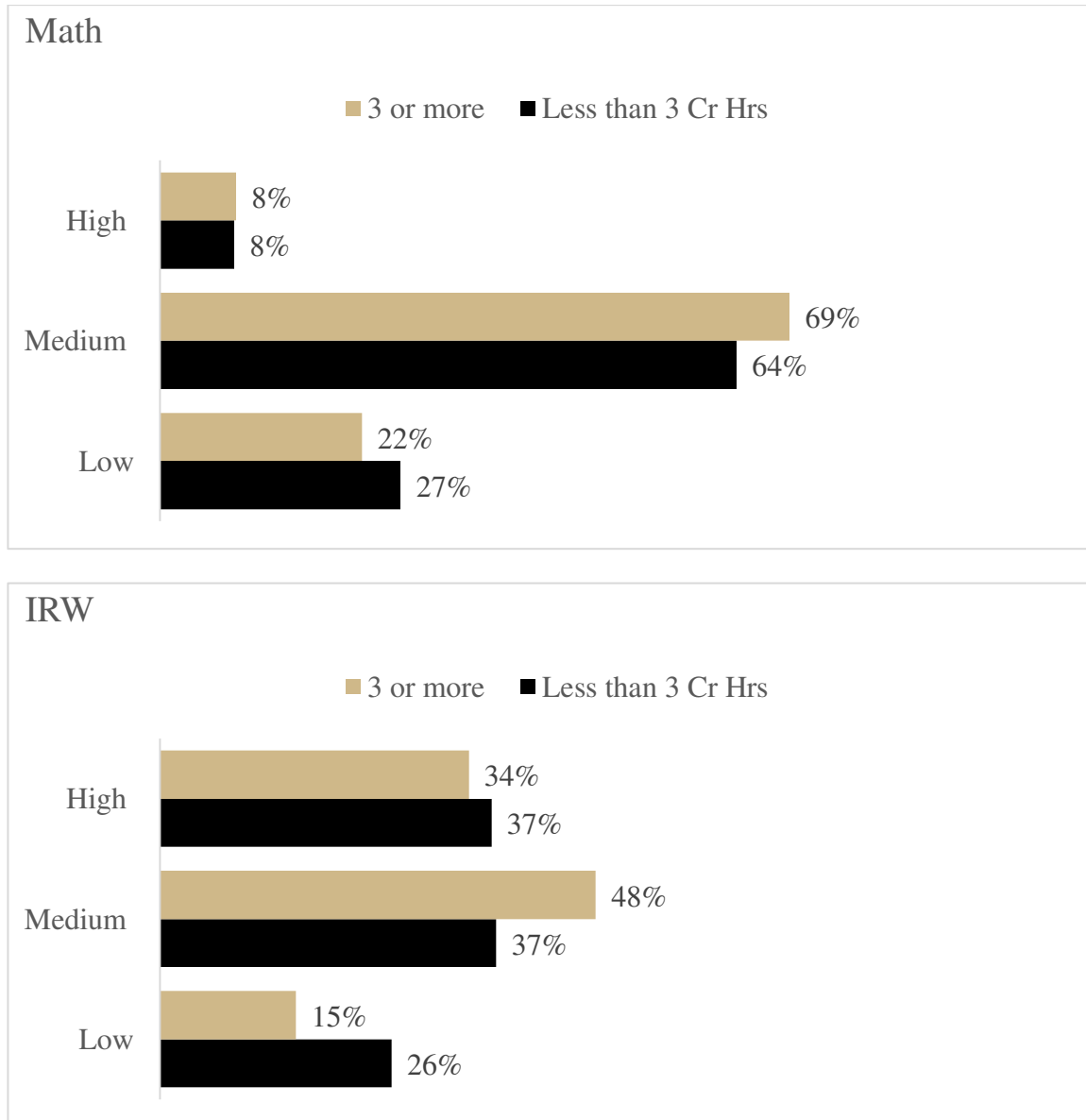


Greater differences in rigor emerged when we examined variation by credit hours, with longer credit hours corequisites tending to have lower rigor in the learning objectives compared to shorter credit hour corequisites (Figure 3). In math, the percentage of learning objectives categorized as “low rigor” was 27 percent for less than three-hour corequisites compared to 22 percent for three or more hour corequisites, a difference of five percentage points. There were

even greater differences in learning objective rigor by credit hours in IRW. Corequisites of less than 3 credit hours had 26 percent of learning objectives categorized as low rigor, compared to 15 percent for corequisites of three or more credit hours, a difference of nine percentage points.

Figure 3

Percent of Learning Objectives Categorized as High, Medium, or Low Rigor for Math and IRW, by Credit Hours



Corequisite Topics & Course Activities

Lastly, we examined the topics and course activities described in the syllabi and we searched for any differences by type of corequisite or number of credit hours. Instruction in NCBOs tended to be online and often included participation in mandatory tutoring or supplemental instruction. This additional support was provided in a mix of formats including one-on-one tutoring, group support provided by faculty, and supplemental instruction provided by professional tutors or other professional support staff. Course-based corequisites had greater variation in instructional strategies relative to NCBOs. Class activities in course-based corequisites included instructor-led lectures, student presentations, individual and group activities, and projects such as interactive student notebooks. Almost all colleges offered course-based corequisites with an in-person format, but many colleges also offered online modes that included either synchronous instruction or flexible formatting with scheduling determined by the student.

Colleges also took different approaches to the sequencing of content within the corequisite course. For example, at one college the course-based corequisites included developmental technology-supported assignments that were paired with in-person instruction for the college-level course. The course schedule provided the sequencing and deadlines for the assignments which were completed in alternating order between the developmental and college-level components. Another college used a flipped class format where students watched lecture videos and completed homework outside of class, and then spent the in-class time addressing questions about the lectures or homework.

We did not distinguish any differences in the content or course topics by course type or number of credit hours. In some cases, the syllabi for different corequisites within the same college were written by different instructors who used different language and terminology that was not directly comparable. In other cases, colleges provided a “master” syllabus on the website which was intended for instructors to insert details relevant to their specific course. Without having access to the individual instructor-level syllabi, there was limited information about the course that could be obtained from the master syllabi.

We noticed that in the math corequisites, there were some differences in the content of the developmental component of the course depending on whether it was paired with a STEM or non-STEM college-level math class. For example, at one college, the “Mathematics for Business and Social Sciences Support Course” (MAT 0324) included applied topics such as “mathematics of finance” In contrast, the “College Algebra Support Course” (MAT 0314) included topics like, “interval notation, graphing using a t-chart, piece-wise functions, and graphing using slope and y-intercept.” Yet there were also some topics that were common to both courses like “solving linear equations.”

There was also variation across colleges in terms of assessment methods and the extent to which the developmental component factored into the course grade for the college-level component of the corequisite. At several colleges, the grades for each component were determined independently. At other colleges, a certain percentage of the grade for the developmental course was dependent on the grade for the college-level course. Another college assigned pass/fail grades for the developmental course that were completely dependent on the grade in the college-level courses. Students who received an A, B, or C in the college-level course received a “Pass” for the developmental course, while students who received a D or F received a “Fail.” If

corequisites were offered in sequential format, students typically had to pass the developmental course in the first part of the semester before progressing to the college-level course.

Summary

Overall, it was difficult to distinguish differences in learning objectives, topics, and classroom activities by type of corequisite or number of credit hours. The main difference was that corequisites less than three credit hours tended to have more lower-order learning objectives relative to corequisites for three or more credit hours. This finding aligns with the information obtained in the focus groups where some participants reported that students with weaker academic preparation may be encouraged to take a longer corequisite option where they spend more time on basic skills. We also found that many syllabi provided incomplete or unclear information about the purpose of the corequisite course, the criteria for assignment to the course, the relationship between the developmental and college-level components, or the requirements for becoming TSI-complete. This lack of clarity in the syllabi suggests that it is critical for advisors, faculty and professional, to clearly explain this information to students before they enroll in their courses. Further, this lack of clarity also suggests that faculty need to make sure they work together to have some consistency across syllabi related to the types of information that should be in each syllabus to provide adequate information for both advisors and students.

Section V

Implications and Directions for Future Research

The findings from this annual report suggest the following implications and directions for future research:

Colleges should continue to have autonomy in making individualized decisions regarding the structure of their corequisite courses for their students. Our findings suggest that there is no one-size-fits-all "magic bullet" course structure that yields the best results for all students. Instead, corequisite effectiveness varies somewhat among student subgroups. It is essential to note that colleges are intentionally making decisions about the type of corequisite courses they offer based on their student population. This approach ensures that the chosen course structure and intensity aligns with the specific requirements of their student body.

Colleges should consider adding or expanding the metrics used for course placement. Some colleges used multiple measures of academic performance, such as high school grades, to determine whether to advise students to take corequisite courses or the number of credit hours recommended for corequisite courses. Many advisors perceived the use of multiple measures as more effective than TSI scores alone in identifying the best course for students.

Instructors of both the developmental and college-level courses should work together to ensure that they are covering the skills needed by these students at the right time. Some institutions use corequisites with longer credit hours to provide additional remedial support for students with lower levels of academic preparation. One promising practice was the development of "communication plans" that outlined expectations for both developmental and college-level instructors to ensure consistency across the content and assignments in corequisite courses. Further, this collaboration also has the potential to improve learning objectives and provide students with accurate information to help them choose the most appropriate course.

Providing information on corequisite course content is important for students, faculty, and advisor—and syllabi alone may not be sufficient source of information. Many corequisite syllabi lacked information defining what a corequisite means, identifying which students are required or encouraged to take the course, defining credit hours, explaining the relationship between the developmental and college-level components, or describing the requirements to become TSI-complete. This type of information must be clearly communicated to advisors, who in turn must provide an explanation to students so that they know what they are getting into before enrolling in a corequisite course.

Additional research is needed on how students make decisions about corequisite course options and what information is provided to them in making this decision. While this report contains extensive information on the types of corequisites offered and the content of these courses as reflected in the syllabi, more student voices could enhance our understanding of the selection process and help provide additional recommendations on advising and student success.

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Appendix A

Protocol Questions for Department Chairs and Faculty about Corequisite Course Structure, Intensity, Content, and How Students are Advised/Matched to Different Course Options

1. Please describe the structure and content of the corequisite courses offered in your department.
 - a. What are the names of the college-level courses that have corequisites, and what are the names of the developmental courses that support them? How many credit hours (0, 1, 2, 3, or 4) is each course worth?
 - i. [If there are multiple options for credit hours]: How do you determine which students should take courses with additional credit hours?
 - b. Are they offered as paired 16-week concurrent courses? Two sequential 8-week + 8-week courses?
 - c. Does the same instructor teach both courses within a pair? If not, is there any collaboration among the two instructors? Are the courses taught by group instruction? Are they self-paced?
2. Do you offer non-course based options (NCBOs), either during long semesters, summer sessions, or mini terms?
 - a. If you offer NCBOs, what determines whether a student takes an NCBO versus a course-based option?
3. Talk to us about changes (for example, content, intensity, or structure improvements) that you have made to the corequisite courses that you offer.
4. Tell us about the advising process for different corequisite course options. What factors are considered when matching students to different corequisite course content and delivery options?
 - a. How do advisors make decisions about which students should be in online or hybrid versus in-person classes?
 - b. How does academic preparation play into which corequisite option students take?
 - c. Is there any collaboration or conversation between instructors and advisors? How are advisors informed and educated on your corequisite course options?
5. Can you tell us more about the content of your different corequisite courses?
 - a. To what extent is there overlap with the associated college-level course? Was there an additional required textbook for the corequisite class? Did departments require the same materials for all corequisite classes?
 - b. If your department offers corequisite courses with different credit hours, how is the additional time spent in the courses with more credit hours?
6. What teaching methods do you find most beneficial for corequisite courses?
 - a. Can you give me some examples of ways you've had to change your teaching for corequisite courses?
 - b. What are some of the differences among the different types of corequisite courses offered by your department in terms of pedagogy/methods of delivery, or order and pacing of course material?
7. How do you use instructional supports (for example, technology, supplemental instruction, tutoring) in your corequisite course(s)?

8. To what extent do students take advantage of the availability of instructional supports outside of the classroom? Do certain groups of students seem to take advantage and participate in particular support activities or events more than others?
9. Have you seen evidence of these external instructional supports influencing students' learning? If so, how?
10. How do corequisite course options differ in the ways that they help students learn? For example, do certain corequisite options benefit certain groups of students more than others?
 - a. Do you see differences in student outcomes by race/ethnicity? Gender? Age? English learner status?
 - b. How do classroom dynamics differ across course options?
 - c. Did you notice different levels of success based on the structure or length of the corequisite course?
11. To what extent have you received training on how to support students with varying needs, particularly those who may need extra support?
 - a. What student populations have you found in need of extra support in corequisites?
12. What does your engagement with networks or individuals who also teach corequisites look like? Does your institution support and/or encourage your attendance at professional conferences, seminars, webinars, etc.?
13. What didn't we ask that you thought or wished we would? Is there anything that we didn't ask you about that you would like to share with us?

Appendix B

Protocol Questions for Advisors about Corequisite Course Advising and How Students are Advised/Matched to Different Course Options

1. How did you learn about House Bill 2223? Did you receive any training on the legislation and its requirements?
2. How do you determine which students should be assigned to a corequisite?
 - a. Do you implement a Multiple Measures model for placing students into college-level courses that would otherwise enroll in a corequisite model?
3. Please describe a typical advising conversation with a student who is required to complete a corequisite course(s).
 - a. What questions do students typically have about corequisites?
4. What is the structure (concurrent, sequential, or group or self-paced) of corequisite courses offered in math? In English?
 - a. How do you determine whether a student should take a sequential or concurrent corequisite?
 - b. If you offer NCBOs, what determines whether a student takes an NCBO versus a course-based option?
5. What is the intensity (1, 2, 3, or 4 credit hours) of corequisite courses offered in math? In English?
 - a. [If there are multiple options] How do you advise students on the number of credits that they should take?
6. What delivery methods (in-person, hybrid, or online) are available for corequisite courses offered in math? In English?
 - a. How do you advise students about whether they should take a corequisite in-person, hybrid, or online?
7. How do student preferences for corequisite options vary by population? (i.e. do certain student groups prefer NCBO over course-based, online over hybrid or in-person, etc.)
8. How does academic preparation play into which corequisite option students take?
9. What feedback have you received from students on corequisites?
 - a. To what extent are students aware that they only have to pass the college-level course?
10. What collaboration do you have with math and English department chairs and/or faculty when it comes to corequisites?
 - a. [If collaboration is present] How frequently do you meet or communicate with department chairs and/or faculty? What topics are typically discussed?
11. What didn't we ask that you thought or wished we would? Is there anything that we didn't ask you about that you would like to share with us?

Appendix C

Protocol Questions for Students about Corequisite Course Structure, Intensity, Content, and How Well Corequisite Courses Met Their Needs

1. What corequisite (paired/support) courses in math or English (Integrated Reading and Writing) are you taking or have you taken?
 - a. Were they offered as paired 16-week concurrent courses? Two sequential 8-week + 8-week courses? Were the courses taught by group instruction? Were the courses self-paced?
 - b. How many credit hours was each course worth (0, 1, 2, 3, or 4)?
2. What, if any, other corequisite options did you receive information about?
How did you decide which corequisite courses to take?
3. Tell me about the corequisite courses themselves.
 - a. What was the pace of the courses like?
 - b. Was your course face-to-face, hybrid, or online? Was the course a non-course based option (NCBO)? What is the average amount of time per week that you spent in or out of class working on your corequisite courses?
 - c. How effective was the developmental support course in terms of preparing you for the next college-level course in that subject?
 - i. Could the developmental course have done anything better to prepare you for the college-level course?
 - d. How did the content of the corequisite course align with the content of the college-level course?
 - e. Were there any assignments or activities that you found particularly helpful or unhelpful?
 - f. If you took a sequential pair of corequisite courses, to what extent did you continue to receive support from your corequisite instructor while taking the college-level course?
4. Tell me about any student support options for the corequisite courses such as mathematics tutoring or writing labs, or supplemental instruction or academic coaching (hours, scheduling, use?).
 - a. How frequently did you use these support options? Were you required to go to tutoring centers or writing labs? Did you find these support options beneficial? Why or why not?
 - b. Were support options available online? If not, how did the location of support options impact how often you used the support option? Did the hours of operation of the support option impact how often you used the support option?
 - c. To what extent were you able to receive the support that you were looking for?
 - d. Have you continued to use any of these supports for any other courses that you have taken?
5. What other resources did you turn to or use when you needed help?
 - a. How did you know which resources existed to help you?
6. What advice would you give an incoming student about enrolling in a corequisite course model?

7. What else do you want to tell us about your experience in corequisite courses that we haven't thought to ask you?