TECHNICAL REPORT FOR

Inequity by Design:

How College Placement Policies Perpetuate Institutional Racism

June, 2021

Inequity by Design

Community and Technical College (CTC) assessment and placement processes serve the primary purpose of predicting the appropriate levels of math and English classes for entering students. Yet, all too often, the approach to placement can systematically and substantially underestimate student capacity, particularly among students of color. Eradicating racial equity gaps begins with understanding the damaging impact current policies have on students of color and exploring why they exist.

EFFORT GOALS

This report is the culmination of a multiyear, three-study series designed to help CTCs in the Road Map Project region transition more rapidly to assessment and placement approaches that can increasplacement e equity across different racial and ethnic groups and support the academic success of all students. The findings draw attention to the compounding inequities that exist in current college policies and show clearly that these policies sustain racial inequity among racial groups, which by definition makes them racist in their impact.

Inequity by Design is a partnership among the Puget Sound College & Career Network, Highline College, and the Community Center for Education Results (CCER). Funding for this project is provided by College Spark Washington. This partnership works alongside an advisory group of staff from community and technical colleges in South King County and SBCTC. This Technical Report includes the detailed methods and findings contributed by each study lead (Highline College - Study 1; CCER - Study 2 and Study 3).

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psccn Puget Sound College and Career Network | HIGHLINE COLLEGE | CCER Community Center for Education Results | Road Map Project

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Study 1 - Long-Term Effects of College Placement

STUDY DESIGN

This analysis attempted to contextualize Highline College's uptick in college-level placements by answering two questions: (1) What effects did the modified assessment and placement process have on longer term student outcomes? and (2) How does achievement of these outcomes differ by student characteristics?

The analysis relied on data from the Highline College student management system. This system includes placement, enrollment, transcript, and demographic data.

Like other community and technical colleges, Highline College serves a broad range of students including students enrolling directly from high school, students who may have delayed enrollment for a number of years after high school before deciding to pursue higher education, recent immigrants and refugees, and adults looking to gain skills in a new area. For this analysis, we focused on recent high school graduates in an effort to generate insights that can support active conversations in the region between K-12, CTC and civic leadership around strategies to support direct enrollees. To achieve this focus, we limited the study cohort to students who met specific criteria. These criteria are outlined in Table 1.1 along with a description and rationale.

Table 1.1 - Cohort Description

Criterion for inclusion	Description and rationale
First time enrollees (first time at Highline)	Description: No credits registered at Highline prior to summer of the cohort year (unless those credits were outside of ordinary degree-seeking programs - Running Start, Tech Prep, Adult Basic Education). For many reasons, students may experience interruptions in their college enrollment. To ensure accurate comparison, the sample included only students who were enrolling at Highline for the first time.
Summer and fall enrollees	Description: Registered in 1 or more credit in fall of the cohort year (may or may not have credits in summer). Highline College has a rolling admissions policy which allows students to enter the college at different times. To ensure accurate comparison, the sample included only students who first enrolled in the fall, or first enrolled in the summer and continued into the fall.
Students younger than 21	Description: Age was less than 21 on the first day of the cohort year's fall quarter. Highline serves students across the age spectrum. This study is intended to improve alignment between high schools and colleges in the Road Map Project region. For this reason, the sample includes students age 20 and under — i.e., those entering within a year or two of high school graduation.
Exclude Running Start students	Description: Not a Running Start student in fall of the cohort year based on Highline's Student Type field. In 2017, Running Start students constituted 34% of all incoming summer and fall students at Highline College. These students often enter having previously completed college credits. To ensure accurate comparison, the sample included only students who did not participate in the Running Start program.

Table 1.1 - Cohort Description (continued)

Criterion for inclusion	Description and rationale
Exclude international students	Description: Not an international student in fall of the cohort year based on Highline's Student Type field. In 2017, international students constituted 7% of all incoming summer and fall students. This study is intended to improve alignment between local high schools and colleges in the Road Map Project region. For this reason, the sample excludes international students.
Coded as intending to transfer or obtain a credential	Description: Highline's Student Intent field listed as B (transfer), F (professional/technical), or M (multiple programs) in fall of the cohort year. Many students who enroll in college do not intend to earn a credential. This study is intended to help improve success of students who do have such goals. For this reason, the sample includes only students who indicated they would like to transfer or obtain a credential.

The study looked at outcomes for students who met these criteria and entered the college between 2012 and 2017. On average, these students constituted 44 percent of the total incoming cohort at the college. A breakdown of student demographics by cohort year is available in table 1.2 below.

Table 1.2 - Cohort Characteristics

	2012		2013		2014		2015		2016		2017	
	N	%	N	%	N	%	N	%	N	%	N	%
Total students	888	100%	885	100%	897	100%	707	100%	831	100%	866	100%
Male	428	48%	411	46%	417	46%	327	46%	377	45%	401	46%
Female	460	52%	472	53%	478	53%	380	54%	453	55%	460	53%
White	337	38%	357	40%	314	35%	228	32%	251	30%	257	30%
Black/African American	81	9%	66	7%	95	11%	74	10%	94	11%	94	11%
Asian/Pacific Islander	177	20%	162	18%	172	19%	130	18%	167	20%	160	18%
Latinx	15	2%	3	0%	79	9%	27	4%	40	5%	37	4%
Multiracial	151	17%	133	15%	153	17%	193	27%	212	26%	254	29%
Economically disadvantaged	288	32%	286	32%	313	35%	265	37%	204	25%	207	24%
Full time enrollees[1]	454	51%	441	50%	386	43%	348	49%	347	42%	400	46%
Professional and technical intent[2]	53	6%	33	4%	46	5%	33	5%	61	7%	76	9%

Researchers explored several relevant "momentum points" for these students including:

- Enrollment in and completion of college-level math and English courses,
- Completion of 45 credits, and
- Successful completion and/or transfer.

[1] Defined as enrolling in at least 15 credits in the fall term of the student's first year.
[2] As indicated by the student during the intake process in the fall term of the student's first year.

FINDINGS

Using Highline College administrative data, the study team uncovered three main findings, outlined in detail below:

1. The changes to assessment and placement appear to have had a disproportionate positive impact on enrollment in and completion of college-level math and English for Black/African American students.
2. Increased placement in college-level math and English courses does not appear to have led to cohort-wide "downstream" effects on college-level course completion, credit accumulation or completion/transfer.
3. Students who enrolled in math and English courses saw a decrease in the average number of credits needed to complete a college-level course, saving them time and money.

Finding 1: The changes to assessment and placement appear to have had a disproportionate positive impact on enrollment in and completion of college-level math and English for Black/African American students.

In addition to improving the placement process and outcomes for the student body as a whole, changes in assessment were intended to benefit the specific population of students who have faced disproportionate barriers to attaining their required math and English credits. Disaggregating outcomes by race/ethnicity shows some evidence that this has been successful. In particular, Black/African American students, who began with some of the lowest levels of math and English enrollment and completion, saw disproportionate improvements. Comparing the period before the changes took place (2012-2014) to the period where the new approach was in place (2015-2017), the percentage of Black/African American students who enrolled in college-level math during their first 45 credits increased by eight percentage points, and the percentage who completed college-level math increased by two percentage points. Likewise, the percentage who enrolled in college-level English and the percentage who completed it each increased by seven percentage points.

Improvements in enrollment and completion of college-level math and English courses for Black/African American students are even more substantial when looking at enrollment and completion during students' first three years at the college: Black/African American students who completed college-level math in their first three years increased by six percentage points and the share who completed college-level English increased by twelve percentage points. It is important to note that these changes are inconsistent among other demographic subgroups. While the college still has much work to do to ensure equitable outcomes on these measures, the analysis provides evidence that colleges can narrow gaps by race/ethnicity.

[3] These outcomes were relevant due to their inclusion in the Washington State Board for Community and Technical College's Student Achievement Initiative. Washington SBCTC. Student Achievement Initiative. Website accessed on November 19, 2019. [LINK]

Finding 2: Increased placement in college-level math and English courses does not appear to have led to cohort-wide "downstream" effects on college-level course completion, credit accumulation or completion/transfer.

Placement and enrollment are separate events. By helping more students place into college-level math and English courses, the college effectively created the conditions in which more students have the option to enroll in those courses, but doing so is ultimately the student's choice. Given that a transfer degree and most credential programs require students to complete both college-level math and English courses, our study team hypothesized that, if given the opportunity to enroll in those courses, more students would opt to do so. We found that, on average, this hypothesis did not prove to be accurate.

As summarized in Figure 1.1, the share of students who enrolled in and completed a college-level math course has seen a slight decrease since the introduction of the new placement approach.[4]

Among students in the 2015 and 2016 cohorts — those who experienced the revised placement approach — an average of 41% of students enrolled in and 30% completed college-level math in their first 45 credits.

Figure 1.2 summarizes college English enrollment and completion rates within the first 45 credits for students in the 2012-2016 entering cohorts. The average share of students who enrolled in college-level English before and after the changes were introduced during this time period held at a steady 57%. Meanwhile, the share of students who completed college-level English within their first 45 credits saw a 1 percentage point increase — from 46% to 47% — after the changes were introduced.

Figure 1.1. Enrollment in and completion of college math in first 45 credits

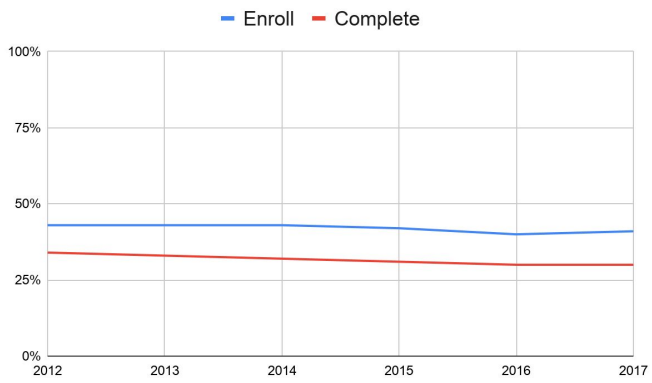
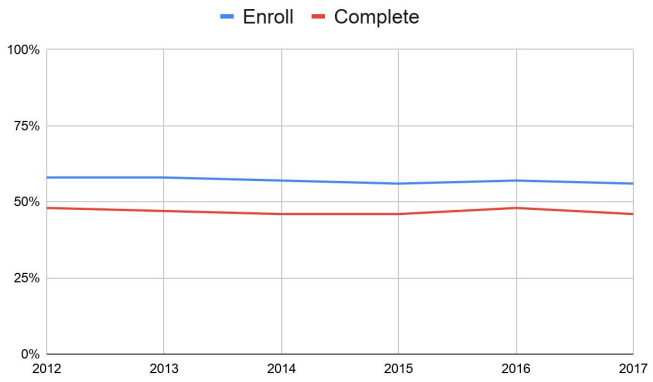


Figure 1.2. Enrollment in and completion of college English in first 45 credits



[4] Because each cohort features a mix of full and part time enrollees, the threshold of "within their first 45 credit" was used as a way to control for enrollment intensity. As outlined in the appendix, full-time enrollment fluctuated only slightly between 2012 and 2017.

Even when students do not enroll in or complete college-level math or college-level English within their first 45 credits there is still a likelihood they will enroll in or complete those courses later on in their college experience. To better understand college-level math and English course taking that happens after a student's first 45 credits, researchers conducted a second analysis that included coursetaking throughout the student's first three years at the college. This analysis, outlined in Figures 1.3 and 1.4, shows that — given the additional time — more students were able to enroll in and complete college-level math and English courses. However, the analysis did not reveal dramatic increases in course enrollment or completion that could be considered a downstream effect of the changes in assessment and placement.

Like college placement, enrollment in and completion of a college-level math and English course is only one step in the student journey. Once these courses are complete, students must persist to reach other milestones including the completion of 45 credits and eventual credential completion and/or transfer. As summarized in Figure 1.5, these longer term outcomes did change from year to year, but researchers did not find consistent patterns that might be attributable to changes in assessment or placement.

Figure 1.3. Enrollment in and completion of college math within three years of enrollment

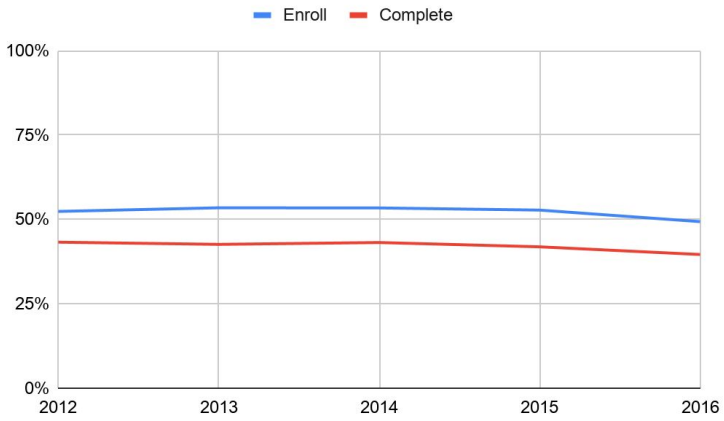


Figure 1.4. Enrollment in and completion of college English within three years of enrollment

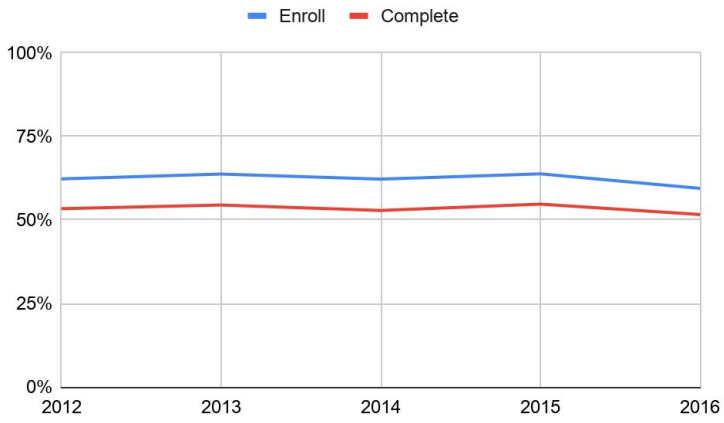
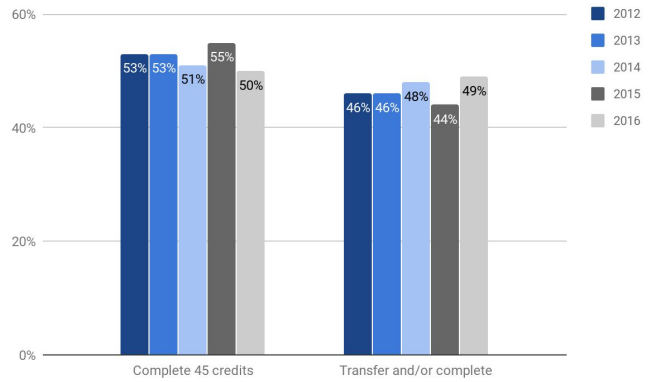


Figure 1.5. Complete 45 credits, transfer and/or complete within three years



Finding 3: Students who enrolled in math and English courses saw a decrease in the average number of credits needed to complete a college- level course, saving them time and money.

Even if increases in the share of students placing into college-level courses did not directly lead to improvements in college-level course enrollment or completion, improving placement accuracy could still benefit students who did enroll in pre-college or college-level math and English courses by helping them avoid unnecessary pre-college courses. This shortened path translates to savings of both time and money and allows the student to redirect resources that would have gone to pay for pre-college coursework to other activities, including higher level courses, preferred electives or non-college expenses that might have otherwise added financial stress.

To explore this issue, researchers analyzed course taking of students who enrolled in math and/or English courses at any point during their first three years at the college to try to quantify any potential shift in the share of students enrolling in pre-college courses. As outlined in Figures 1.6 and 1.7, researchers found that the improvements that the college made to its assessment and placement process coincided with substantial reductions in the proportion of students who take pre-college classes in both English and math. The share of math course takers who enrolled in one or more pre-college math courses decreased by 18 percentage points between 2012 and 2018 and the share who enrolled in one or more pre-college English course declined by 15 percentage points over this same time period.

Figure 1.6. Pre-college and college-level math course taking among math enrollees (2012-17)

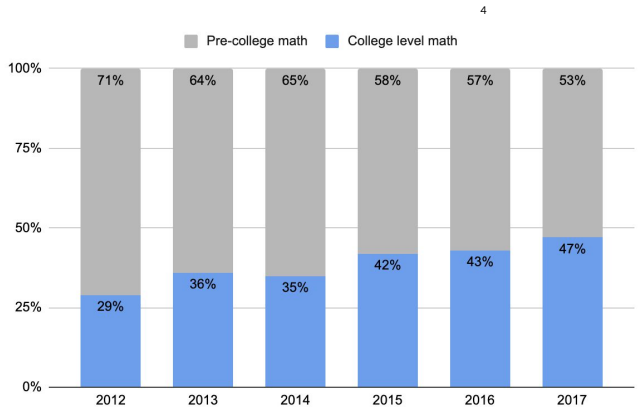
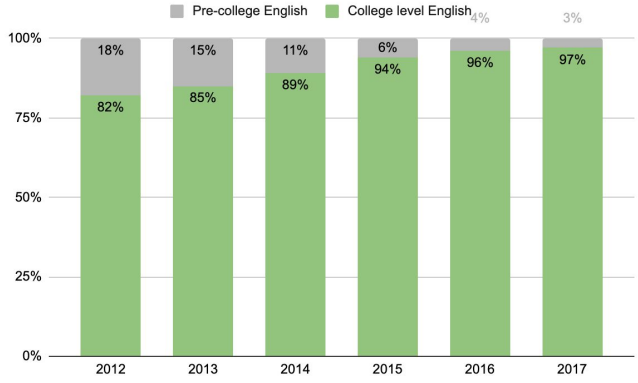


Figure 1.7. Pre-college and college-level English course taking among English enrollees (2012-17)

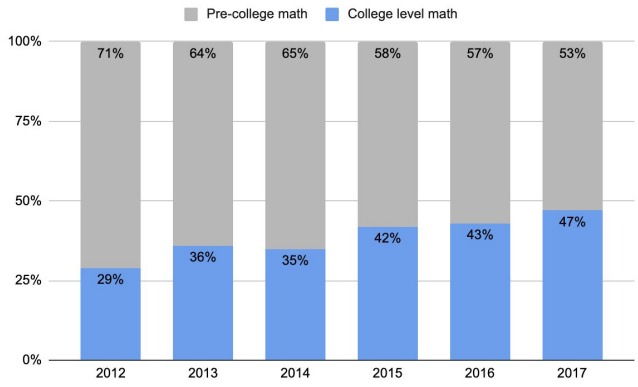


Among the effects of this decrease in pre-college course enrollment was a decrease in the average number of credits required to complete college-level math and college-level English courses. Students in the 2012 cohort who completed college-level math, took on average 10.6 math credits to do so compared to only 8.2 credits for students in the 2017 cohort. A similar trend occurred in English — the average number of credits needed to complete college-level English declined from 6.5 to 5.7 over this same time period. While these changes may

sound minimal, they translate to meaningful cost savings for students. As outlined in Figure 1.8, students in the 2017 cohort paid an average of $215 less to complete a college-level math course than students in the 2014 cohort. Similarly, students in the 2017 cohort paid an average of $20 less to complete a college-level English course than students in the 2014 cohort. The cost savings are even more substantial when viewed at the level of the cohort: **the reduction in the share of math enrollees required to take pre-college courses saved an estimated $65,700 in unnecessary cost costs for the 2017 cohort alone**[5].

It is important to note that, in addition to these financial costs, students who avoided pre-college courses also benefited by avoiding the psychological toll of being told they are "not college ready" when they arrive at college. While this cost is difficult to quantify, recent research on student belonging suggests that it can play a significant role in student-decision making.[6] Indeed, this psychological effect may even benefit a student who leaves the college without completing or transferring. If they perceive themselves as a "college ready" student, then perhaps it is more likely that they would consider re-enrolling in the future.

Figure 1.8. Average cost to complete college-level math and college-level English (2012-17)



[5] Estimate generated by multiplying the number of pre-college course takers in 2017 (N=306) by the average cost to complete college -evel math in 2014 ($995) and the average cost to complete college-level math in 2017 ($780) and then subtracting the difference.

[6] For more, see Romero 2015. What We Know about Belonging From Scientific Research. LINK

Study 2 - Transcript-Based Placement

OVERVIEW AND APPROACH

Study 2 sought to understand placement into college-level (or precollege) courses at community & technical colleges (CTCs) in the Road Map Project region. This study focused on high school graduates from the schools within the Road Map Project which comprises the following districts: Auburn, Federal Way, Highline, Kent, Renton, South Seattle, and Tukwila. The CTCs included in the analysis are Bellevue College, Green River College, Highline College, Seattle Central College, South Seattle College and North Seattle College.

Given the lack of placement tracking data across colleges, the study simulated transcript-based placement policies for Road Map Project CTCs by using the high school transcript data of Road Map Project high school graduates to determine their math and English course placement eligibility, then reviewing these students' college transcript data to understand their actual course placement upon enrolling in college.

RESEARCH QUESTIONS

This study investigated the following four topics:

Coursetaking: Considering that college transcript placement policies frequently rely on high school math and high school cumulative grade point average (GPA), what is the distribution of math coursetaking and cumulative GPA among Road Map Project high school graduates? How does this vary by race - are there equity implications of relying on these criteria?

Placement Eligibility: Based upon coursetaking and GPA, how many Road Map Project high school graduates could place into college-level math and English at each local CTC? What are the current equity implications - how does this vary by CTC and by student race?

Underplacement: How many students who were eligible for college-level courses, based upon high school transcripts, were placed into precollege math or English courses? How does this vary by student race?

Success in College-Level Coursetaking: Are there aspects of high school or college coursetaking associated with success in college-level math and English?

DATA SOURCES

College transcript placement policies and course catalogues were found on college websites.

High school course catalogues were found on district websites.

High school enrollment and transcript data - OSPI CEDARS student-level data provided to CCER by ERDC for academic years 2011 - 2018.

Community college enrollment and transcript data - SBCTC student-level data provided to CCER by ERDC for academic years 2011 - 2018.

DATA TOOLS

All data and transformations are saved in a private GitHub repository. Data was imported into the CCER education data warehouse (SQL Server) and transformed using a combination of R and Data Build Tool (DBT).

Descriptive analyses were conducted in Python, R, and Tableau. Regression analyses were performed using lme4 packages of R.

TRANSCRIPT-BASED PLACEMENT POLICIES OVERVIEW

Transcript-based policies were found for Bellevue, Green River, Highline, and Seattle (Central, North, and South) colleges on their websites in the placement and testing sections. Renton Technical College's policy was not available on their website.

English

For most English policies, college-level eligibility was determined solely based on a student's cumulative high school grade point average (HS GPA) provided that the student graduated within a certain number of years. There is a lot of variation in GPA and time thresholds used to determine placement into English 101.

Table 2.1: College-Level Placement through English Transcript-Based Policies

Road Map Project CTC	Min HS GPA	Max years from HS Grad	Note
Bellevue	3.0	5	
Green River	2.5	5	
Highline	2.5	10	
Seattle Colleges (South, Central, North)	2.5	10	
	2.0 to 2.49	10	With ENGL099 co-requisite

Green River College also provided students the opportunity to use their most recent English course grade to determine placement into a college-level or a precollege course. Only Bellevue College had an additional GPA threshold for precollege placement.

Other colleges required use of a different placement method when the GPA threshold for English 101 was not met.

Math

The Road Map Project region CTCs' math policies used a student's math coursetaking and the grade received in that course to determine placement eligibility into college-level courses. As of the 2020-21 academic year, no CTCs used cumulative HS GPA in their placement criteria.

In general, math transcript-based policies had the following components:

- ***District requirement***: While a few college policies were available to students from any district, most provided specific eligibility for students from a particular high school district.
- ***Course requirement:*** High school courses are grouped into 1st Year Algebra, 2nd Year Algebra, Precalculus, and Calculus courses. Each policy has specific grade and time requirements to determine placement.
- ***Grade requirement:*** Grade cutoffs were based on the grade in the last semester of the course. Grade cutoffs at all CTCs were all set with a minimum of earning a C in the course, and often allowed different placement based on whether a student earned an A, B, or C in the course.
- ***Time requirement:*** In general, time requirements were based on whether a course was completed within a certain number of years prior to enrollment. For many policies, there would be different placement outcomes for students who had the same grade in the same course depending on whether the course was taken within 1 year or 2 years of college enrollment.

The use of these criteria varied widely across placement policies, with some combinations allowing a student to place into college-level courses while a slightly different combination would prohibit the use of transcripts for course placement. This leads to different course placement for students depending on where they graduated from high school and where they enrolled in college.

USING ACADEMIC DATA TO SIMULATE TRANSCRIPT-BASED PLACEMENT

In order to categorize student transcripts based upon transcript-based placement policies, the following steps were performed:

1. Identify all high school math and English courses that could be used for the purpose of placement and determine each student's cumulative HS GPA.
2. Use high school coursetaking and cumulative GPA to determine placement eligibility at the CTC.

Determining High School Coursetaking

Math & English Coursetaking

The initial categorization of high school math coursetaking was done by grouping the different courses in the OSPI CEDARS Student Grade History file into the course groups that were identified in the policies.

All placement policies had a group related to 1st Year Algebra/Algebra I, 2nd Year Algebra/Algebra II, Precalculus, and Calculus. However, there were some smaller variations between policies, like having a separate course group for Basic/Pre-Algebra, separate placement for Bridge to College Math, or consideration of specific quantitative courses like Computer Science or Finance.

We assigned high school math courses into these course groupings either as defined explicitly in the college policies or by searching for courses that appeared to match the criteria for colleges that offered general policies (e.g. Bellevue and Highline Colleges). We then identified the last term that the course was taken so that the final term grade was pulled for placement.

Similarly, English high school coursetaking was initially categorized by grouping the different courses in the OSPI CEDARS Student Grade History file (File H) into the course groups that were identified in the policies. Because only Green River College had coursetaking as a part of their policy and they only had coursetaking policies for Renton and Kent school districts, there was a very limited set of English coursetaking that was considered.

The identification of the English course to be used for placement was simulated by using the courses that met the highest placement criteria, and selecting the course taken in the most recent year with priority for the course in which the student received the highest grade.

Cumulative GPA

For most students, high school cumulative GPA was pulled directly from their OSPI CEDARS District Student file (File B). When a student did not have a valid cumulative GPA, the cumulative high school GPA was calculated using the student's OSPI CEDARS Student Grade History data using the formula:

$$\frac{\sum \text{GPA Points}}{\sum \text{Credits Attempted}}$$

GPA Points were assigned to all courses where credits were attempted and received a letter grade based on the Business Rules for Element H10 - Letter Grade in the OSPI CEDARS Manual for shown on Table 2.2:

Table 2.2: CEDARS Business Rules for Letter Grade

Letter Grade	GPA Points
A	4.0
A-	3.7
B+	3.3
B	3.0
B-	2.7
C+	2.3
C	2.0
C-	1.7
D+	1.3
D	1.0
E	0.0
F	0.0

Determining Highest Math Course Taken

For each student, we wanted to try and identify the highest level of math the student successfully completed. To do this we looked at all courses that a student took that were being considered for placement by at least one of the RMP CTC's placement policies.

For the highest math course taken, we wanted to focus on the 4 main levels of math that were identified by all of the transcript-based placement policies: Algebra I, Algebra II, Precalculus, and Calculus. Smaller course groupings identified in only some policies were either combined into one of the 4 main levels or removed. Basic/Pre-Algebra was added into our 1st Year Algebra/Algebra I group, Bridge to College Math was added into 2nd Year Algebra/Algebra II, and non-math quantitative courses were not considered for the purpose of determining the highest math course taken.

The final course groupings for highest math course taken are summarized in Table 2.3:

Table 2.3: Final Math Course Groupings

High School Math Course Grouping	High school math course examples
1st Year Algebra/ Algebra I	Pre-Algebra, Basic Algebra, Algebra I-II, Geometry, Apps in Math, Reasoning I-II
2nd Year Algebra/ Algebra II	Algebra 2nd year, Intermediate Algebra, Advanced Algebra, Algebra III-IV IB Math Studies SL1-2, Pre-HL Math, Bridge to College Math
Precalculus	Precalculus, Trigonometry, IB Math SL 3-4, Math Analysis
Calculus	Honors PreCalculus, Calculus, IB Math Studies HL2, AP Calculus AB

As none of the CTC placement policies consider math courses where a student received a grade below a C, we first looked for the highest course where a student earned a C or better. When a student didn't earn a C or better in any courses, we then looked for the highest math course, regardless of the grade earned in this course.

Determining College-Level Placement Eligibility

After coursetaking and cumulative GPA were determined, transcript-based placement policies were simulated by building out all the mutually exclusive combinations of course, grade, and time requirements and their corresponding placement for each CTC's transcript-based placement policy.

Then for each student, all relevant math/English

courses and cumulative GPA were evaluated against each policy to determine each possible placement for math and English. When policies used whole grades then eligibility criteria was established for the entire grade span (e.g. 3.3, 3.0, 2.7), otherwise the specific course grade was used for the course eligibility criteria limits to determine whether a student's grade in their math course met placement eligibility.

For determining time requirements, the difference between the academic year that the course was taken and the year that the student enrolled at the CTC was used to determine if the time requirement was met. For students who didn't enroll in college, the following academic year was used to estimate placement eligibility.

In cases where there were multiple potential placements for a student at a CTC, an assumption was made that the highest possible placement would always be taken. Students who had any potential placement into a college-level course were considered eligible for college-level placement.

COLLEGE ENROLLMENT AND COURSETAKING

Determining First CTC Enrollment

The majority of students who enrolled into a RMP CTC did so at a single CTC; for these students, the first CTC enrollment was determined by filtering out all enrollments that were considered a Running Start — a program that allows 11th and 12th Grade high school students to attend courses at a community college — enrollment, and then finding the first CTC enrollment record in the academic year following the students graduation year.

There were a number of students who had enrollments at multiple CTCs. For students who had multiple CTC enrollments, their first non-Running Start college enrollment was used for the purpose of this analysis. This was implemented to control for the possibility that if a student had attended a prior CTC, their math or English placement could be based on their academic history at that prior CTC rather than from their high school.

Determining College Coursetaking

The first step to determining math and English college coursetaking was to define what courses we wanted to consider in our analysis. This analysis was based on courses that the student took after completing high school, and that fulfilled requirements that students needed to earn a credential or transfer to a four-year college. To achieve this, we included courses taken on or after the initial academic quarter that the student enrolled at the CTC, as defined above. Running Start courses were omitted from the analysis because these are courses taken prior to high school graduation. Resource courses, which don't fulfill credential requirements, were also omitted from the analysis by excluding any courses that had fewer than 5 credits.

College Level Coursetaking

College level math coursetaking was defined as a 5 or more credit math course that satisfied Quantitative Symbolic Reasoning requirements. This college level course status was confirmed on each college website and in discussions with college representatives. While additional course breakouts were established to designate whether the course was STEM track, and the relative level of each course, this high level college/precollege

status was used in all report analyses.

College-level English coursetaking was defined as a 5 or more credit English course with a course number 100 or above.

Precollege Coursetaking

Precollege math and English coursetaking was defined as a 5 or more credit course that had a course number 099 or below. There were rare instances where a student took precollege courses after taking a college-level course. In these instances, only courses that were taken prior to a college-level course were considered in this analysis.

Grading

Most courses were graded using a decimal grade. In the instance where a Letter Grade or an alternative grade like Pass/Not Pass (P/NP) or Satisfactory/Unsatisfactory (S/U) was used, the grades were converted to a Decimal Grade or an equivalent as though the student earned a 2.0 grade or better using logic based on SBCTC Shared Course Web Grading Palette summarized in the Table 2.4.

Approximating CTC Placement

After math and English coursetaking was defined, we simulated the actual placement of students by looking at the first course that the student took at the CTC as the actual placement of the student.

When students didn't take a Math/English course, we reviewed courses that relied on college-level Math/English as a prerequisite to serve as a proxy for college-level placement. Ultimately, our final analyses did not use these proxy-based placements as they focused on either success in actual math or English courses or placement into precollege courses.

Table 2.4. SBCTC Shared Course Web Grading Palette

Letter Grade	Decimal Grade	Credits Earned	2.0 or Better
A	4.0	Yes	Yes
A-	3.7	Yes	Yes
B+	3.3	Yes	Yes
B	3.0	Yes	Yes
B-	2.7	Yes	Yes
C+	2.3	Yes	Yes
C	2.0	Yes	Yes
C-	1.7	Yes	No
D+	1.3	Yes	No
D	1.0	Yes	No
D-	0.7	Yes	No
F	0.0	No	No
P	NA	Yes	Yes
NP	NA	No	No
S	NA	Yes	Yes
U	NA	No	No
CR	NA	Yes	No
NC	NA	No	No
W	NA	No	No
V	NA	No	No

COHORT DEFINITIONS

This study focused on high school graduates from the schools within the Road Map Project which comprises the following school districts: Auburn, Federal Way, Highline, Kent, Renton, South Seattle, and Tukwila. The community colleges included in the analysis are Bellevue College, Green River College, Highline College, Renton Technical College, Seattle Central College, South Seattle College, and North Seattle College.

For all analyses in this study, students who participated in Running Start were excluded because Running Start courses directly determine college course placement.

Our analyses looked at 3 different cohorts of students:

RMP Graduating Classes of 2014 - 2017 (N=22,931)

This cohort of students was used to analyze the cumulative HS GPA and math coursetaking of all graduates from the RMP region, as well as the eligibility variation across college transcript-based placement policies. The 2014 - 2017 time period was used because 2015 was identified as the year where transcript-based placement began to be used at a larger scale.

CTC Enrollees from the RMP Graduating Classes of 2014 - 2017 (N=6,749)

This cohort of students was used to analyze college-level eligibility of college enrollees under current placement policies, as well as underplacement in math and English at CTCs. The 2014 - 2017 time period was also used for this cohort because the analyses were all focused on the transcript-based placement policies and their implementation, and our analysis was limited to students who initially enrolled between 2015 and 2018. For this cohort, we also focused on students who were on an award-seeking pathway, which we defined as pursuing a degree or a transfer to a four-year college and who were not pursuing professional/technical pathways which require a different set of math requirements. This cohort did not include students who were enrolled at Renton Technical College because they did not have a publicly published transcript-based placement policy.

CTC Enrollees from the 2012 - 2017 (N=8,634)

This cohort of students was used in our analysis of success in college-level math and English coursetaking at the CTCs. We expanded this cohort to look at students who enrolled prior to 2015 because this analysis did not factor placement into our analyses. All measures calculated using this cohort were based on 2-year windows, so we could consistently look at them across students with different enrollment dates. As a result, this cohort was limited to students who initially enrolled prior to 2017 because of our measures of success for college-level coursetaking. This cohort was also focused on students who were on an award seeking pathway.

Study 2 - Analysis Methodology

DESCRIPTIVE ANALYSES

College-Level Eligibility among High School Graduates

This measures the extent to which current transcript-based placement policies would make students eligible to place into college-level courses based on a student's cumulative GPA or high school math/English coursetaking.

Numerator: The count of students who were eligible for college-level math/English at a particular CTC.

Denominator: All students included in the RMP Graduating Classes of 2014 - 2017 cohorts.

College-Level Eligibility among College Enrollees

This measures the extent to which current transcript-based placement policies would make students eligible to place into college-level courses based on a student's cumulative GPA or high school math/English coursetaking.

Numerator: The count of students who were eligible for college-level math/English at the CTC where they were enrolled.

Denominator: All students included in the CTC Enrollees from the RMP Graduating Classes of 2014 - 2017 cohorts.

Two or More Precollege Coursetaking

A measure of precollege coursetaking at RMP CTCs. The count of precollege coursetaking included both distinct and repeated courses because, in both instances, the student would need to spend additional time and resources to complete the precollege courses.

Numerator: The count of students who took two or more precollege courses within 2 years of enrolling at the CTC prior to their first college-level math/English course.

Denominator: All students from the CTC Enrollees from the 2012 - 2017 cohorts.

Underplacement

This measure was developed to assess the implementation and use of transcript-based placement policies. An assumption was made that among students who attempted any (precollege or college-level) math course at the CTC, a student would not take a precollege course if they were eligible to take a college-level course. Therefore, we used the percentage of students who were eligible for a college-level course, but took a precollege course, as our measure.

Numerator: The count of students who took a precollege course as their first math/English course at the CTC.

Denominator: All students who were eligible for college-level math/English coursetaking from the CTC Enrollees from the RMP Graduating Classes of 2014 - 2017 cohorts.

Ever Pass Algebra II

This measure was developed to determine the baseline percentage of students who could be placed into college-level courses if passing Algebra II was a requirement for a policy. This was done because Intermediate Algebra/Algebra II was a prerequisite for nearly all college-level math courses.

Numerator: The count of students passed an Algebra II course in high school.

Denominator: All direct enrollees with math coursetaking data from the CTC Enrollees from the RMP Graduating Classes of 2014 - 2017 cohort.

Precalculus or Higher in High School

This measure looked at access to Precalculus and Calculus coursetaking because for most current transcript-based placement policies in the RMP region, the majority of college-level placement options were available for students who had taken Precalculus or Calculus in high school.

Numerator: The count of students whose highest math course taken in high school was Precalculus or Calculus..

Denominator: All students from the RMP Graduating Classes of 2014 - 2017 cohort.

Success in College-Level Courses - 2.0 or Better

This measure was developed to measure the success of students who attempted a college-level course, and was used in our descriptive analyses as well as the dependent variable in our logistic regression model. The denominator was set to include only students who had attempted a college-level course because there was not a valid assumption that could be made about what grade a student who did not attempt a college-level math course would have received.

Numerator: The count of students who earned a 2.0 or higher in their first college-level math/English course at the CTC.

Denominator: All students who attempted a college-level math/English course at the CTC from the CTC Enrollees from the 2012 - 2017 cohort.

Success in College-Level Courses - Credits Earned

This indicator was also developed to measure the success of students in college-level courses, but used a broader definition which allowed us to consider students who may not have attempted a college-level course within their first two years. The assumption was made that any award-seeking student who attempted a precollege or college-level math/English course would intend to earn credits in a college-level math/English course within two years of enrolling. Therefore, any student who attempted a precollege course and never attempted a college-level course was still considered in this indicator.

Numerator: The count of students who earned credits in a college-level math/English course at the CTC.

Denominator: All students who attempted any (precollege or college-level) math/English course at the CTC from the CTC Enrollees from the 2012 - 2017 cohort.

LOGISTIC REGRESSION ANALYSES

Overview

The logistic regression analysis was set up with the goal of answering our research question: *what aspects of high school and college coursetaking are associated with success in college-level coursetaking in math and English?*

Outcome Measures

To answer the above research question, we decided to look at two variations of success in college-level coursetaking:

1. Students who earned a 2.0 or better in their first college-level course among students who attempted a college-level course, using the *Success in College-Level courses - 2.0 or Better* measure, described above.
2. Students who earned a credit in a college-level math/English course among all students who would likely need this course for their credential, using the *Success in College-Level Courses - Credits Earned* measure, described above.

Predictor Definitions

The following factors were considered in this analysis:

Predictor	Definition
EMinHS	Student was Emergent Multilingual (received English Learner Services) in high school
RaceEthnicity	Student reported race/ethnicity where 'White' was the reference category
Gender	Student reported gender where 'Male' was the reference category
GPA2.80	Student with a high school cumulative GPA of 2.80 or higher
HighestMathCourseTaken	Highest math course a student took in high school where 'Algebra I' was the reference category
DirectEnroll	Student who enrolled at the CTC within one year of graduation
EverDualCredit	Student that attempted a dual credit course at any point during or after their 9th grade year
AwardSeeking	Student that is pursuing a degree or transfer to a four-year college, and is not seeking a professional/technical pathway
FullTime	Student that had 4 quarters with 12 or more credits during their first two enrolled years
CollegeLevelInFirstTwoQtrs	Student that attempted a college-level math/English course within their first two enrolled quarters

Predictor Definitions (continued)

Predictor	Definition
TwoOrMorePrecollege	Student that took two or more precollege courses during their first two enrolled years
GPA2.80 x HighestMathCourseTaken	Interaction effect added to ensure that the effect of Highest Math Course Taken was not dependent on cumulative high school GPA
CollegeName	College that student enrolled. This was added to account for the random effect that enrolling at different colleges could introduce.

Earning a 2.0 or Better in first college-level course

College-Level Math

Predictors

Student outcomes were assessed using a logistic regression model, which looked at the probability that a student will earn a 2.0 or higher in their first college-level math course conditional on a set of variables, below. The college where the student was enrolled was used to account for the random effect from that difference in enrollment.

$$\log\left(\frac{p_{ij}}{1-p_{ij}}\right) = \beta_0 + \beta_1 EMinHS_{ij} + \beta_2 RaceEthnicity_{ij} + \beta_3 Gender_{ij} + \beta_4 GPA2.80_{ij} + \beta_5 HighestMathCourseTaken_{ij} + \beta_6 DirectEnroll_{ij} + \beta_7 EverDualCredit_{ij} + \beta_8 AwardSeeking_{ij} + \beta_9 FullTime_{ij} + \beta_{10} CollegeLevelFirstTwoQtrs_{ij} + \beta_{11} TwoOrMorePrecollege_{ij} + \beta_4 GPA2.80_{ij} \times \beta_5 HighestMathCourseTaken_{ij} + u_{ij}$$

p=1 when student earns a 2.0 or higher, or an equivalent letter grade in their first college level course

p=0 when student earns a 1.9 or below, or an equivalent letter grade in their first college level course

i = Student level

j = School attended

Hierarchical Logistic Regression Results

Table 2.5 uses predicted probabilities to measure the degree of association between earning a 2.0 or higher in the college-level math course and the predictors listed above. Values greater than 50% show a higher chance of seeing the positive outcome. Predictors that were statistically significant are labeled with a "*".

Discussion:

The interaction effect between *GPA2.80* and HighestMathCourseTaken variables was included in the model to account for whether the effect of higher levels of math coursetaking could be accounted for by a higher cumulative GPA. After controlling for that interaction, we saw that there were no statistically significant

Table 2.5. Hierarchical Logistic Regression Results for Earning a 2.0 or Higher in First College-Level Math

Predictors	Predicted Probabilities	95% Confidence Interval
EMinHS*	0.5628	0.5094 - 0.6148
Gender	0.5305	0.4936 - 0.5670
DirectEnroll*	0.4250	0.3778 - 0.4736
EverDualCredit	0.4817	0.4373 - 0.5265
AwardSeeking	0.5551	0.4785 - 0.6292
FullTime*	0.7150	0.6832 - 0.7448
CollegeLevelInFirstTwoQtrs	0.4816	0.4305 - 0.5332
TwoOrMorePrecollege*	0.4043	0.3484 - 0.4628
GPA2.8*	0.6121	0.5059 - 0.7087
HighestMathCourseTaken		
Algebra II	0.4509	0.3782 - 0.5257
Precalculus	0.4614	0.3692 - 0.5564
Calculus*	0.6744	0.5560 - 0.7741
RaceEthnicity		
Asian	0.4933	0.4450 - 0.5416
Black/African American*	0.3703	0.3136 - 0.4307
Latinx	0.4420	0.3843 - 0.5013
Multiracial	0.4442	0.3612 - 0.5304
Native American	0.4466	0.2139 - 0.7053
Pacific Islander*	0.3019	0.1667 - 0.4831
GPA2.80 x HighestMathCourseTaken		
GPA2.80 x Algebra II	0.5677	0.4474 - 0.6806
GPA2.80 x Precalculus	0.5988	0.4643 - 0.7198
GPA2.80 x Calculus	0.4975	0.3436 - 0.6519

Source: OSPI CEDARS student level data, and SBCTC data via ERDC. The reference category for HighestMathCourseTaken was Algebra I. The reference category for RaceEthnicity was White. AIC: 4469.409 ; BIC: 4613.221 ; CollegeName (Intercept): 0.2300;

interactions, and results show that significant positive predictors of the outcome include EMinHS, GPA2.80, FullTime, and HighestMathCourseTaken:Calculus. Significant negative predictors of the outcome include DirectEnroll, TwoOrMorePrecollege, RaceEthnicity:Black/African American, and RaceEthnicity:Pacific Islander.

When controlling for all other predictors, Black/African American students as well as Pacific Islander students saw a reduced likelihood of earning at least a 2.0 or higher in their first college-level math course with predicted probabilities of 37% and 30% respectively. Students who were emergent multilingual students in high school saw an increased likelihood of success with a predicted probability of 56%. Students who were enrolled full time saw the highest increased likelihood of success with a predicted probability of 72%. Interestingly, students who directly enrolled had a reduced likelihood of earning at least a 2.0 in their first college-level math course with a predicted probability of 43%. Among the coursetaking predictors, students who had a cumulative GPA above 2.80 had a 61% probability of earning a 2.0 or higher and students who took Calculus in high school had a 67% probability of success. **Students who took 2 or more precollege math courses before their first college-level math course saw a reduced likelihood of success with a predicted probability of 40%.**

Our research question focused on what aspects of high school and college coursetaking are associated with success in college-level math coursetaking. Results show that among high

school coursetaking predictors, cumulative high school GPA and taking Calculus in high school were the strongest predictors. Among college coursetaking predictors, taking two or more precollege math courses was the strongest negative predictor.

College-Level English

Predictors

Student outcomes were assessed using a logistic regression model, which looked at the probability that a student will earn a 2.0 or higher in their first college-level English course, conditional on a set of variables, below. The college where the student was enrolled was used to account for the random effect from that difference in enrollment.

$$\log\left(\frac{p_{ij}}{1-p_{ij}}\right) = \beta_0 + \beta_1 EMinHS_{ij} + \beta_2 RaceEthnicity_{ij} + \beta_3 Gender_{ij} + \beta_4 GPA2.80_{ij} + \beta_5 HighestMathCourseTaken_{ij} + \beta_6 DirectEnroll_{ij} + \beta_7 EverDualCredit_{ij} + \beta_8 AwardSeeking_{ij} + \beta_9 FullTime_{ij} + \beta_4 GPA2.80_{ij} \times \beta_5 HighestMathCourseTaken_{ij} + u_{ij}$$

p=1 when student earns a 2.0 or higher, or an equivalent letter grade in their first college level course

p=0 when student earns a 1.9 or below, or an equivalent letter grade in their first college level course

i = Student level

j = School attended

Hierarchical Logistic Regression Results

Table 2.6 uses predicted probabilities to measure the degree of association between earning a 2.0 or higher in the college-level math course and the predictors listed above. Values greater than 50% show a higher chance of seeing the positive outcome. Predictors that were statistically significant are labeled with a "*".

Table 2.6. Hierarchical Logistic Regression Results for Earning a 2.0 or Higher in First College-Level English

Predictors	Predicted Probabilities	95% Confidence Interval
EMinHS	0.5323	0.4872 - 0.5770
Gender*	0.5534	0.5256 - 0.5809
DirectEnroll	0.4880	0.4535 - 0.5227
EverDualCredit	0.5678	0.4971 - 0.5562
AwardSeeking*	0.5682	0.5035 - 0.6306
FullTime*	0.7831	0.7590 - 0.8058
CollegeLevelInFirstTwoQtrs	0.5277	0.4938 - 0.5613
TwoOrMorePrecollege	0.5411	0.4796 - 0.5613
GPA2.80*	0.7066	0.6811 - 0.7308
RaceEthnicity		
Asian	0.5244	0.4843 - 05641
Black/African American	0.4634	0.4213 - 0.5060
Latinx	0.4964	0.4542 - 0.5386
Multiracial	0.4778	0.4150 - 0.5414
Native American	0.4386	0.3007 - 0.5866
Pacific Islander*	0.3810	0.2795 - 0.4941

Source: OSPI CEDARS student level data, and SBCTC data via ERDC. The reference category for RaceEthnicity was White. AIC: 7762.289 ; BIC: 7880.745; CollegeName (Intercept): 0.1639;

Discussion:

Results show that significant positive predictors of the outcome include Gender, AwardSeeking, FullTime, and GPA2.80. Significant negative predictors of the outcome include RaceEthnicity:Pacific Islander.

When controlling for all other predictors, Pacific Islander students saw a reduced

likelihood of earning at least a 2.0 or higher in their first college-level English course, with predicted probabilities of 38%. Students who were enrolled full-time saw the highest increased likelihood of success, with a predicted probability of 78%. Similarly, students who were enrolled in an Award-Seeking pathway saw an increased likelihood of earning at least a 2.0 in their first college-level English course with a predicted probability of 57%. Among the coursetaking predictors, students who had a cumulative GPA above 2.80 had a 71% probability of earning a 2.0 or higher.

Results show that among high school coursetaking predictors, cumulative high school GPA was the strongest predictor associated with success in college-level coursetaking. There were no significant predictors among college coursetaking predictors.

Earning Credits in first college-level course

College-Level Math

Predictors

Student outcomes were assessed using a logistic regression model, which looked at the probability that a student will earn credits in their first college-level math course conditional on a set of variables, below. The college where a student was enrolled was used to account for the random effect from that difference in enrollment.

$$\log\left(\frac{p_{ij}}{1-p_{ij}}\right) = \beta_0 + \beta_1 EMinHS_{ij} + \beta_2 RaceEthnicity_{ij} + \beta_3 Gender_{ij} + \beta_4 GPA2.80_{ij} + \beta_5 HighestMathCourseTaken_{ij} + \beta_6 DirectEnroll_{ij} + \beta_7 EverDualCredit_{ij} + \beta_8 AwardSeeking_{ij} + \beta_9 FullTime_{ij} + \beta_4 GPA2.80_{ij} \times \beta_5 HighestMathCourseTaken_{ij} + u_{ij}$$

p=1 when student earns credits in their first college level course

p=0 when student does not earns credits in their first college level course

i = Student level

j = School attended

Hierarchical Logistic Regression Results

Table 2.7 uses predicted probabilities to measure the degree of association between earning a 2.0 or higher in the college-level math course and the predictors listed above. Values greater than 50% show a positive association, and values less than 50% show a negative association. Predictors with 95% confidence intervals that contain 50% were not considered statistically significant.

Discussion

The interaction effect between GPA2.80 and HighestMathCourseTaken predictors was included in the model to account for whether the effect of higher levels of math coursetaking could be accounted for by a higher cumulative GPA. After controlling for that interaction, we saw that there were no statistically significant interactions, and results show that significant positive predictors of the outcome include EMinHS, EverDualCredit, FullTime, GPA2.80, and all HighestMathCourseTaken predictors. Significant negative predictors of the outcome include RaceEthnicity:Black/African American, RaceEthnicity:Latinx, and RaceEthnicity:Pacific Islander.

Table 2.7. Hierarchical Logistic Regression Results for Earning Credits in First College-Level Math

Predictors	Predicted Probabilities	95% Confidence Interval
EMinHS*	0.5934	0.5550 - 0.6313
Gender	0.4813	0.4539 - 0.5087
DirectEnroll	0.4710	0.4365 - 0.5057
EverDualCredit*	0.5618	0.5311 - 0.5921
AwardSeeking	0.4862	0.4360 - 0.5368
FullTime*	0.8084	0.7883 - 0.8269
GPA2.80*	0.7017	0.6414 - 0.7558
HighestMathCourseTaken:		
Algebra II*	0.6040	0.5586 - 0.6477
Precalculus*	0.6761	0.6187 - 0.7286
Calculus*	0.8512	0.7933 - 0.8950
RaceEthnicity:		
Asian*	0.5519	0.5143 - 0.5889
Black/African American*	0.3860	0.3448 - 0.4288
Latinx*	0.4013	0.3612 - 0.4428
Multiracial	0.4798	0.4157 - 0.5446
Native American	0.3924	0.2551 - 0.5490
Pacific Islander*	0.3229	0.2252 - 0.4388
GPA2.80 x HighestMathCourseTaken		
GPA2.80 x Algebra II	0.5454	0.4670 - 0.6216
GPA2.80 x Precalculus	0.4966	0.3766 - 0.6171
GPA2.80 x Calculus	0.5400	0.4491 - 0.6171

Source: OSPI CEDARS student level data, and SBCTC data via ERDC. The reference category for HighestMathCourseTaken was Algebra I. The reference category for RaceEthnicity was White. AIC: 8012.745; BIC: 8157.930; CollegeName (Intercept): 0.8650;

When controlling for all other predictors, Black/African American, Latinx, and Pacific Islander students saw a reduced likelihood of attempting and earning credits in their first college-level math course with predicted probabilities of 39%, 40%, and 32% respectively. Students who were emergent multilingual in high school saw an increased likelihood of success with a predicted probability of 59%. Similar to our first outcome variable, students who were enrolled full time saw the highest increased likelihood of success with a predicted probability of 81%. Among the coursetaking predictors, students who had a cumulative GPA above 2.80 had a 70% probability of earning credits and students who took any dual credit course in high school had a 56% probability of success. **Students whose highest level of math in high school was Algebra II, Precalculus, or Calculus saw an increased likelihood of success.**

When looking at the aspects of coursetaking that are associated with earning credits in their first college-level math course, results show that all coursetaking predictors were significant positive predictors, with Calculus coursetaking and cumulative high school GPA being the strongest positive predictors.

College-Level English

Predictors

Student outcomes were assessed using a logistic regression model, which looked at the probability that a student will earn credits in their first college-level English course conditional on a set of variables, below. The college that a student was enrolled at was

used to account for the random effect from that difference in enrollment.

$$\log\left(\frac{p_{ij}}{1-p_{ij}}\right) = \beta_0 + \beta_1 EMinHS_{ij} + \beta_2 RaceEthnicity_{ij} + \beta_3 Gender_{ij} + \beta_4 GPA2.80_{ij} + \beta_5 DirectEnroll_{ij} + \beta_6 EverDualCredit_{ij} + \beta_7 AwardSeeking_{ij} + \beta_8 FullTime_{ij} + u_{ij}$$

p=1 when student earns credits in their first college level course

p=0 when student does not earn credits in their first college level course

i = Student level

j = School attended

Table 2.8. Hierarchical Logistic Regression Results for Earning Credits in First College-Level English

Predictors	Predicted Probabilities	95% Confidence Interval
EMinHS	0.4677	0.4178 - 0.5183
Gender	0.5185	0.4837 - 0.5531
DirectEnroll	0.4934	0.4485 - 0.5383
EverDualCredit*	0.5681	0.5318 - 0.6037
AwardSeeking*	0.5682	0.5318 - 0.6037
FullTime*	0.8551	0.8277 - 0.8788
GPA2.80*	0.7104	0.6786 - 0.7403
RaceEthnicity		
Asian	0.4566	0.4075 - 0.5068
Black/African American*	0.4139	0.3631 -0.4665
Latinx	0.4582	0.4054 - 0.5121
Multiracial	0.4291	0.3532 - 0.5084
Native American	0.4473	0.2683 - 0.6412
Pacific Islander	0.4281	0.2941 - 0.5735

Source: OSPI CEDARS student level data, and SBCTC data via ERDC. The reference category for RaceEthnicity was White. AIC: 5151.570; BIC: 5252.423 ; CollegeName (Intercept): 0.1343;

Hierarchical Logistic Regression Results

Table 2.8 uses predicted probabilities to measure the degree of association between earning a 2.0 or higher in the college-level math course and the predictors listed above. Values greater than 50% show a higher chance of seeing the positive outcome. Predictors that were statistically significant are labeled with a "*".

Discussion

Results show that significant positive predictors of the outcome include EverDualCredit, AwardSeeking, FullTime, and GPA2.80. Significant negative predictors of the outcome were RaceEthnicity:Black/African American.

When controlling for all other predictors, Black/African American students saw a reduced likelihood of attempting and earning credits in their first college-level English course with predicted probabilities of 41% respectively. Students who were enrolled full time saw the highest increased likelihood of success with a predicted probability of 86%. Among the coursetaking predictors, students who had a cumulative GPA above 2.80 had a 71% probability of earning credits and students who took any dual credit course in high school had a 57% probability of success.

When looking at the aspects of coursetaking are associated with earning credits in their first college-level English course, results show that all coursetaking predictors were significant positive predictors with cumulative high school GPA being the strongest positive predictor.

HYPOTHETICAL PLACEMENT ANALYSIS

Goals

The final step of our analysis was to look into whether transcript-based policies could be changed to increase the overall rate of college-level eligibility to at least 70% across all racial/ethnic groups and eliminate the gap between the highest and lowest college-level eligibility rates across racial/ethnic groups.[1]

Approach

To develop these hypothetical policies, we reviewed the high school cumulative GPA and coursetaking information of the CTC Enrollees from the RMP Graduating Classes of 2014 - 2017 cohort to determine what percentage of students would be eligible for college-level placement as we adjusted different GPA & coursetaking cutoffs for prospective policies. To determine potential college math placement eligibility, we reviewed the proportion of students who could be eligible based on different cumulative high school GPA and the highest high school math thresholds. **Because the majority of RMP CTCs use only cumulative high school GPA to determine college-level eligibility for English, we reviewed college-level eligibility for English solely across different GPA cutoffs.**

Current Placement Policies

Current transcript-based placement policies place RMP graduates into college-level courses at the following rates:

Table 2.9. College-Level Eligibility among CTC Enrollees from the RMP Graduating Classes of 2014 - 2017

Placement	Overall eligibility	Range across Race/Ethnicity	Gap across Race/Ethnicity
Math	25%	16% - 37%	21%
English	60%	43% - 70%	27%

Source: OSPI CEDARS student level data, and SBCTC data via ERDC.

Hypothetical Placement Using Cumulative HS GPA

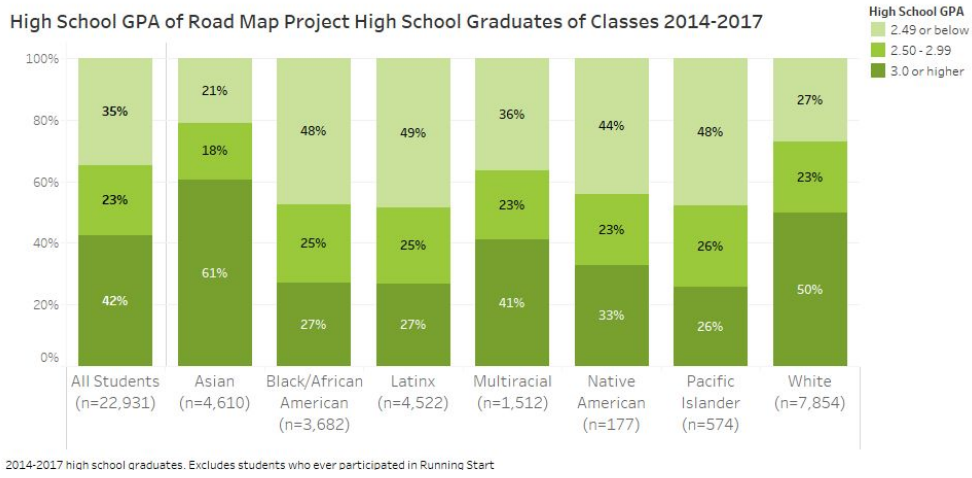
We first looked into using cumulative GPA as the sole dimension for our prospective policy. This approach mirrors the English TBP placement policies used by the majority of CTCs, and also allowed us to create a policy that could work for both English and math. Additionally, we saw that cumulative HS GPA had a strongly positive correlation in our descriptive and regression analysis with success in both first college-level math and english. Creating a math policy that factors in cumulative GPA would also make the application of cumulative HS GPA easier to apply in that there would not need to be district/school specific policies.

[1] *70 percent was selected in a non-scientific way as a benchmark that researchers felt would indicate meaningful progress. Statewide, about 70 percent of students who identify as Asian or White place avoid precollege courses when they enroll at CTCs (compared to 52 percent of Latinx students and 56 percent of Black/African American students). Thus setting a 70 percent benchmark for all racial and ethnic groups in the Road Map region would bring them into alignment with the racial/ethnic groups currently at the high end of the distribution statewide.*

College-Level English

We started by looking at the maximum GPA cutoff that would allow at least 70% of students to be college-level eligible across all racial/ethnic groups. Our earlier review of high school GPA (see figure 2.1) and earlier analysis of English TBP policies demonstrated that policies that set a HS Cumulative GPA threshold of 2.50 or higher do not meet either of the access or equity gap criteria that we had set, so we used this as our starting point for this analysis, and then assessed the potential eligibility impact by calculated the college-level eligibility across racial/ethnic groups for each threshold from 2.50 to 0.00 at .01 increments.

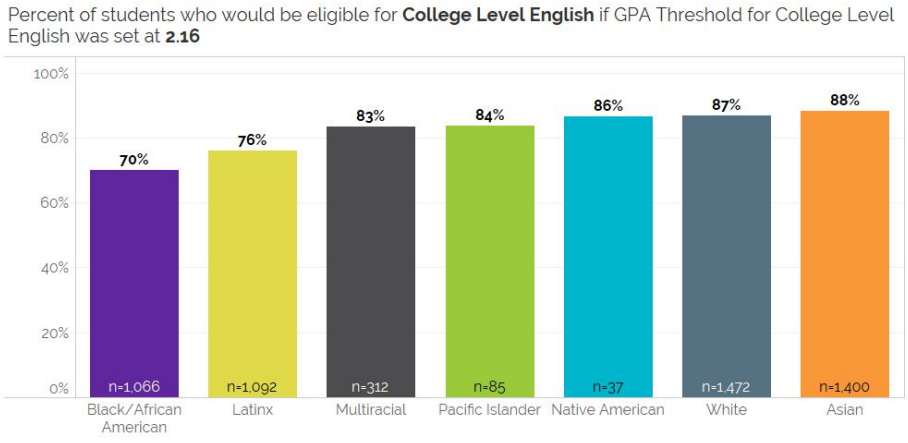
Figure 2.1. Cumulative High School GPA Among high school graduates



Source: OSPI CEDARS student level data.

The first GPA policy that would allow for 70% college-level eligibility across all racial/ethnic groups was 2.16. While this policy did meet the access goal that we had set for our hypothetical policies, there was still a 18 percentage point gap in college-level eligibility. Eligibility for Black/African American and Latinx students were 70% and 76% respectively, while college-level eligibility for other racial/ethnic groups were above 83% with White and Asian students placing at the highest rates at 87% and 88%.

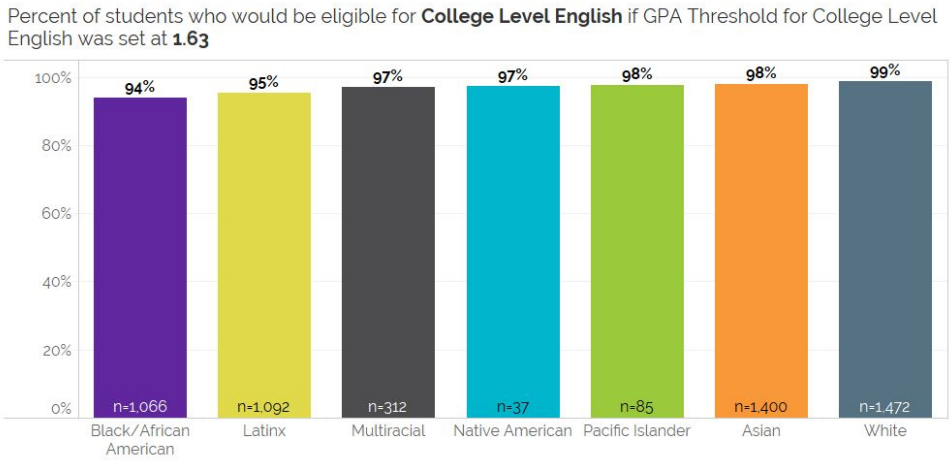
Figure 2.2. Hypothetical College-Level Eligibility with GPA threshold of 2.16



Source: OSPI CEDARS student level data. Note: Among RMP graduates from 2014 - 2017 who enrolled at a RMP CTC.

The first GPA cutoff that would reduce the eligibility gap to **5 percentage points or below** was 1.63. The levels of college-level eligibility ranged from 94% for Black/African students to 99% for white students.

Figure 2.3. Hypothetical College-Level Eligibility with GPA threshold of 1.63

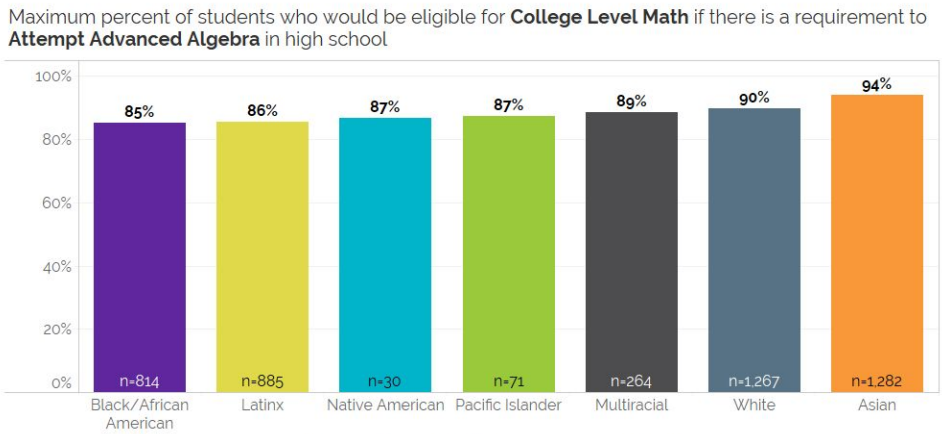


Source: OSPI CEDARS student level data. Note: Among RMP graduates from 2014 - 2017 who enrolled at a RMP CTC.

College-Level Math

For math GPA placement, it made sense to us to ensure that a student had pass Algebra II in high school in order to be eligible to be placed into college-level math using their cumulative HS GPA due to the fact that Algebra II was a prerequisite for most college-level math courses. Because of this, we started our analysis by reviewing what percentage of students within our sample passed Algebra II or higher in high school.

Figure 2.4: College-math eligibility based on the requirement of passing Algebra II.



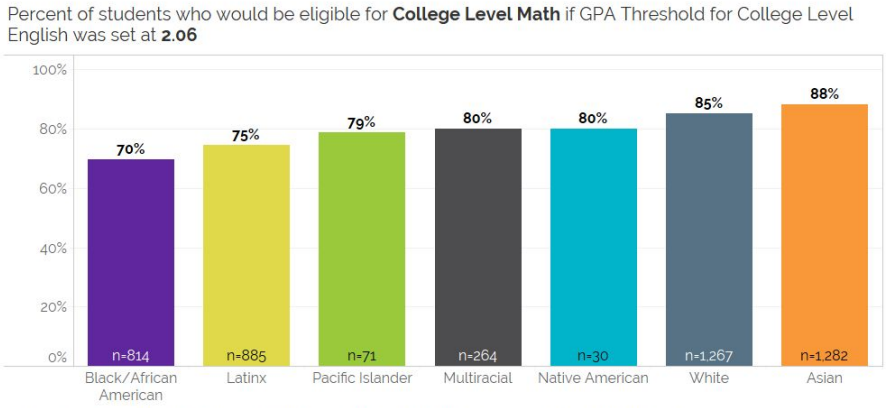
Source: OSPI CEDARS student level data. Note: Among RMP graduates from 2014 - 2017 who enrolled at a RMP CTC.

From this analysis, we see that because of inequitable access to math coursetaking in high school, there will always be a 9 percentage point gap in college-level eligibility when passing Algebra II is required for placement, with the maximum college-level eligibility ranging from 85% for Black/African American students to 94% for Asian students. With this understanding, we wanted to look into potential GPA placement policies for math to see what cutoffs needed to be set at to increase access and reduce the eligibility gap of 22 percentage points that currently exists within math policies.

Similar to the English analysis, we also started our math analysis from 2.50 cumulative GPA, and then calculated the college-level eligibility across racial/ethnic groups for each GPA cutoff between 0.00 to 2.50 at increments of .01.

The first GPA policy that would create 70% eligibility for all race/ethnicities was 2.06. While this policy did meet the access goal that we had set for our hypothetical policies, there was still a 19 percentage point gap in college-level eligibility. Eligibility for Black/African American and Latinx students were 70% and 77% respectively, while college-level eligibility for other racial/ethnic groups were above 83% with white and Asian students placing at the highest rates at 86% and 89%.

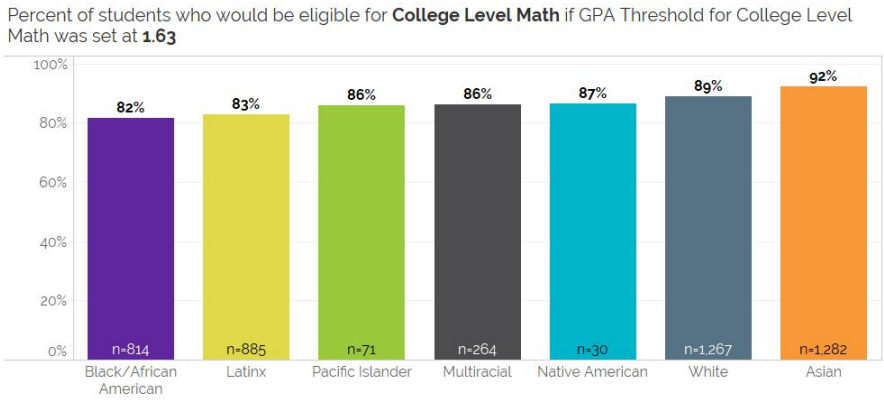
Figure 2.5. Hypothetical College-Level Eligibility with GPA threshold of 2.06



Source: OSPI CEDARS student level data. Note: Among RMP graduates from 2014 - 2017 who enrolled at a RMP CTC.

We continued to look at the potential policies to see when the eligibility gap closed to within 10 percentage points, and found that 1.63 would be the first GPA cutoff where this criteria was met, with college-level eligibility ranging from 82% for Black/African American students and 92% for Asian students (Figure 2.6)

Figure 2.6. Hypothetical College-Level Eligibility with GPA threshold of 1.63



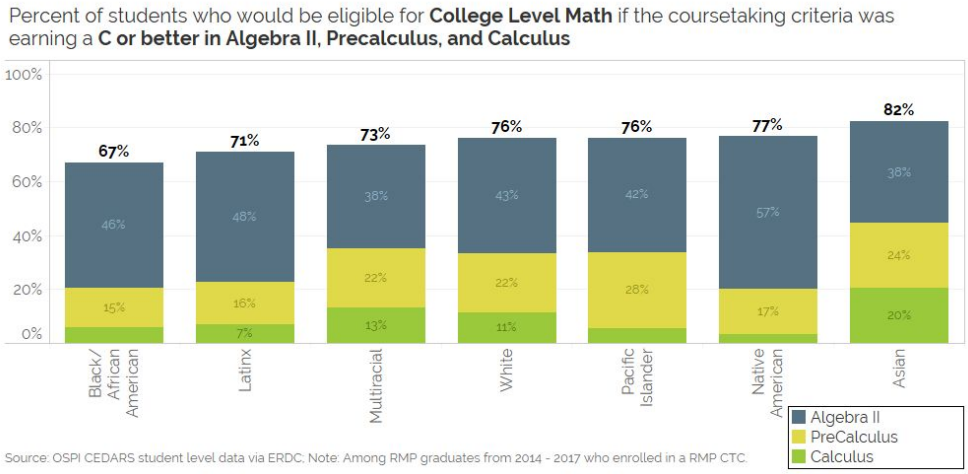
Source: OSPI CEDARS student level data. Note: Among RMP graduates from 2014 - 2017 who enrolled at a RMP CTC.

Hypothetical Placement Based on High School Math Coursetaking

Next, we wanted to look at how coursetaking could be used to create an equitable placement policy for math. We started by creating prospective policies using solely HS math coursetaking to create policies. This approach mirrors what all RMP CTCs currently use to place students. **We wanted to drastically shift the way that coursetaking was used for placement because under current math policies only 25% of all students eligible for college-level math, and there were large racial disparities in those rates**. We also saw through our regression analysis that having Algebra II and Precalculus as a student's highest level of HS math coursetaking were not significant predictors of a student earning a 2.0 or higher in their first college-level math course. So we wanted to ensure that high school coursetaking was not used to exclude students from being eligible for college-level placement.

Similar to our process for testing GPA based policies, we started by using the approximate thresholds that are found in current policies. Most RMP CTC placement policies require an A or better in Algebra II, or a B or better in Precalculus or Calculus for college-level math placement. Starting with this, we then calculated college eligibility rates for different combinations of grade (including +/- grade levels) cutoffs for Algebra II, Precalculus and Calculus coursetaking. Since Algebra II is a requirement for college-level math eligibility in nearly all college transcript-based placement policies, we set the minimum math coursetaking requirement at receiving C or better in Algebra II. In addition, if a grade threshold was set to a certain level for a lower level of math, we made sure that a more restrictive grade threshold was not set for a higher level math (e.g. if the grade cutoff was set at B or better for Algebra II, we would not set the cutoff to A or better for Calculus).

Figure 2.7. **Hypothetical College-Level Eligibility Based on a C or better in Algebra II or Higher**



After running this analysis, we found that no coursetaking-based policies would either increase access to at least 70% across all race/ethnicities or reduce the equity gap to 5 percentage points or below. As shown in Figure 2.7 when the policy was set to C or Better for Algebra II, Precalculus, and Calculus, college-level eligibility ranged from 67% for Black/African students to 82% for Asian students.

We determined from this that a policy based solely on coursetaking would be inadequate in reaching our goals for both access and closing the gaps in eligibility across racial/ethnic groups.

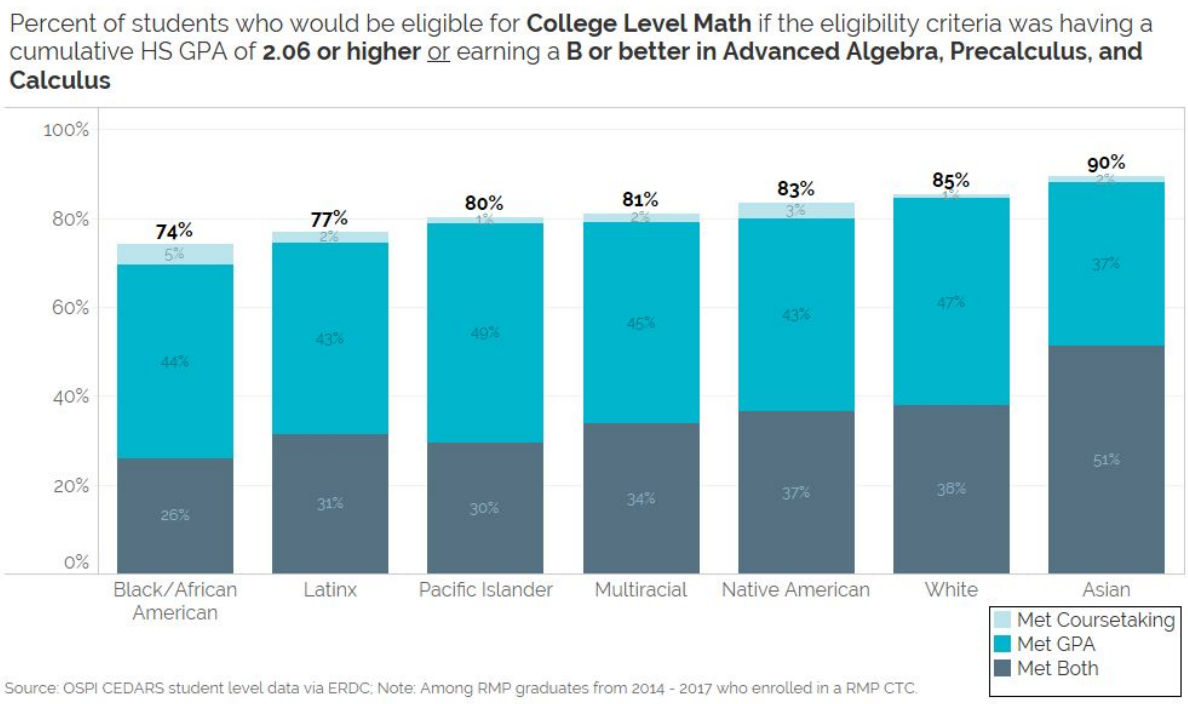
Hypothetical Placement Based on a Hybrid of Cumulative HS GPA and Math Coursetaking

From our analysis of high school math coursetaking, we did see that if courestaking policies include a C or better in Algebra II, there was a large increase in the percentage of Black/African American, Latinx, and Native American students who were now eligible because there are higher proportions of students in those racial/ethnic groups who had Algebra II as their highest level of math coursetaking in high school. We then assessed college-level eligibility rates for policies that would allow both coursetaking and cumulative GPA options for college-level placement. This would make a student eligible for college-level math if they met either the GPA criteria or the HS math coursetaking criteria.

Because there were a large number of hypothetical policies that would allow for at least 70% access, we centered this analysis around closing the eligibility gap. We started our analysis from the GPA cut off of 2.06 from our GPA analysis, and added a B or better condition in their HS math coursetaking

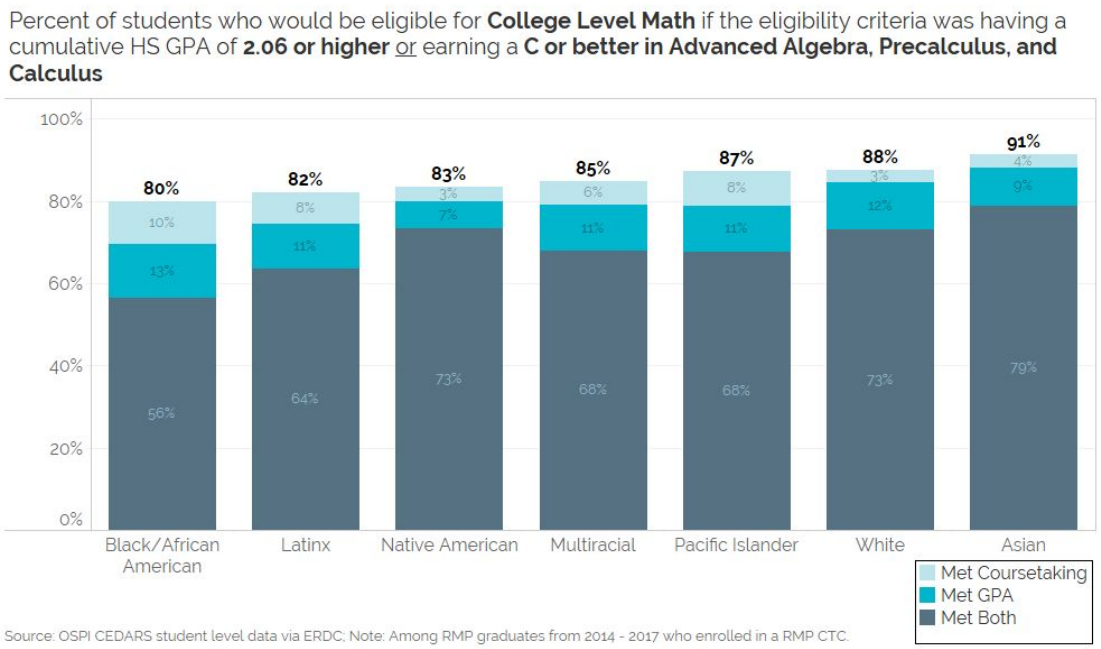
From this, we saw that adding a B or better in Algebra II, Precalculus, or Calculus condition would have a very marginal effect because nearly all students who earned a B or better in their HS math coursetaking also met the GPA criteria.

Figure 2.8. Hypothetical College-Level Eligibility with GPA threshold of 2.06 & B or Better in Algebra II or Higher



It is not until the coursetaking criteria is set to a C or better in Algebra II, Precalculus, or Calculus that we see coursetaking make a larger impact on the college-level eligibility as shown in Figure 2.9. It's important to note that a big reason why is that some districts in the RMP region do not use +/- in their grading scale, so any policy that is cut using + as a part of their policy will prevent students from certain districts from being able to be eligible for their courses.

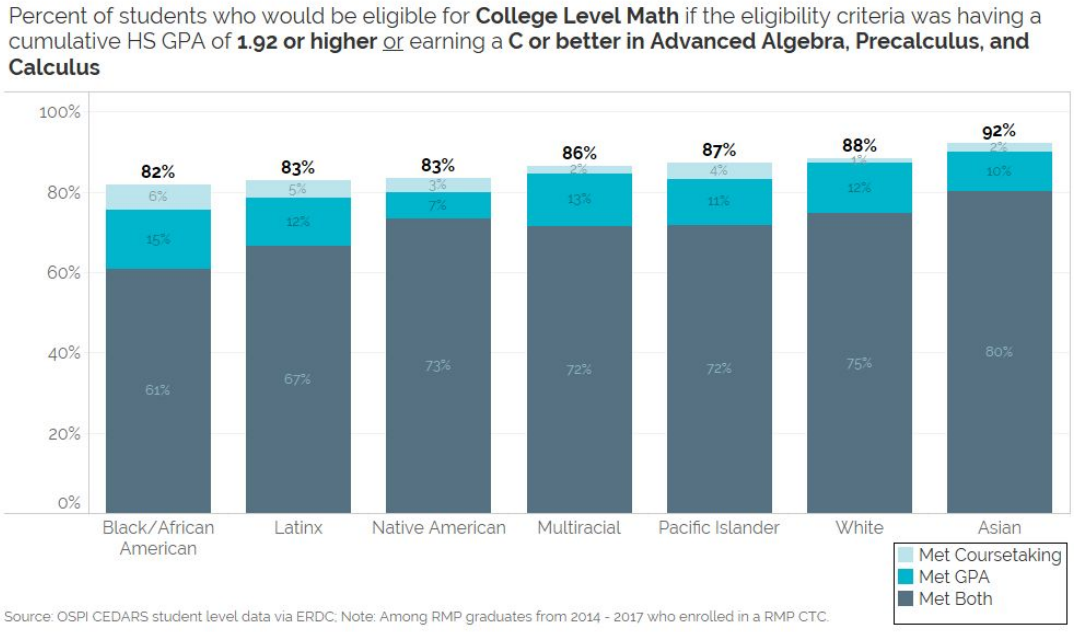
Figure 2.9. Hypothetical College-Level Eligibility with GPA threshold of 2.06 & C or Better in Algebra II or Higher



The majority of students who met the coursetaking condition also met the GPA condition, but now the coursetaking criteria would allow a much higher percentage of students who didn't meet the GPA requirement of 2.06. It's also important to note that this coursetaking criteria had the largest effect on Black/African American and Latinx students who had lower levels of eligibility in our GPA only policy for 2.06 GPA, and helped to close the eligibility gap from 18 percentage points to 11 percentage points.

The eligibility gap does not close to 10 percentage points or below until the GPA cutoff is set to 1.92, where the placement eligibility ranges from 82% for Black/African American students to 92% for Asian students.

Figure 2.10. Hypothetical College-Level Eligibility with GPA threshold of 1.92 & C or Better in Algebra II or Higher



Hypothetical placement - Confirming Success in First College-Level Courses

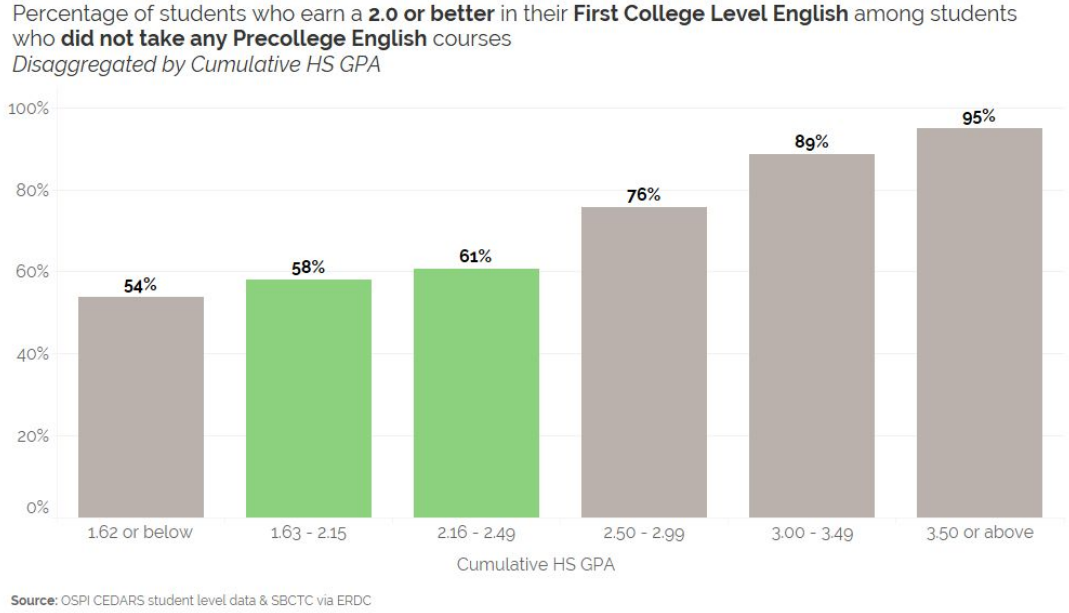
The ultimate goal of all of these new policies is to ensure that students could not only place into and take the college-level math courses to reach their postsecondary goals at their CTC, but to ultimately be successful in those courses. Merely changing the transcript-based placement policies to increase access to college-level courses will not be enough. We must also rethink the way that students are supported.

We looked at data related to students who took college-level math and English courses without previously taking precollege courses to understand the potential for success in college-level courses for students who didn't meet college-level eligibility based on current transcript-based policies (but who placed into these courses using other placement options), who could be eligible for college-level courses under these hypothetical placement policies. It is important to note that these data points are all looking at data tied to prior levels of support offered to students who went directly into college-level math. These data points help us to understand how successful those students were and to help identify where students could use additional supports, but should not be used to exclude students from being eligible for college-level courses.

College-Level English

For college-level English, we disaggregated the data to match what we had identified in our analysis as potential cutoff points for college-level math. When looking at the percentages of students in the 1.63 - 2.15 and 2.16 - 2.49 GPA groupings, we see that close to 60% of students have earned a 2.0 or better in their first college-level math course. It is important to also note that 54% of students with a GPA of 1.62 or below earned a 2.0 or better in their first college-level English course. This shows that the majority of students within the GPA groupings below 2.5 who are not eligible to be placed under any policies in RMP CTCs at this time, are earning a 2.0 or better when they are able to place into a college-level English course.

Figure 2.11. Success in First College-Level English Across Cumulative GPA Bands



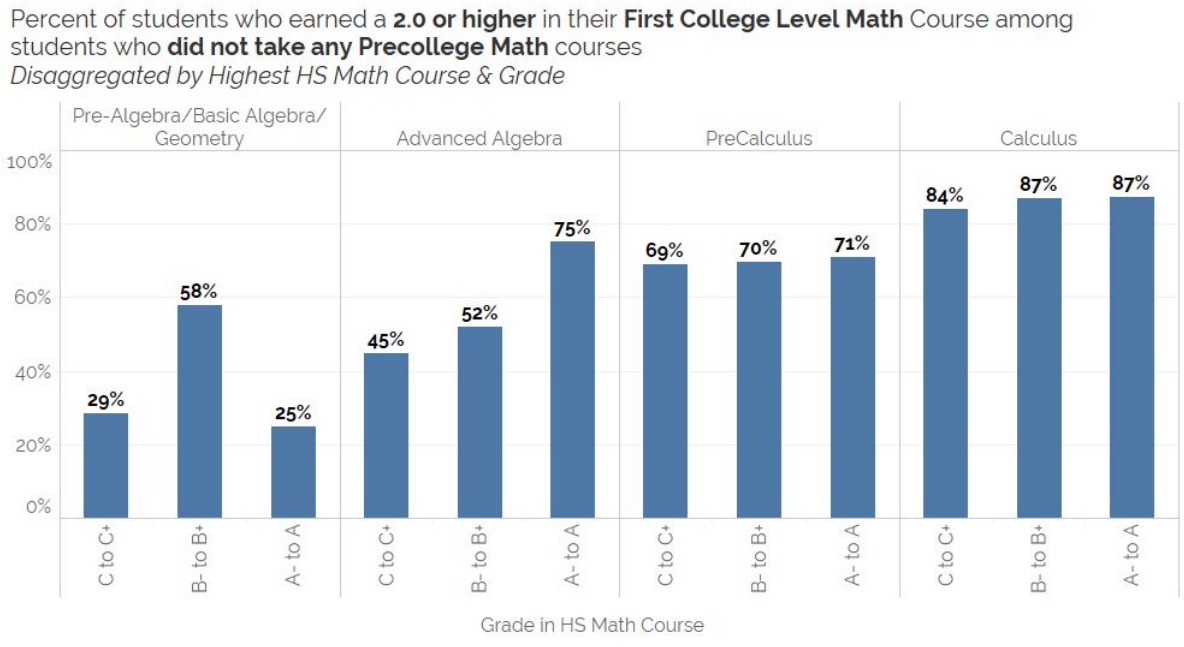
We do also see in this data that the rates for students in the GPA groupings above 2.50 have success rates that range from 76% to 95%. So when thinking through how to provide additional supports to students in their first college-level English course, it is important to center students with GPAs below 2.50 when figuring out how to best provide supports for these students.

College-Level Math

For college-level math courses, we also looked at disaggregated data related to the prospective policies that we had created earlier. When looking at coursetaking data, we saw that for students in Precalculus and Calculus, the success rates in college-level math was pretty consistent across all grade groupings in those courses. For Algebra II, we did see that among students who had a grade of A or A-, 75% earned a 2.0 or better. For students with a C to C+ or B to B+, that rate was closer to 50%. **This helps to reinforce that many students who previously would not be eligible for college-level placement have been successful when they take their first college-level math course without any precollege courses.**

Our data suggests that many students who have taken Precalculus or Calculus or have gotten an A- or better in their Algebra II course should be in a position to succeed without much additional support. When identifying students who could benefit from additional supports, it appears that students whose highest coursetaking in Math was Algebra II and had a grade below an A- could benefit from supports to help get success rates closer to the rates for students who had taken Precalculus, Calculus, or had earned an A- or better in Precalculus.

Figure 2.12. Success in First College-Level Math Across Math Coursetaking and Grade Received

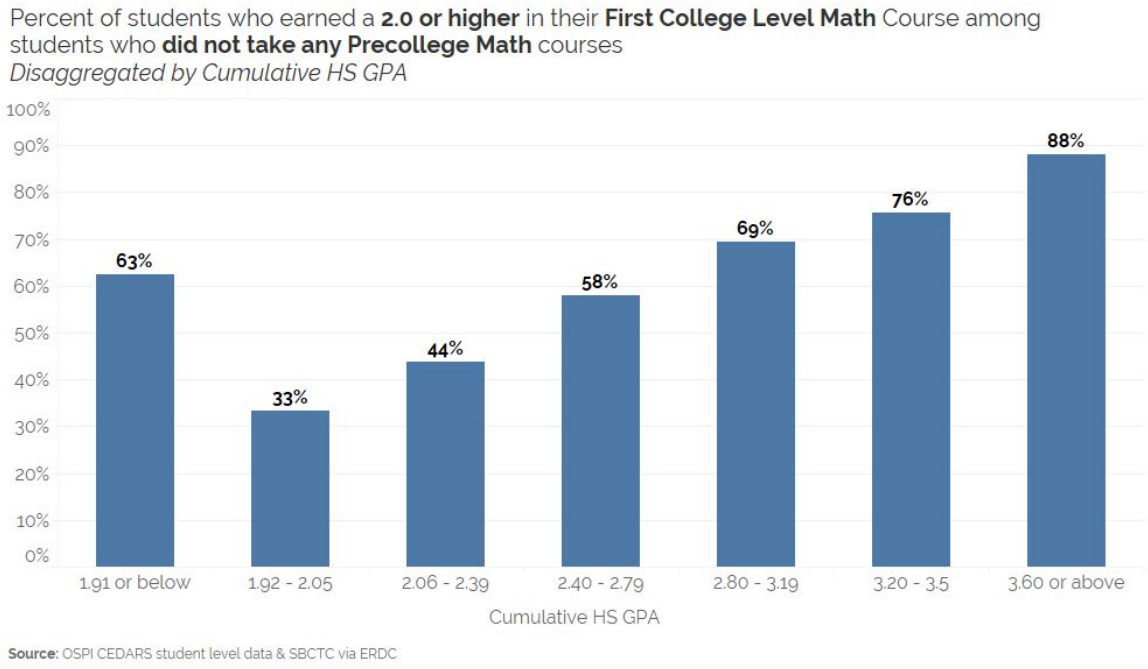


Source: OSPI CEDARS student level data & SBCTC via ERDC

We also looked into success rate data disaggregated by the different GPA groupings related to our prospective policies. From this data we see that the success in college-level math is positively correlated with cumulative GPA, and at higher cumulative GPA groupings, we see higher rates of students earning a 2.0 or better. For GPA groupings 1.92 to 2.05 and 2.06 to 2.39, we do see rates of students earning a 2.0 or better below 50%. For the GPA grouping of 1.91 and below, there appears to be a bump in the success rate of up to 63%.

Our data suggests that many students with a 2.80 or higher GPA appear to be in a position to earn 2.0 or better in their first college-level math course without much additional support with success rates close to or above 70%. Supports should be provided to students whose GPAs are below 2.80 to help to get success rates closer to the rates of students with higher cumulative HS GPAs, particularly for students with GPAs 2.40 and below.

Figure 2.13. Success in First College-Level Math Across Cumulative GPA Bands



Source: OSPI CEDARS student level data & SBCTC via ERDC

DEFINITIONS

Award-Seeking: Students who are seeking a degree or certificate.

In alignment with the SBCTC data manual, this definition includes students with the following intent codes:

Intent Codes:

A - Academic Non-Transfer Degree Program

B - Academic Transfer Program

F - Professional/Technical Program

G - Professional/Technical Program Applicant (preparatory coursework only)

H - Apprenticeship Program

I - Applied Baccalaureate Program

M - Multiple Programs

Note: students with the intent code of D (Basic Education for Adults) were excluded from all analyses in this study

Additionally, upon consultation with the study Project Team and the Advisory Council, we further refined this definition for the purpose of this study to omit students in professional/technical programs as they have different math requirements than the academic transfer, non-transfer, and applied baccalaureate programs. To **omit professional/technical programs** from the award-seeking definition, the programming logic excluded the following:

Program Codes that begin with a numeric value

Program CIP Codes that begin with any of the following values: 01, 03, 10, 11, 12, 13, 15, 16, 22, 31,43,45, 46,47,48,49,50, 51, 52

Direct Enrollee: A student who enrolls at a postsecondary institution within 12 months of high school graduation

n = denominator: The small n was used in most figures to denote the denominator for the specific student population within the study. A large N is used to represent the entire study population.

Running Start: A program that allows 11th and 12th Grade high school students to attend courses at a community college

Study 3
Student Voices on College Enrollment & Course Placement

RATIONALE

This study examined how recent CTC enrollees experienced their institution's placement process and took a participatory approach, engaging and elevating student needs and insights. While students are the focal point of our community and technical colleges' metrics of success, rarely are they engaged in meaningful ways to share their experiences and provide input to improve system design.

Improvement efforts often fail to engage students as stakeholders. We believe this can yield misguided conclusions that move systems even further out of alignment with student need. Additionally, quantitative, administrative data is necessary, but insufficient to tell us how students experience their institutions.

Study 3 served to complement this research series, with novel measures, qualitative data and engagement with students to deepen understanding and ground recommendations in student insights.

OVERVIEW AND APPROACH

This study took a participatory approach such that students were engaged in the research process and centered as experts and consultants in this effort (Cooley, 2017 pages 3-5). Responsive, equity-focused methodologies and centering young people's insights are critical to this effort. Additionally, strong stewardship of qualitative data is also a core value of this team.

Findings from Study 2 informed the sampling criteria of students recruited for the current study (Study 3). This study was also informed by a qualitative study, examining how Road Map Project region high school juniors and seniors (N = 43) experienced their high school's college access resources and overall student awareness of multiple postsecondary pathways (Cooley, Yoshizumi, Pérez, Chu & Avery, 2019).

STUDY GOALS

In addition to increasing the visibility about how course placement processes impact students, this current study aimed to shift the mindsets and practices around college navigation, and support to improve student persistence. This study hoped to achieve these goals by:

- Examining the placement processes — how students experience enrollment and its possible impacts on academic outcomes and academic self-perceptions among recently enrolled college students
- Uplifting a clear set of recommendations about enrollment knowledge access and college-wide practices from Road Map Project region college and high school students

RESEARCH QUESTIONS

1. Academic goals and aspirations

How do young, recent, community college enrollees describe community college enrollment as it fits within their larger career and life goals?

2. Enrollment and course placement

How supported have young, recent, community college enrollees felt while navigating the enrollment and placement processes across the region's community colleges? What recommendations do they have about course placement and enrollment?

3. Staff connection and motivation

How supportive have they found instructional and administrative staff? And how does their perceived course placement fit impact their expectations of persistence?

4. Racial equity and representation

In what ways (if at all) are students' cultures represented in the instructional staff, peers and curricula? What elements of staff and structural supports exist on campus?

5. Student traits and academic standing

To what extent is variance in the areas above accounted for by student, high school or college campus traits?

METHODS

This study took a mixed-methods approach, developing a novel survey instrument and conducting student interviews. The team developed the survey instrument and method based on a review of the literature and interviews with CTC staff on the course placement process.

Participation involved a 50-item online survey, with the option of participating in a 45-60 min semi-structured interview over Zoom. The first 40 students from each college received a $15 honorarium for survey participation and all interviewees received a $25 gift card.

Institutional Review and Recruitment

After approval was received from each CTC Institutional Review Board (or Human Subjects Review committee), staff in enrollment and student orientation were contacted to support with student recruitment. Email outreach was conducted to 18- and 24- year-old, first-time college enrollees who graduated high school in the last 3 years and attended high school in South Seattle and South King County. Students attending Highline, Bellevue, Green River, Renton Tech, South Seattle, or Seattle Central participated in the study, and the sample included students who were both disconnected and connected to on-campus navigation programming and community based organization (CBO) supports (e.g., Guided Pathways, Northwest Educational Access...).

Analysis Plan

Descriptive and associative analysis were used to examine survey responses and qualitative coding was used to examine open-ended responses.

Qualitative coding enables student reasoning to be used in analyses. Open-ended questions were coded using a grounded theory approach, closely matching the wording used by students. Decision rules were developed to ensure codes reflected the breadth and frequency of responses. These criteria were informed by literature in child development, education and Critical Race Theory (Garcia, López, & Vélez, 2018; Marks, & García Coll, 2018; Solórzano, & Yosso, 2002).

Initial codes were refined until frameworks represented a distinct set of codes and met statistical power standards. Rates of illegible or un-codable responses were under 9 percent.

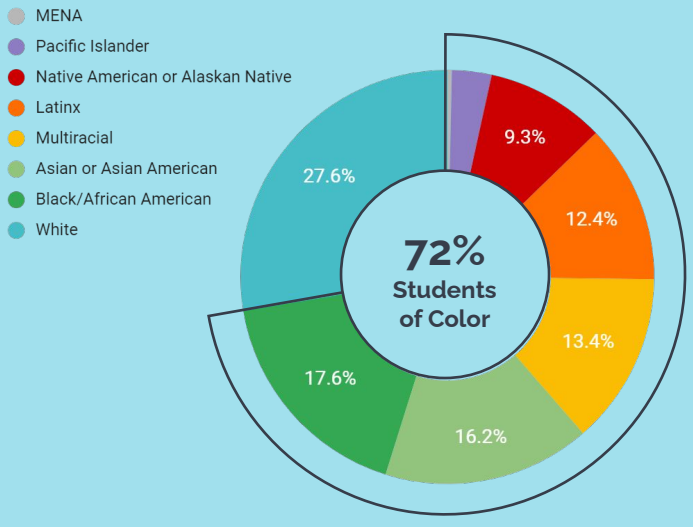
Study 3 Findings

STUDENT DEMOGRAPHICS

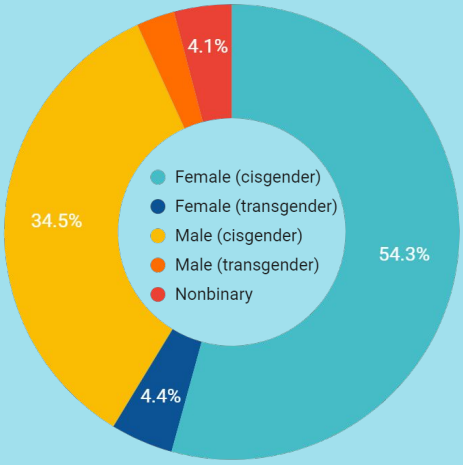
The distribution of racial, ethnic, and gender identities among student participants reflect the regional demographics of the Road Map Project region, and most students attended high school in the Puget Sound Region. Of the 293 students surveyed, 72% were students of color and 54% identified as female (cisgender). While all students were recent enrollees, there was a greater distribution of age than anticipated, but most students were born between 1997 and 2003 (18 to 24 years old at the time of the survey).

STUDENT TRAITS & DEMOGRAPHICS
N = 293

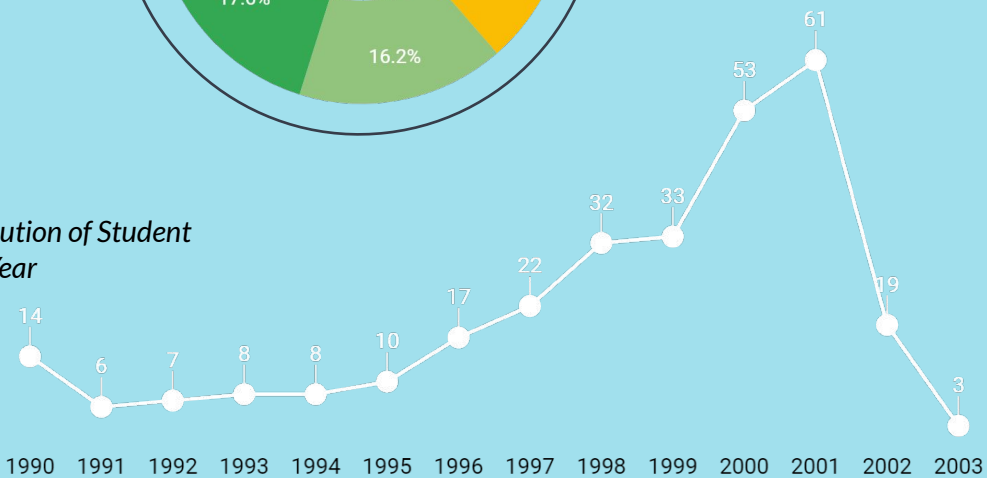
Race and Ethnicity



Gender Identity

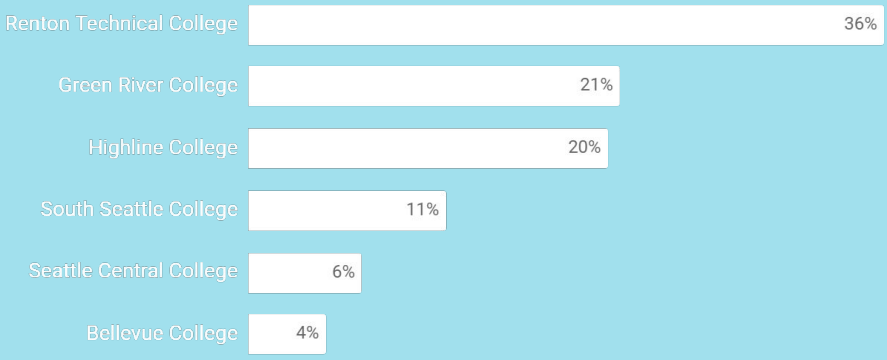


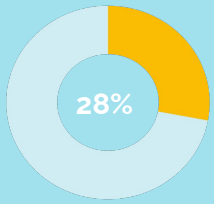
Distribution of Student Birth Year



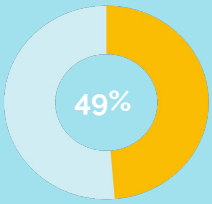
Students were recruited from six of the seven Road Map Project region CTCs, with highest representation among RTC, Green River and Highline College students. Twenty-eight percent of students spoke a language other than English at home (consistent with regional K-12 student demographics). Almost half of participants were first-generation college students and only 30% were enrolled in college part-time.

Community and Technical College

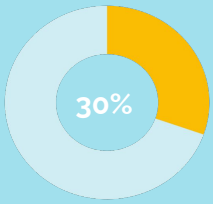




Language Other than English as First Language



First Generation College Student

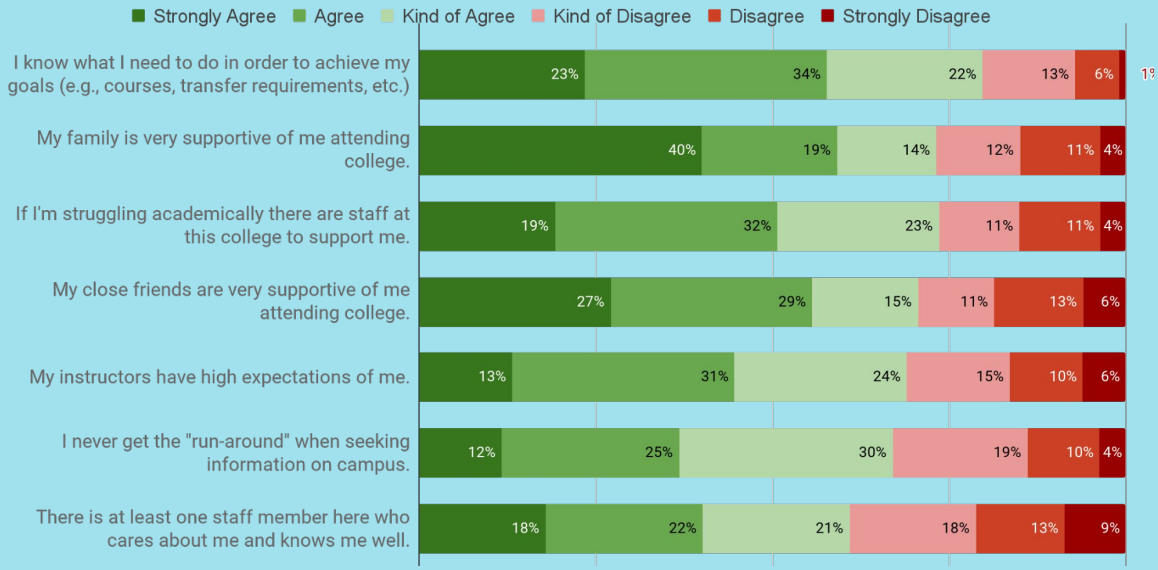


Enrolled in College Part-time

Student survey, N = 293

SELECT FINDINGS

To examine staff connections, a section of the survey focused on the extent to which students felt supported and set up for success at their college. Two in five students believed - agreed or strongly agreed - that they would be supported by college staff if they were struggling academically.



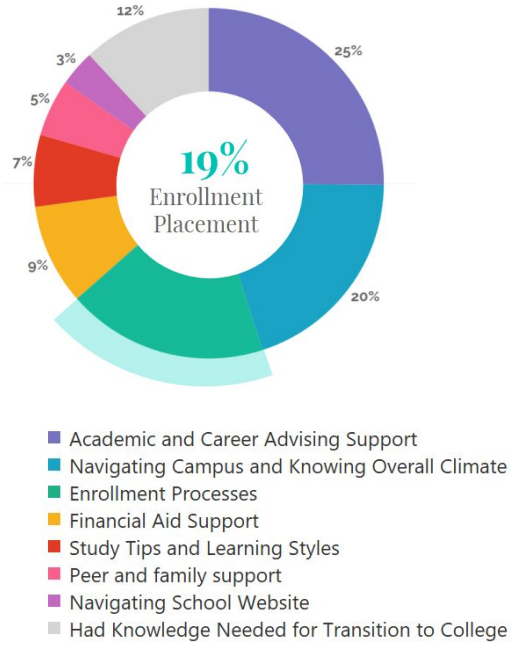
SELECT FINDINGS CONTINUED

Students have a lot to say about the types of information they wish they had prior to enrollment at our local community and technical colleges. When asked: "**What do you wish you'd known about your college, prior to enrolling?"** most students described access to information around academic and career advising as well as general information about the campus and climate. Almost 1-in-5 students wish they had known more about the enrollment placement process, most often referencing a lack of knowledge about transcript placement options and specifics within placement policies —such as which classes counted towards college credit, letter grade cutoffs for course placement and how to have test records saved.

Almost 1 in 5 students wish they had known more about the **enrollment process**

"I wish the school told me beforehand that you could use high school transcripts to place you in English and math classes instead of taking the test and being placed in a class that puts you behind."

" I wish I knew I would have to get official transcripts."

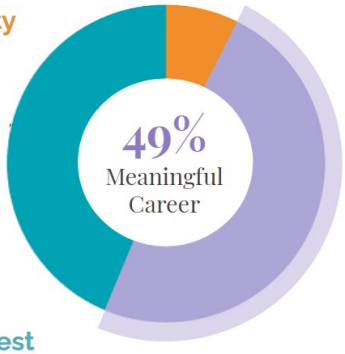


Critical to center in our work on college enrollment and navigation are the convictions with which students pursue their career path and reasons why they enrolled in our local CTCs. Overwhelmingly, our students enroll to pursue a meaningful career (49%) and one connected to their interests and passions (44%).

What career are you pursuing? ***And why did you choose this field?***

7% Economic Mobility or Stability

" A lineman. It's better financially so I want to start making a significant financial contribution for my immediate family since our mindset is to keep money in the family, so we aren't paying out to third parties wherever possible."



49% Meaningful Career

" Dental hygienist because I always had an interest in being a dentist and from different interactions with a lot of people within that profession they will all talk about how much they love their job."

44% Personal Connection & Interest

" Accounting, always felt like I've been great with numbers so I chose to do something I would excel in."

QUALITATIVE CODES AND PROPORTIONS

Career

What career are you pursuing? And why did you choose this field?

Code and Description	Example	Freq.
No Reasoning No reasoning provided for their career choice	"Business management."	**33%**
Meaningful Career Students described a specific personal or career goal motivating their desired level of educational attainment	"Dental hygienist because I always had an interest in being a dentist and from interactions with people in that profession they talk about how much they love their job."	**33%**
Personal Connection and Interest Students described a specific personal or career goal motivating their desired level of educational attainment	"Accounting, always felt like I've been great with numbers so I chose to do something I would excel in."	**29%**
Economic Mobility or Stability Students shared how they or their family would experience economic stability, mobility or increased access to opportunities	" Lineman, it's better financially so I want to start making a significant financial contribution for my immediate family since our mindset is to keep money in the family, so we aren't paying out to third parties wherever possible."	**5%**

Enrollment Experience

How would you evaluate your overall experience enrolling and going through your first course placement at this college?

Code and Description	Example	Freq
Generally Positive Experience Describes a positive with no specifics	" It was all right, I did well in all the classes I was enrolled in."	**26%**
Neutral or Satisfactory Adequate or fair experience with no specifics	" It had its ups and downs, but was mostly ok."	**24%**
Easy, Simple or Stress-free Described enrollment process as easy or straightforward to navigate	" I did not take placement test. I just gave my high school transcript and the college advisor said i do not need to take it"	**21%**
Burdensome, Overwhelming or Lacked Access to Key Information Described enrollment process as stressful, overwhelming, or difficult to navigate due to little to no prior knowledge and/or preparation	" It was irritating that my transcripts and AP scores weren't entered in permanently [so] I had to go talk to placement every quarter to ask for an access code, delaying my registration."	**17%**
Received Crucial Navigation Support Received individual support that helped them navigate enrollment and course selection	" It was very easy, the academic advisors at [my college] were extremely helpful, and the placement test wasn't bad."	**11%**

Care and Impact

Can you recall a time when you felt someone at the college cared about you or helped you in a way that made a difference?

Code and Description	Example	Frequency
No Support Did not receive any support	"Not that I recall of no, I never felt that someone at college cared enough about me."	**25%**
General Support Nondescript support, student says "yes" received support or focuses on who rather than what the type of support	"Thank you very much, to my teachers and other students"	**20%**
Relationships, Trust, and Understanding Refers to care, strong relationships and trust-building	"My main professor is pretty awesome we see him on a day to day basis so he cares about everyone in the class and wants us to do our best even through hardships and is willing to work with you."	**15%**
Individual Academic Support Individual support on coursework and assignments (e.g., tutoring, office hours)	"Yes, instructors allow me to be honest about my experiences in the classroom, and they ask questions when they see me not meeting class expectations. They listen to me and offer ways to help me in the course and get back on track."	**14%**
Motivation and Persistence Support that served to motivate and inspire	"My first welding instructor was one of the best welders I've ever seen and worked hard to teach me how to be the best welder I could be."	**10%**
Enrollment and Course Planning Support around enrollment, transferring and course planning	"My advisor helped me plan my future attending [this college] and helped me be less stressed and worried about it."	**8%**
Financial Aid and Employment Support Guidance around financial aid and employment	"Different times that an instructor would go out of their way to help me out. For example willing to fill out a recommendation last minute."	**5%**
Unsure or Uncodeable Unsure about having experienced support or gave uncodeable response	"I don't remember."	**4%**

Impact of Covid-19

In as much detail as you feel comfortable, please reflect on how the Covid-19 global pandemic has and continues to impact you personally. Are there specific supports you need from your college to stay healthy, financially stable, academically engaged and enrolled?

Code and Description	Example	Freq.
Finances and Employment Reflects on Covid-19 impact on employment and finances and challenges paying for school vs. basic needs.	"The covid 19 pandemic has changed my way of life completely. How I learn how I make money how I interact with people. It's a very stressful thing. I just need financial aid to pay for my classes and that's all."	**31%**
Learning and Course Progression Shared challenges learning in online format the need for quality instruction and negative impact of Covid-19 on future coursetaking and career plans	" As a student who learns better in the classroom, it's been difficult taking science and math classes online but the instructors have been very accommodating. I feel like [my college] should provide more instruction on how to access advising, where to go when we have questions, etc."	**20%**
Neutral Impacts or Needs Are Met Described immediate needs as being met and Covid-19 not having a direct impact on them personally.	" Due to the pandemic, I have had difficulty with school but I have also learned to surpass these challenges."	**15%**
Family, Social and Community Impact Covid-19 impacting family and local community.	" Hard with teaching my son and having to take care of my baby. Can't take them with me to the store. haven't seen my family and financially my partner got a pink slip due to this pandemic."	**10%**
Mental or Physical Health and Safety Student impacted in their mental, emotional or physical health and safety.	" It has affected me so much because it has heightened my anxiety. I am always worried about bringing the virus home to my loved ones. Also, my boyfriends family has health conditions and are high risk, [but, I] still have to work. I have to help pay bills, stay a float and help my family [...] It's super stressful.	**10%**
In Need of General Support Indicated wide-ranging impacts of Covid-19 and need for support, but did not specify in what areas.	" I think that the college needs to recognize that these are hard times and it impacts every student differently.	**9%**
Resource Access and Communication Challenges accessing campus financial resources, school resources, advising, etc.	" The pandemic cost me my full-time job which was supporting me through college. [...] It has been difficult getting in touch with the financial aid department, but that can be expected during the transition to online schooling."	**5%**

Knowledge Access

What do you wish you'd known before enrolling and why would that have been helpful?

Code and Description	Example	Freq.
Academic and Career Advising Support Students expressed they wish they had more support in academic and career planning from college advisors on campus	" I wish I had gotten into contact with a counselor earlier so they could help plan out my two year schedule. I took classes that I didn't need for my degree."	**25%**
Navigating Campus and Knowing Climate Student wished they knew how to navigate campus buildings and knew more general info about the campus such as school climate.	" More information about the school and atmosphere."	**20%**
Enrollment Processes Students expressed they wished they had more support navigating the enrollment and registration processes such as using transcripts, GED/placement test scores to enroll into courses.	" I wish the school told me beforehand that you could use high school transcripts to place you in English and math classes instead of taking the test and being placed in a class that puts you behind."	**19%**
Had Knowledge Needed for Transition to College Student did not need any additional knowledge	"Nothing. I had enough access to information."	**12%**
Financial Aid Support Students wished they had more support in navigating and receiving financial aid and funding support for course supplies.	" I would have liked to know that if FAFSA is filled but missing some documents, tuition would be placed on hold. That happened to me and I dropped 2 classes because I thought I wouldn't be able to cover it."	**9%**
Study Tips and Learning Styles Students wished they had more support on what college curriculums are like and identifying learning styles to help them be more successful in the courses.	" Style of study. [And] just learning how to better balance work and college-level classes would've been helpful."	**7%**
Peer and Family Support Student received from peer/ friend/ family	" I had friends who helped me."	**5%**
Navigating School Website Students wished they knew how to find info through navigating school websites	" How to access online resources right away."	**3%**

Study 3 Survey Instrument

STUDENT TRAITS AND ACADEMICS

Demographics

Item	Responses	Item Source
In what year were you born?	*YYYY*	
What is your gender identity?	• *Female (cisgender)* • *Male (cisgender)* • *Female (transgender)* • *Male (transgender)* • *Nonbinary* • *Something Else Fits Better ____*	Northwest Education Access Intake Demographics
What is your racial or ethnic identification? (Mark all that apply)	• *Asian or Asian American* • *Black or African American* • *Latino, Latina, Latinx* • *Multiracial* • *Native American, Alaska Native or Indigenous* • *Pacific Islander* • *White or European American* • *Something else fits better ___*	Road Map Project CCLI
Is English your first language?	*"Yes" or "No"*	CCCSE 2017
What is the highest academic credential you have earned to date?	• *None* • *GED* • *High school diploma* • *Vocational/technical certificate* • *Associates degree* • *Other ___*	CCCSE 2017
Who in your immediate family has attended at least some college? (Select all that apply)	• *Parent or Legal Guardian* • *Sibling* • *Spouse/Partner* • *None of the above*	CCCSE 2017

STUDENT TRAITS AND ACADEMICS

High School and College

Item	Responses	Item Source
From what high school (and school district) did you graduate? In what year?	[High school]; [School district]; [YYYY]	
In what range was your cumulative grade point average (GPA) in high school?	"3.5 or higher", "3.0-3.4", "2.5-2.9", "2.0-2.4" "1.9 or lower" or "N.A.; I do not know"	CCCSE 2017
Have you been in any of the following dual-enrollment programs or received navigation support? (select all that apply)	• Running Start • College in the high school • Seattle Promise • Seattle Education Access (Northwest Education Access) • Other ____ • I have not been in a dual-enrollment or college navigation support program	Novel item
College name	[College]	
Was this college (above) where you first enrolled? (select one)	"Yes, I began college here", "Yes, I began here and I am currently enrolled at two colleges", "No, I began at a different college and transferred here"	
What quarter and year did you first enroll in college?	[Quarter] [YYYY]	
How many total academic terms have you been enrolled at this college? "this current term is my..."	1st, 2nd, 3rd, 4th, or 5th or more term	CCCSE 2017
How many total credit hours have you earned at this college not counting this academic term?	• 1-14 credits • 15-29 credits • 30-44 credits • 45-60 credits • Over 60 credits	CCCSE 2017
At this college, what is your overall college grade point average (GPA)?	"3.5-4.0", "3.0-3.5", "2.5-3.0", "2.0-2.5" "1.9 or lower" or "N.A.; I do not know"	CCCSE 2017
Thinking about just this academic term, how would you characterize your enrollment?	"Full-time" or "Less than full-time"	CCCSE 2017

GOALS AND ASPIRATIONS

Item	Responses	Item Source
What is the highest level of education you want to obtain?	• *Some college but less than a 2-year degree* • *2-year college degree (Associates)* • *Apprenticeship* • *4-year college degree (Bachelors) or higher*	Road Map Project CCLI
What path are you currently pursuing at this college?	• *Academic Non-Transfer Degree Program* • *Academic Transfer Program* • *Basic Education for Adults* • *Professional/Technical Program or Applicant (prep coursework only)* • *Apprenticeship Program* • *Applied Baccalaureate Program* • *Upgrading Job Skills Courses* • *Multiple Programs* • *Extensive Continuing Education* • *Other* _____	SBCTC (Student Intent)
What career are you pursuing and why did you choose this field?	*Open-ended*	Road Map Project CCLI
Which of the following was the most helpful when first learning your about college options? Please select one:	• *Parent/Legal guardian* • *Other relatives* • *High school counselor* • *High school teachers* • *Friends* • *TV/Movies* • *Online research* • *High school college access specialist* • *Community-based organization* • *Other high school staff (i.e. Dean, Coach)* • *I did not received info about college* • *Other:* _____	Road Map Project CCLI

ENROLLMENT AND PLACEMENT

Navigation and Supports

Item	Responses	Item Source
Where did you first learn that your college uses placement tests (ACCUPLACER, Wonderlic, College Success, ALEKS, WAMAP, etc.) for initial course enrollment…	• *While I was in high school* • *When reading the college website* • *When I arrived on campus* • *When I first enrolled in classes* • *I did not know I could use my high school transcript*	Novel item
Prior to taking it, I felt very prepared for this placement test	*6-point scale: "Strongly Agree" to "Strongly Disagree", "N.A.; This is not how I enrolled in classes"*	Novel item
Where did you first learn that your college can also use students' high school transcripts to place them in courses?	• *While I was in high school* • *When reading the college website* • *When I arrived on campus* • *When I first enrolled in classes* • *I did not know I could use my high school transcript*	Novel item
If you used your transcript for your first course placement, who helped you access your high school records?	• *High school counselor* • *High school registrar* • *College access specialist* • *An adviser at the college* • *Someone at the testing center* • *I was able to get it myself with no support* • *Other _____* • *N.A.; This is not how I enrolled in classes*	Novel item
Getting my high school transcript to my college was very easy	*6-point scale: "Strongly Agree" to "Strongly Disagree", "N.A.; I did not send my college my high school transcript"*	Novel item
At this college, what has been your main source of academic advising (e.g., getting help with academic goal setting, planning, course recommendations, graduation requirements, etc.)? Mark only one.	• *Instructors/teachers* • *Academic advisors (not instructors)* • *Friends, family, or other students* • *College website or materials* • *Non-profit college access provider (e.g., Seattle Education Access)* • *Other ____*	*MODIFIED:CCSSE Standard Item Set: Academic Advising and Planning*
An academic advisor at this college has clearly explained to me which classes I need to take in order to reach my academic goals.	*6-point scale: "Strongly Agree" to "Strongly Disagree" or "I have not met with an academic advisor at this college"*	CCSSE Standard Item Set: Academic Advising and Planning
How would you evaluate your overall experience enrolling and going through your first course placement at this college?	*Open-ended*	Novel item
What do you wish you'd known before enrolling and why would that have been helpful?	*Open-ended*	Novel item

ENROLLMENT AND PLACEMENT

Type of Course Placement

Item	Responses	Item Source
Which course placement option(s) does your college offer new students? [Please select all that apply]	• *Placement test (ACCUPLACER, Wonderlic, College Success, ALEKS, WAMAP, etc.)* • *Directed Self Placement* • *Smarter Balanced scores* • *High school transcripts* • *Other _____* • *I don't know*	Novel item
How were you placed in to your first college Math class? [Select one]	• *Placement test (ACCUPLACER, Wonderlic, College Success, ALEKS, WAMAP, etc.)* • *Directed Self Placement* • *Smarter Balanced scores* • *High school transcripts* • *Other _____* • *I don't know*	Novel item
I took the Math course where I was placed, and I felt that this course level was…	• *Above my skill level at that time* • *Appropriate for my skill level at that time* • *Below my skill level at that time* • *N.A. I have not taken this Math class*	CCSSE Standard Item Set: Assessment and Placement
How were you placed in to your first college English class? [Select one]	• *Placement test (ACCUPLACER, Wonderlic, College Success, ALEKS, WAMAP, etc.)* • *Directed Self Placement* • *Smarter Balanced scores* • *High school transcripts* • *Other _____* • *I don't know*	Novel item
I took the English course where I was placed, and I felt that this course level was…	• *Above my skill level at that time* • *Appropriate for my skill level at that time* • *Below my skill level at that time* • *N.A. I have not taken this English class*	CCSSE Standard Item Set: Assessment and Placement
My course placement at this college indicated that I needed to take one or more development or basic skills courses (also referred to as "College Prep" or "remedial" courses)	• *Yes, in English only* • *Yes, in Math only* • *Yes, in another subject: _____ only* • *Yes, in two or more subjects (e.g., English and Math)* • *No, I was not placed in any developmental or basic skills courses*	Modified: CCSSE Standard Item Set: Assessment and Placement

STAFF CONNECTION AND MOTIVATION

Item	Responses	Item Source
I understand how my academic work is preparing me for the career field in which I am interested.	*6-point scale: "Strongly Agree" to "Strongly Disagree"*	CCCSE 2017
At my college, I know what I need to do in order to achieve my goal (e.g., courses, exams, transfer requirements, GPA etc.)?	*6-point scale: "Strongly Agree" to "Strongly Disagree"*	Booth et al (2013)
Someone at this college contacts me if I'm struggling with my studies to help me get the assistance I need.	*6-point scale: "Strongly Agree" to "Strongly Disagree"*	CCCSE 2017
My instructors have high expectations of me.	*6-point scale: "Strongly Agree" to "Strongly Disagree"*	CCLI Survey & LS
There is at least one adult in my school who cares about me and knows me well.	*6-point scale: "Strongly Agree" to "Strongly Disagree"*	CCLI Survey & LS
I feel very connected to staff or instructors at my college.	*6-point scale: "Strongly Agree" to "Strongly Disagree"*	MODIFIED: CCLI Listening Sessions
My friends are very supportive of me attending this college.	*6-point scale: "Strongly Agree" to "Strongly Disagree"*	Modified: CCCSE 2017
My close family are very supportive of me attending this college.	*6-point scale: "Strongly Agree" to "Strongly Disagree"*	Modified: CCCSE 2017
I never get the "run-around" when seeking information on campus.	*6-point scale: "Strongly Agree" to "Strongly Disagree"*	Student Satisfaction Inventory Noel-Levitz (Form B). Item #37
Can you recall a time when you felt someone at the college cared about you or helped you in a way that made a difference?	*Open-ended*	Booth et al (2013)
How likely is it that the following situations would cause you to withdraw from classes or from this college?" • Working full-time • Caring for dependents • Academically unprepared • Lack of finances • Transfer to a 4-year college or university	*6-point scale: "Very Likely" to "Not Likely at All"*	Modified: CCCSE 2017

RACIAL EQUITY AND REPRESENTATION

Item	Responses	Item Source
During the current academic year at this college, my instructors have included topics and perspectives focused on race and ethnicity in my classes.	*6-point scale: "Very Often" to "Never"*	CCSSE: Race and Ethnicity
During the current academic year at this college, I have participated in activities or discussions outside of class that encouraged me to examine my understanding of issues of race and ethnicity.	*6-point scale: "Very Often" to "Never"*	CCSSE: Race and Ethnicity
I feel safe when I am at school.	*6-point scale: "Strongly Agree" to "Strongly Disagree"*	CCLI Survey & LS
Campus staff are fair and unbiased in their treatment of individual students on campus.	*6-point scale: "Strongly Agree" to "Strongly Disagree"*	Modified: Student Satisfaction Inventory Noel-Levitz (Form B), Item #12
At my campus there are students that have experiences similar to my own (I feel like I relate to my classmates)	*6-point scale: "Strongly Agree" to "Strongly Disagree"*	Novel item
During the current academic year at this college, I have personally experienced racism.	*6-point scale: "Strongly Agree" to "Strongly Disagree"*	CCSSE: Race and Ethnicity
During the current academic year at this college, I have been advised by a college staff member who is the same race/ethnicity as I am.	*"Yes" or "No"*	CCSSE: Race and Ethnicity
During the current academic year at this college, I have taken the following number of classes taught by instructors who are the same race/ethnicity as I am.	*"None", "One", "Two" "Three" or "Four or more"*	CCSSE: Race and Ethnicity

FINANCIAL AID SUPPORT AND EMPLOYMENT

Item	Responses	Item Source
Which one of the following best describes the source from which you originally learned about the process for applying for financial aid?	• *Parents or other family members* • *High school counselor/teacher* • *College employee or staff* • *Friend or other student* • *On-campus, college navigation support specialist* • *Other _____* • *I have not learned about the financial aid application process*	CCSSE 2008 Special-Focus Items: Student Financial Aid
Have you submitted the form for financial aid known as the FAFSA (Free Application for Federal Student Aid) or WASFA (Washington State Financial Aid) to pay for your expenses at this college?	*"Yes", "No", "Don't recall" or "Don't know what it is"*	CCSSE 2008 Special-Focus Items: Student Financial Aid
Are you employed? And if so, how many hours per week do you currently work while enrolled in classes?	• *Yes, 9-hours a week or less* • *Yes, 10-19-hours a week* • *Yes, 20-29-hours a week* • *Yes, 30-39-hours a week* • *Yes, 40-hours a week or more* • *No, I am not working this term*	Novel item
This section has two parts. Please answer both parts indicating 1) how often you have used the following services during the current academic year, and 2) how satisfied you are with the services: • Orientation session for new students • Course placement process • Academic advising and planning • Financial aid advising • Tutoring or skill labs (writing, math etc.) • Career counseling and job placement • Student organizations or clubs • Library resources • Child care • Transfer advising and planning	• *6-point scale: "Very Often" to "Never"* • *6-point scale: "Very Satisfied" to "Very Dissatisfied"*	Modified: CCCSE 2017

SURVEY ITEM FULL CITATIONS

Source line	Full citation
Booth et al (2013)	Booth, K., Cooper, D., Karandjeff, K., Large, M., Pellegrin, N., Purnell, R., … Willet, T. (2013). Using student voices to redefine support What community college students say institutions, instructors and others can do to help them succeed. Retrieved from www.rpgroup.org
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CCSSE Standard Item Set: Assessment and Placement	Center for Community College Student Engagement (2018) *Standard Item Set: Assessment and Placement.* The University of Texas at Austin. Retrieved from: https://www.ccsse.org/aboutsurvey/aboutsurvey.cfm.
CCSSE Standard Item Set: Academic Advising and Planning	Center for Community College Student Engagement (2018) *Standard Item Set: Academic Advising and Planning.* The University of Texas at Austin. Retrieved from: https://www.ccsse.org/aboutsurvey/aboutsurvey.cfm
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Gaxiola Serrano, T. J. (2017)	Gaxiola Serrano, T. J. (2017) "Wait, What Do You Mean by College?" A Critical Race Analysis of Latina/o Students and Their Pathways to Community College, *Community College Journal of Research and Practice, 41:4-5*, 239-252, DOI: 10.1080/10668926.2016.1251362
Student Satisfaction Survey Inventory Form B	Student Satisfaction Survey Inventory (2006). Community, Junior, and Technical College Version Form B. Noel-Levitz. Retrieved from: https://www.ruffalonl.com/wp-content/uploads/pdf/SSIFormB2yrPaperandPencilSample.pdf
Road Map Project CCLI	Cooley, S., Yoshizumi, A., Pérez, A., Chu, B., & Avery, K. (2019). Research Guide: Survey and Listening Sessions from "Let Us Succeed, Student College and Career Aspirations". Seattle, WA: Community Center for Education Results.
Novel item	Community Center for Education Results (2019-20)

RESOURCES

RESOURCES	URL
Inequity by Design	rdmap.org/inequity-by-design

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Solórzano, D. G., & Yosso, T. J. (2002). Critical Race Methodology: Counter-Storytelling as an Analytical Framework for Education Research. *Qualitative Inquiry, 8*, 23–44.

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