College Readiness Math Initiative: Intensified Algebra

YEAR 6 REPORT

The BERC GROUP
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Table of Contents

Executive Summary

College Spark Washington (CSW) is a grant making organization dedicated to improving educational outcomes for low-income students in Washington State. In 2014, CSW launched a multifaceted College Readiness Math Initiative (CRMI) designed to support college readiness around the state. The goal of the initiative is to prepare students to transition into college level math without the need for remediation or other placement courses. This initiative includes the following programs:

> **Intensified Algebra (IA).** Agile Mind and the Charles A. Dana Center developed Intensified Algebra 1 (IA), an intervention program for students struggling in math. This 70- to 90-minute daily math course utilizes a strengths-based approach to build on students' assets and to develop their academic skills through engaging learning experiences and the facilitation of growth mindset principles.
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> **Bridge to College.** The State Board for Community and Technical Colleges created and implemented senior year college readiness math and English courses that are designed to align with the Common Core State Standards and with pre-college courses in higher education. The courses were developed collaboratively with high school and college faculties. Seniors who complete the transition courses will be able to move directly to college level math and English courses in college without remediation or additional placement testing.
>
> **Academic Youth Development (AYD).** Agile Mind, in collaboration with the Charles A. Dana Center, developed Academic Youth Development (AYD). This program translates research on student motivation, engagement, and learning into practical strategies and tools teachers and students can use daily in the classroom. A specific focus is on growth mindset, whereby teachers and students understand that intelligence is not a fixed quality, and through effective effort, persistence, collaboration, and motivation students can improve their academic success.

As part of this strategy to improve educational outcomes for all students, CSW supports on-going evaluation of each program included in the initiative. This evaluation is intended to provide formative and summative data to help understand the fidelity of program implementation as well as help measure program impact. The evaluation includes mixed-methods and multiple measures. By using qualitative and quantitative measures, and by providing formative and summative evaluation data, we can tell the story of program development, measure the fidelity of program implementation, determine the impact of program components, and provide information for on-going program advocacy and development.

Intensified Algebra. During the 2020-21 school year, researchers from The BERC Group met virtually with schools from Cohort 2 and 3 to gather data for this evaluation report. These meetings included interviews and focus groups with IA teachers and school administrators. School leaders from both cohorts were also asked to complete an implementation survey in Spring 2021. Quantitative data included high school and postsecondary data, provided by the ERDC, that was used to build a longitudinal database to analyze student outcomes over time. Researchers also used demographic data to analyze the equity of IA courses in relation to the overall school populations.

Researchers analyzed student grades, failure rates, discipline, attendance, course taking patterns, and math GPA to better understand math outcomes for IA students at the high school and postsecondary levels. A comparison group of students taking Algebra 1 was identified from a cohort of matched comparison schools that do not offer IA. The longitudinal IA data has reinforced several trends that researchers have uncovered over time and across many different groups of students. In all cohort groups except Cohort 3B, IA students had statistically significant higher grades than comparison Algebra 1 students from the matched sample populations. This result with Cohort 3B could be attributed to the students only receiving half a year of instruction in person, as the Covid-19 pandemic forced low-quality distance learning across the state. This positive effect did not always carry over to subsequent years of math grades, as only some cohorts experienced higher grades in some years while others performed equal to the comparison groups. As in previous years, IA membership was predictive of higher 10th grade SBA scores, where data was available. These results, along with the qualitative data, suggest that students are responding positively to the unique curriculum, professional development, and pedagogy of IA courses. Membership in IA shows better grades and lower failure rates in 9th grade math courses than comparison groups, which is crucial for future success and graduation from high school. For the first time, postsecondary data was provided for Cohort 1A students. Though a small percentage of the whole Cohort 1A group attended college, enough attended to perform some analyses. Though there was no difference in enrollment or college course-taking behavior between IA students and comparison students, the smaller sample size could be the culprit.

Throughout the duration of the College Readiness Math Initiative, qualitative responses to Intensified Algebra (IA) have trended positive and become predictable over time. Schools across Washington state have shared similar experiences regarding the implementation and impact of the curriculum on their students' sense of math efficacy and understanding of algebra concepts. This perception aligned with quantitative data measuring the success of IA. Grantees have identified strengths and challenges, and school district leaders and IA supports have worked to capitalize on those strengths and mitigate perceived challenges over time.

Several long-term themes emerged from the qualitative analysis, including:

- Teacher capacity, experience, and interest. In the early years of the grant, teachers were unfamiliar with the curriculum, requiring time to learn new strategies and reflect on their practice. As teachers grew more familiar with the curriculum and were provided more professional development, they began to see the value of adding brain science and growth mindset material to the double-block curriculum, and even to ask for more integration.
- Support. Throughout the duration of the grant, the support that schools received to implement the IA curriculum was seen as a strength by teachers and school administrators. The Agile Mind team built relationships by offering onsite support and coaching, modeling lessons to demonstrate strategies, helping to modify the curriculum to adapt to the needs of individual schools, and providing suggestions for deepening student learning and building classroom culture with a focus on growth-mindset and math efficacy.
- Scheduling and prioritization of IA. A consistent point of discussion throughout the duration of the grant was the ability for schools to prioritize a double-block math course in their schedules. In initial years of the grant, schools mostly followed the guidance from Agile Mind of at least 90 minutes of IA per day to support students, with the first section of class focused on learning the content, and the second on providing opportunities to work collaboratively with peers to solidify the concepts through practice. With the introduction of Cohorts 2 and 3, and changes in statewide credit expectations for graduation, several grantees moved to a trimester system, which greatly impacted the intended IA delivery model.
- The marketing of IA to students and families. While some schools prioritized communications with families about the intent of the course, others were less communicative. This led to assumptions about the course being "remedial," which may have discouraged students who could have benefit from IA. Several administrators spoke to the need to message the course correctly, and to highlight the importance of building math efficacy through research-based strategies.
- The pandemic. The pandemic, which had a global impact on learning, created barriers and challenges to delivering the IA curriculum as well. IA teachers expressed significant frustration with the transition to online and hybrid learning, although they acknowledged there was ample support from the Agile Mind team. The parts of the curriculum that they

most appreciated were difficult to implement during remote learning, including the mindset work, and student collaboration.

Recommendations for the IA initiative were provided based on qualitative and quantitative data. These included considering extending feedback and providing more time for teachers to collaborate and observe one another; expanding professional development to address current student social/ emotional needs and to consider how to better support students, especially in light of the harm the pandemic inflicted on them; refining the IA student selection process; and identifying strategies to extend the scope of IA within schools.

College Readiness Math Initiative

Introduction

College Spark Washington (CSW) is a grant making organization dedicated to improving educational outcomes for low-income students and students of color in Washington State. In 2014, CSW launched a multifaceted Math Initiative designed to support college readiness for WA students. The goal of the initiative is to prepare students to transition into college level math without the need for remediation or other placement courses. Three programs are included in this initiative: Intensified Algebra 1 (IA), Bridge to College (BtC), and Academic Youth Development (AYD). This report is focused specifically on Intensified Algebra.

The initiative began by developing strategies and partnerships to provide programs targeted to students who performed below grade level on the Smarter Balanced Assessment. Several organizations, including CSW, Equal Opportunity Schools (EOS), Agile Mind (AM), The Dana Center (University of Texas), The BERC Group, and The Office of the Superintendent of Public Instruction (OSPI) coordinate efforts and meet regularly to manage grant implementation. Overtime, the initiative has become a series of best practices in college-readiness and student efficacy that provide additional support to students who are not prepared to succeed in college-level courses. While the seven-year initiative includes strategies for students who perform at all levels on the Smarter Balanced Assessment, the programs as designed are not intended to target specific achievement levels on the SBA.

As this initiative has progressed, program stakeholders have maintained a commitment to implementation fidelity and continuous improvement. Leaders from each partnership organization meet monthly to discuss progress, identify challenges and promising practices, and suggest opportunities for improvement. School staff receive several trainings and information sessions throughout each year, with the intention of keeping the data out in front of those working directly with students. Additionally, Agile Mind trainers continue to visit schools in active cohorts to provide in-person coaching and support.

During the 2020-2021 year, schools continued to face unprecedented challenges related to the COVID 19 pandemic. The spring prior, the pandemic shut down schools with little warning. Teachers were tasked with altering instruction to support students in the remote learning environment on the fly. Each school district developed a unique delivery model based on family access, student needs, and availability of resources. During immediate planning in response to closures, many districts were focused on meeting the basic needs of their communities and worked to pivot their focus from academics to community outreach. Once it became clear that school closures would persist for an extended period, school administrators and teachers refocused on how to provide safe, equitable access to instruction. With the support of Agile Mind trainers, many schools were able to provide IA students with a modified curriculum to address issues around student engagement, assessment, and access. During the 2020-21 school year, most schools started and spent most of the year in the same remote environment, though many teachers had altered their instruction with more time and support than the immediate closures of March 2020. In addition, Agile Mind provided further support and resources to ensure that the curriculum was being implemented with as much fidelity as possible with remote learning. As the year progressed, some schools transitioned to some or all in-person learning and were able to revert back to the true implementation of the Intensified Algebra curriculum.

Program Descriptions

Intensified Algebra

Agile Mind and the Charles A. Dana Center developed Intensified Algebra 1 (IA), an intervention program for students struggling in math. This 70- to 90-minute daily math course utilizes a strengths-based approach to build on students' assets and to develop their academic skills through engaging learning experiences. "Central to the program is the idea that struggling students need a powerful combination of a challenging curriculum; cohesive, targeted supports; and additional well-structured classroom time." (Inverness, 2014). Intensified Algebra seeks to address the need for a robust Algebra I curriculum with embedded, efficient review and repair of foundational mathematical skills and concepts.

Bridge to College

The State Board for Community and Technical Colleges created and implemented senior year college readiness math and English courses that are designed to align with the Common Core State Standards and with pre-college courses in higher education. The courses were developed collaboratively with high school and college faculties. Seniors who complete the transition courses with a B or better will be able to move directly to college level math and English courses in college without remediation or additional placement testing.

Twenty-five schools piloted the Senior Year Transition Courses in the 2014-2015 school year, with 120 additional sites anticipated for Year 2. As of 2019-2020, 210 schools across Washington State offered BtC courses, with 200 BtC English teachers and 235 BtC math teachers. The goal of the strategy is to improve the college readiness of students graduating high school, to develop college to school partnerships, to reinforce transcript placement efforts with the smarter balanced assessment, and to provide rigorous alternatives to algebra 2 as the third-year math course.

Evaluation Design

College Spark Washington's Math Initiative is unique because of the multi-pronged strategy to improve math. As such, in addition to this evaluation report, each partner is conducting their own research and collecting their own data on the interventions. For example, the University of Texas, Dana Center and Agile Mind are collecting data on program usage and measures of growth-mindset and non-cognitive factors related to IA. The State Board of Community and Technical Colleges are gathering additional data to assess the value of the BtC course material, the quality of the course training and technical support, and the impact on college readiness and success in college. This collaborative partnership and evaluation structure has provided valuable information throughout the duration of the project and has allowed stakeholders to make real time use of the data to effect change and improve student outcomes.

The purpose of this independent evaluation report is to assess the implementation fidelity and impact of each initiative. Programs were evaluated within different parameters due to availability and access to data. The evaluation of IA includes multiple measures of data collection and analysis to triangulate findings, increasing the reliability and validity of findings. Qualitative research measures, including semi-structured interviews, focus groups, artifact analysis and survey measurement allow for a rich, thick descriptive story of program implementation, while quantitative data helps to understand the impact of these programs on student performance. Due to availability of quantitative data, there is a lag of one year in quantitative data. The qualitative data for this report was collected during the 2020-2021 school year but the qualitative data is from the 2019-2020 school year.

Intensified Algebra

Methodology

BERC researchers conducted a quasi-experimental research study, using quantitative analysis and parametric statistics to identify differences between groups of students. To strengthen the study, BERC researchers identified a matched comparison group of schools to understand the impact of the initiative more clearly. The comparison schools are matched to the grantee schools in size, percent of students receiving free/reduced lunch supports, and percent of students identifying as non-white. Throughout this report, comparison students refer to Algebra 1 students in comparison schools.

This report contains the results of statistical tests performed to analyze differences between IA students and comparison students along several variables. Researchers conducted regression analysis using R data analysis software. Goodness of Fit tests were used to verify the statistical models for accuracy. The data was provided by The Education Research and Data Center (ERDC).

One key concept in the interpretation of statistical tests is that of statistical significance. Simply put, an analysis with a statistically significant result means that there is a 95% chance that the result is not due to random variation in the data. Researchers set the confidence level at .05 based on the abundance of research in the field of educational statistics (Trochim, 2006).

Evidence of Impact

Researchers conducted descriptive and inferential analysis on data provided by the ERDC. By understanding demographic and performance characteristics on a sample population and a comparison group, patterns and trends are identified, and causal relationship may be uncovered. In this section we provide an overview of student characteristics and metrics gathered to ascertain performance in target course and on standardized assessments.

IA Demographics

For this study, the population was disaggregated into Cohorts. As of the 2019-2020 school year, Cohort 1 has had three groups of students take Intensified Algebra, referred to as Cohort 1A, 1B, and 1C. Cohort 1A took the IA course in 2016, 1B in 2017, and 1C in 2018. Cohort 2 also has had three groups of students take IA: Cohort 2A in 2018, Cohort 2B in 2019, and Cohort 2C in 2020. Cohort 3 has had two groups take the course: Cohort 3A in 2019 and Cohort 3B in 2020.

As data becomes available from the ERDC, charts and analyses will be updated to reflect change over time. It is possible that the data can change year to year as schools send refreshed data to the ERDC, therefore each analysis relies on a new dataset and aggregate calculations could change.

Table 1 and Figure 1 show the number of students in each cohort. Cohort 1A and 1B had similar student enrollment numbers while Cohort 1C had a smaller enrollment. Cohort 2, although comprised of fewer schools, offered more sections of IA in both cohort groups, resulting in a larger sample size but also saw a decrease in the third group of students. Cohort 3 showed a similar pattern as Cohort 2, as the number of students decreased between cohort groups A and B but was still larger than any Cohort 1 group.

Table 1

Cohort	1A	1B	1C	2A	2B	2C	3A	3B
Number of Students	579	565	515	848	826	698	808	672

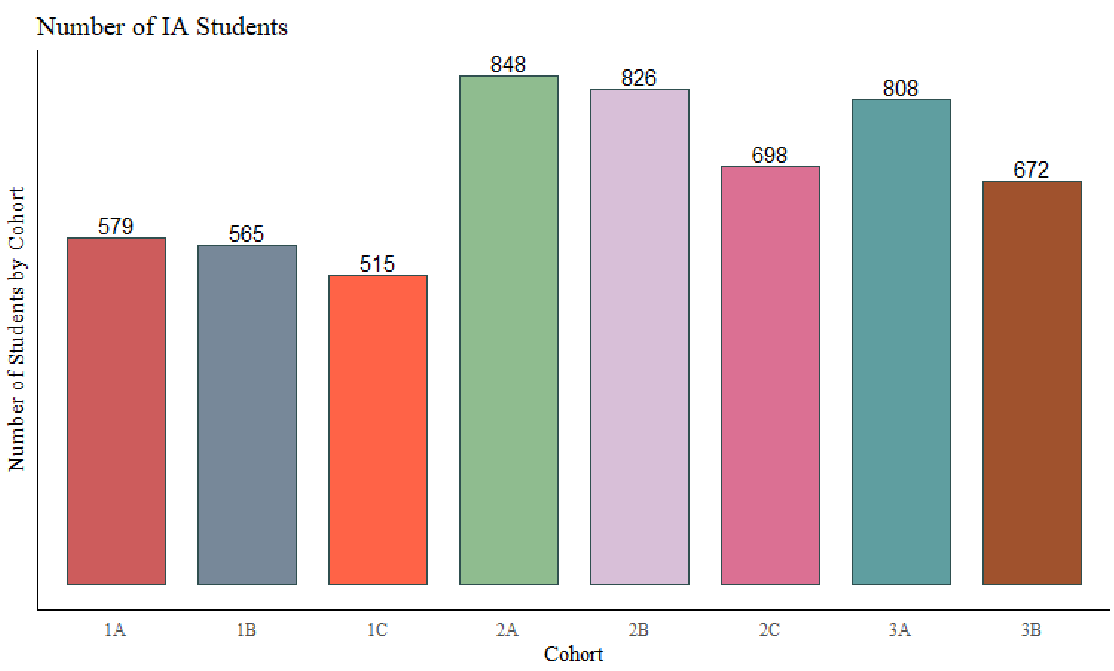


Figure 1

Table 2 displays demographic information for each Cohort, disaggregated by Cohort sub-group. The descriptive data reveals a trend over time; between 40 to 70 percent of students in Cohorts 1 and 2 enrolled in IA are Latinx students, while approximately one third of IA students are White. Other ethnicities appear to take IA at much lower rates. Cohort 3 shows an increase in the percentage of White students, up to 56%, and a decrease of Latinx students, down to 34% of students.

Table 2.

Race/Ethnicity	Cohort 1A	Cohort 1B	Cohort 1C	Cohort 2A	Cohort 2B	Cohort 2C	Cohort 3A	Cohort 3B
American Indian/Alaska Native	4%	4%	6%	4%	1%	1%	1%	.3%
Asian	1%	2%	1%	4%	3%	4%	1%	1%
Black/African American	4%	2%	0%	6%	5%	5%	1%	2%
Hispanic/Latino of any race(s)	**50%**	**49%**	**69%**	**40%**	**45%**	**44%**	**34%**	**34%**
Native Hawaiian/ Pacific Islander	0%	0%	1%	1%	2%	3%	1%	1%
Two or more races	4%	4%	1%	7%	7%	7%	7%	6%
White	**36%**	**39%**	**22%**	**37%**	**37%**	**36%**	**56%**	**56%**

Researchers calculated equity indexes to better understand over or underrepresentation of specific student groups in comparison to the entire IA population. An index of 100% would demonstrate an equitable distribution of students into courses. A value higher than 100% indicates over-representation while a value below 100% indicates under-representation. Figure 2 to Figure 8 show the equity distribution of each group of IA students. In every group, Latinx students are overrepresented by 20% to 60%, while White and Asian students are underrepresented. It should be noted that sample sizes are noticeably different, which can somewhat skew the equity index for the smallest groups of students. Groups with a sample of less than 10 students have been suppressed for the privacy of the students.

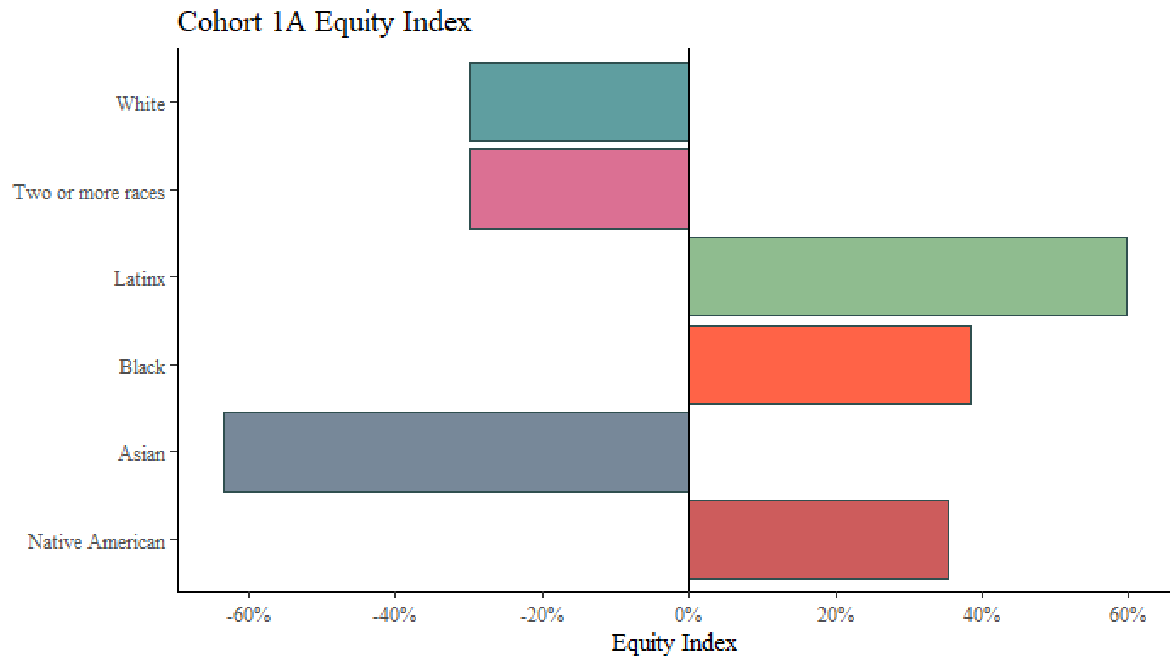


Figure 2

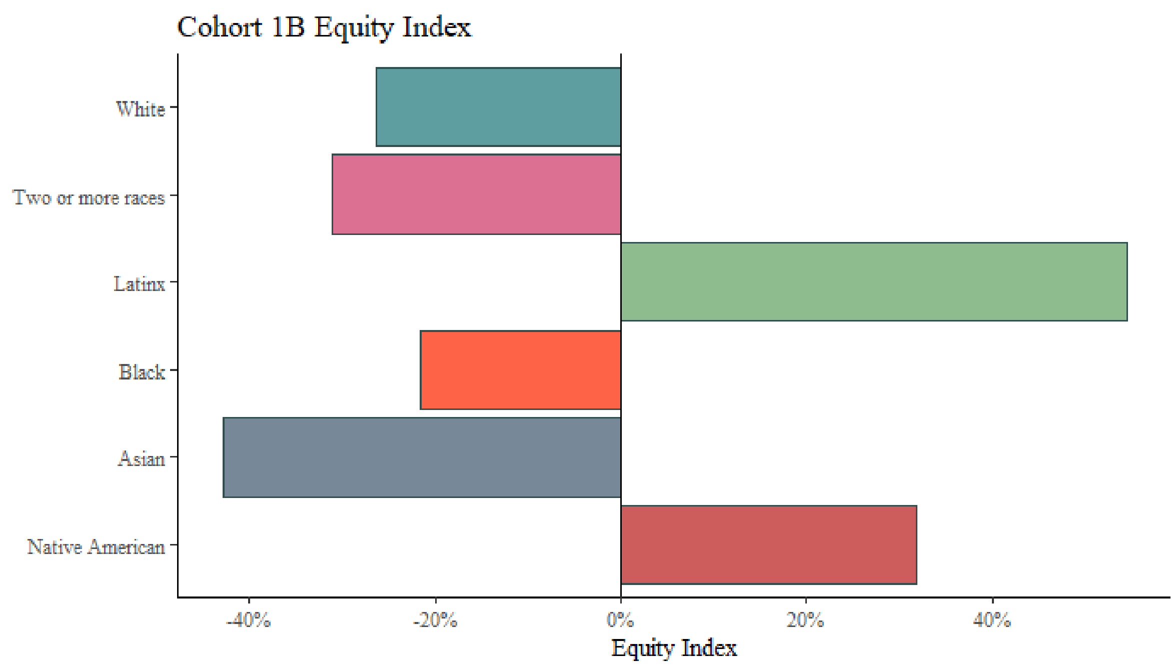


Figure 3

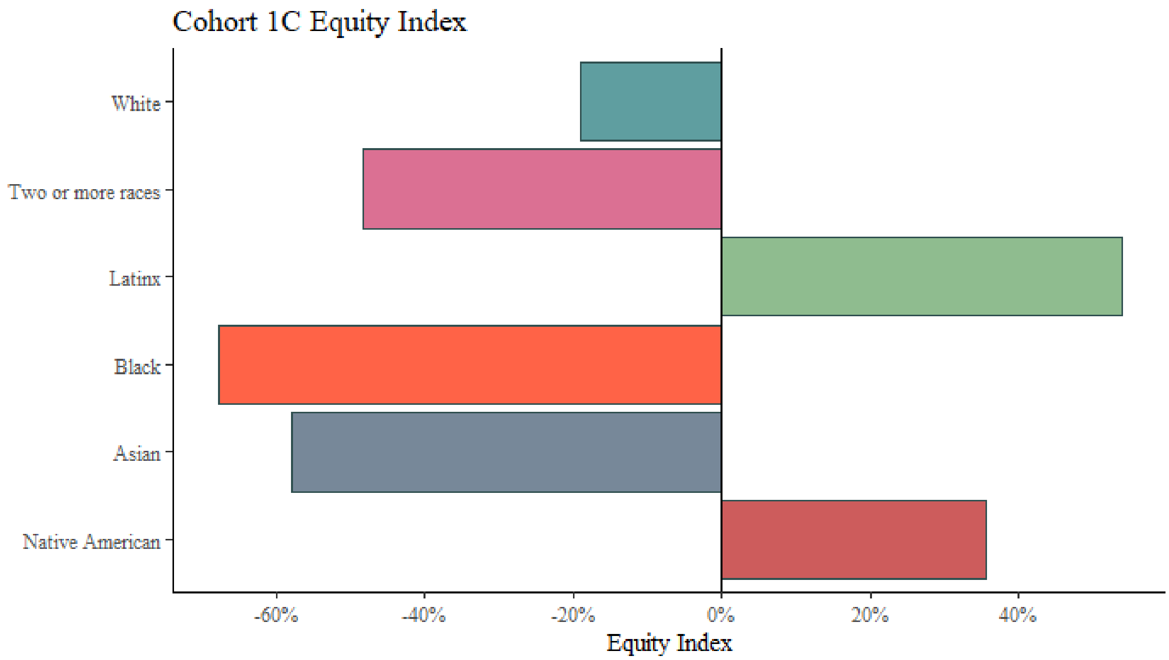


Figure 4

The representation of all three groups in Cohort 1 followed a similar pattern, with Latinx students being overrepresented between 40% and 60%, and Native American students being overrepresented between 20% and 40%. Asian and White students were consistently underrepresented. Black students were Overrepresented in Cohort 1A but underrepresented in Cohorts 1B and 1C.

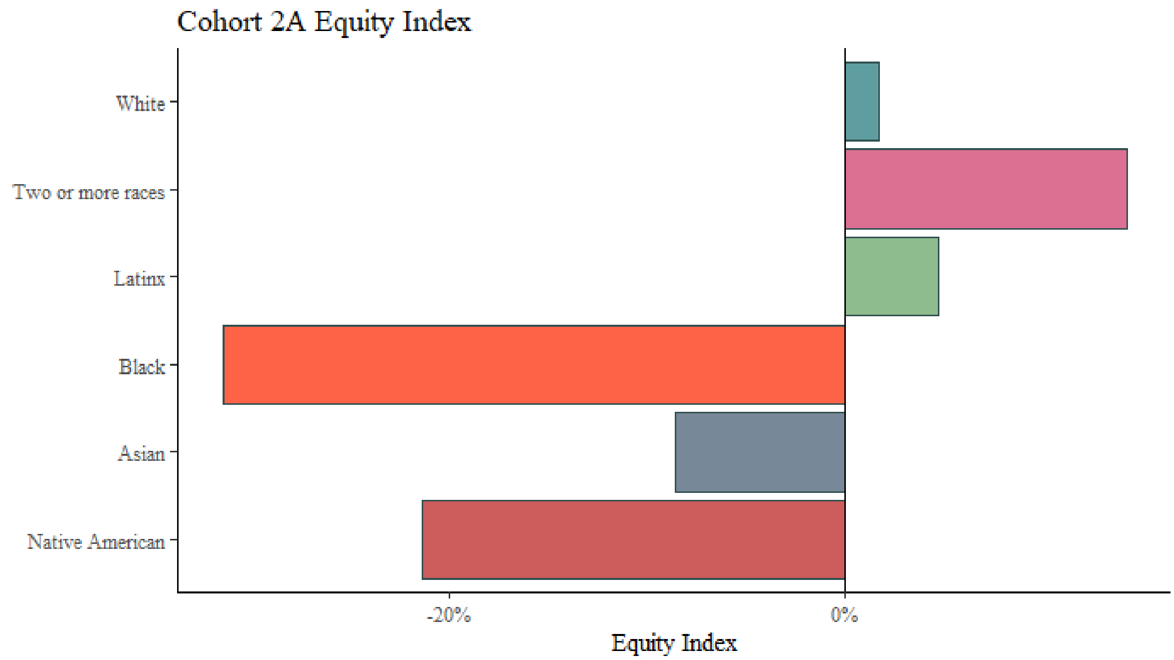


Figure 5

Figure 6

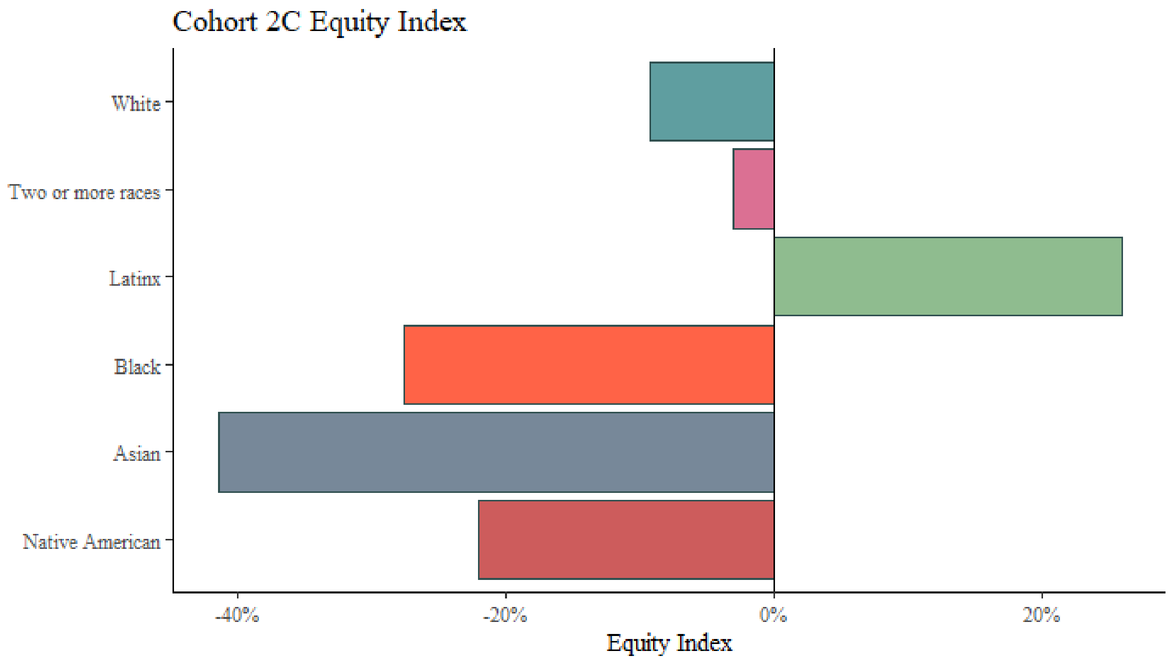


Figure 7

All three groups in Cohort 2 also showed similar patterns over the three years of data. Between Cohort 2A and 2B, overrepresentation of Latinx students increased by over 10% while Black students were underrepresented in IA courses. This pattern continued into Cohort 2C.

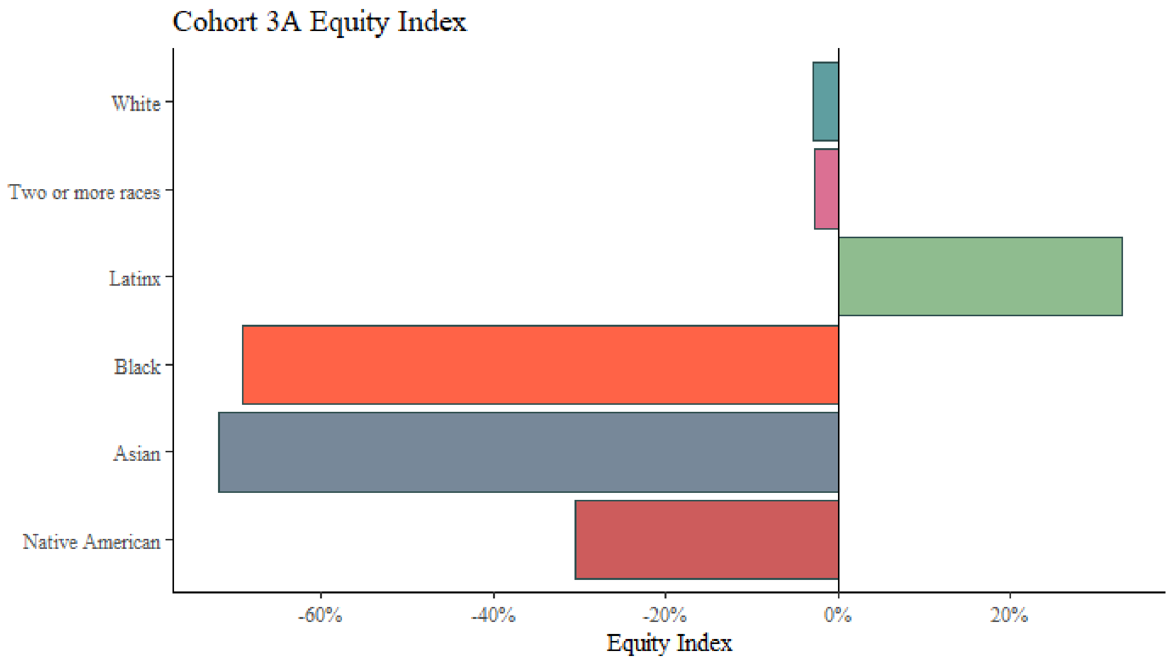


Figure 8

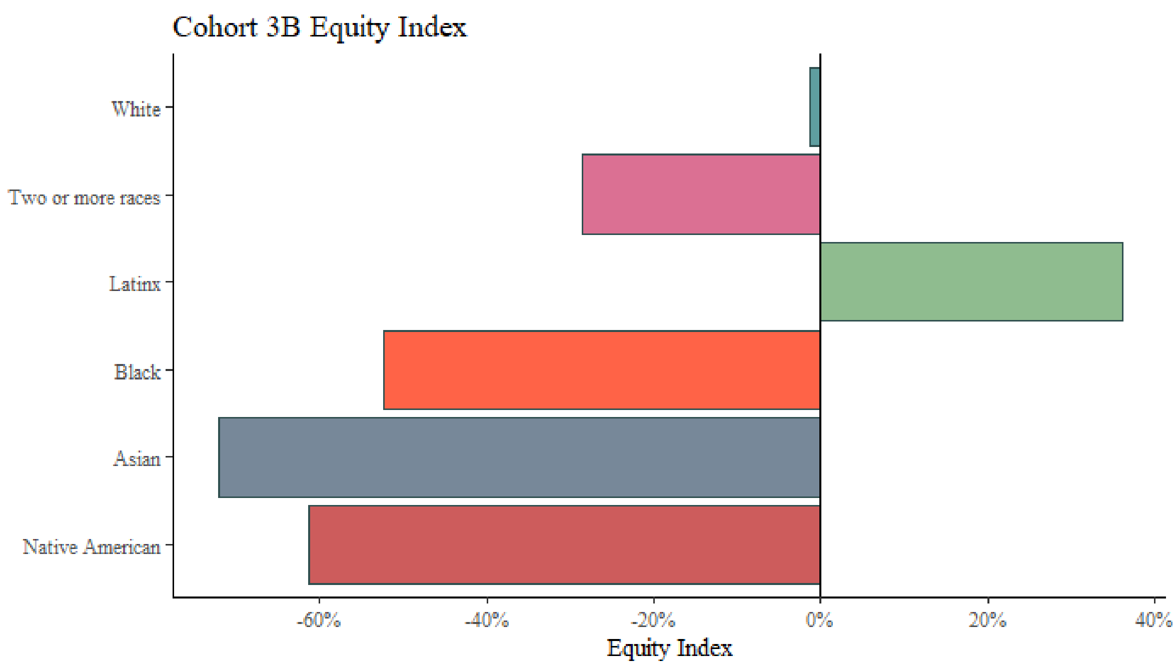


Figure 9

Cohort 3A showed representation similar to Cohort 1 and 2 groups, with Latinx students overrepresented and White students at an equitable level relative to the population of the schools.

IA Impact

Researchers considered a holistic approach to understanding the impact of IA on student outcomes, identifying contextual factors and confounding variables to include in statistical models and descriptive representations. Student enrollment patterns in math were important to understand to better understand the impact of IA on student performance. Table 3 shows student enrollment in IA based on results of the 8th grade Smarter Balanced Assessment (SBA). This summative assessment was developed by the states that administer it, was created with the input of teachers, and proposes to "be flexible, adaptive, and provide unparalleled support for diverse learners," (smarterbalanced.org, 2020). A student taking the SBA receives a Level score from 1 to 4, with a Level 4 suggesting proficiency at the student's assessed level. About half of the students that take IA score a L1 on their 8th grade SBA, while between 30% and 47% received a Level 2. In Cohort 3A, 15% of students earned a L3 on their 8th grade SBA, the highest rate of any group of IA students and this trend continued for Cohort 3B while other groups of students were well below 10%. Very few Level 4 students from any cohort were enrolled in IA classes.

Table 3

8th Grade SBA	Cohort 1A	Cohort 1B	Cohort 1C	Cohort 2A	Cohort 2B	Cohort 2C	Cohort 3A	Cohort 3B
L1	62%	53%	46%	55%	58%	56%	52%	54%
L2	34%	37%	47%	39%	37%	36%	28%	33%
L3	4%	9%	4%	6%	4%	5%	15%	11%
L4	0%	1%	2%	1%	1%	3%	4%	3%

As described earlier in this report, to further understand the impact of IA on student math outcomes a comparison group of students enrolled in Algebra 1 was created. These comparison students were randomly selected from a set of matched schools that are similar to IA schools in size, type (rural, suburban, or urban), and free or reduced lunch percentage. The comparison students were sampled from the matched schools through a stratified sampling technique to match IA students by 8th grade SBA level, ethnicity, and free or reduced-price lunch rate. Each cohort group has a different set of comparison schools and students that were sampled in this manner, allowing researchers to compare IA and Algebra 1 student outcomes over time.

Due to the Covid-19 school shutdowns in the second half of the 2019-2020 school year, only the first half of the school year's grades were included in this analysis, since students were learning remotely, and many schools changed their grading systems in light of the drastic change in learning environments.

Figure 11 shows a comparison of average 9th grade math GPA math between IA and comparison students. Across all 8 Cohort groups, IA students had higher grades than the comparison groups.

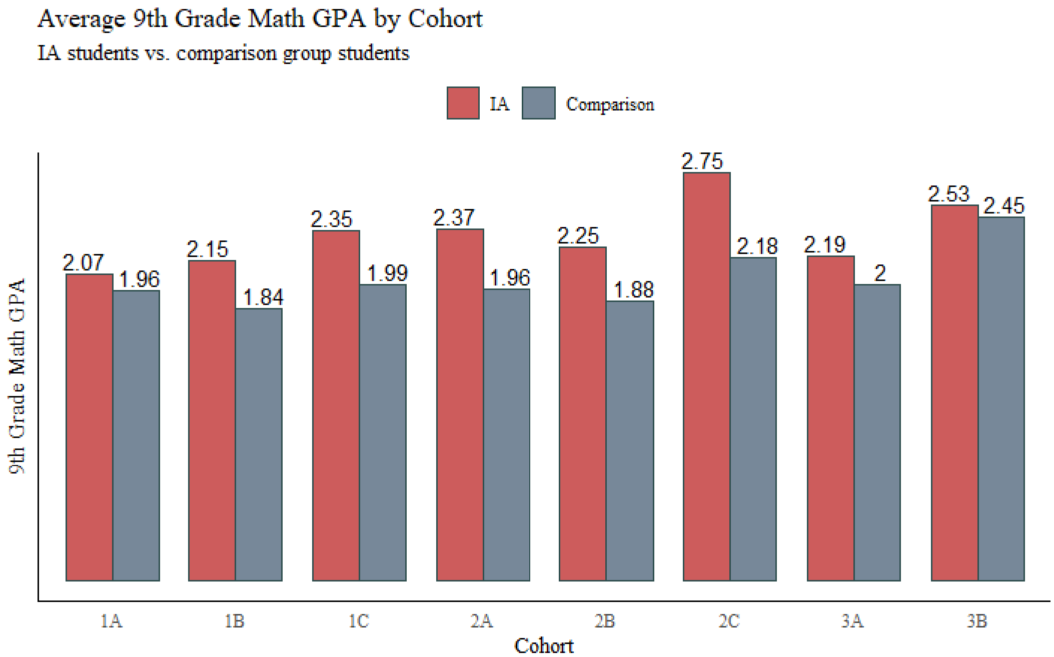


Figure 10

In this report, Cohort 1A students have four years of grades data (9th to 12th grades). Figure 11 compares the grades earned by IA students and comparison Algebra students over time. Researchers performed a Multivariate Analysis of Variance (MANOVA) to compare 9th, 10th, 11th, and 12th grade math GPA of Cohort 1A students with the comparison student group. Students who took math courses all four years of high school are included in this analysis. The MANOVA shows that there is a significant difference in grades at 9th grade and 12th grade between Cohort 1A Intensified Algebra students and the Cohort 1A comparison group. There is no significant difference at 10th and 11th grade.

Researchers performed a linear regression to ascertain the predictive value of 8th grade SBA, IA group membership, 9th grade math grade, 10th grade math grade, 11th grade math grade and 12th grade math grade on 10th grade SBA scores. Results show that 8th grade SBA scores and IA group membership were statistically significant, positive predictors of 10th grade SBA scores. The total R squared (practical effect size) of the model is .442, meaning 44% of the variance is accounted for with these variables.

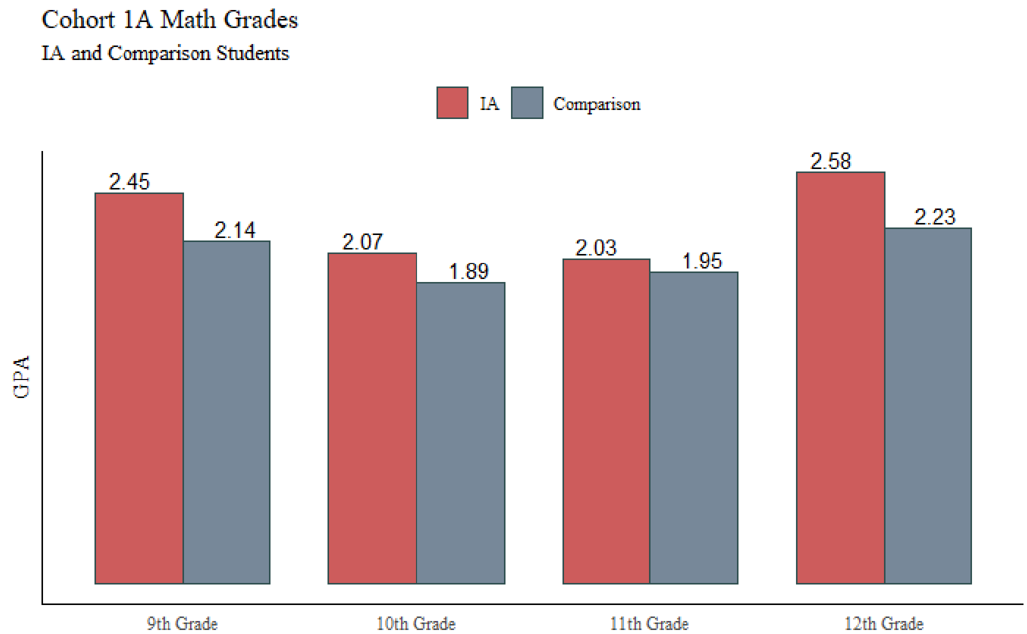


Figure 11

Cohort 1B students also have four years of grade data (9th to 12th grades) represented in this report. Figure 12 shows math grades of IA students and comparison Algebra students over the four years of data available. Researchers performed a MANOVA to compare 10th, 11th , and 12th grade math grades of Cohort 1B IA students to Cohort 1B comparison students. The MANOVA shows a statistically significant difference in Algebra grades between Cohort 1B IA students and Cohort 1B Comparison students. There was no statistically significant difference in 10th and 11th grade math courses. There was a statistically significant difference in 12th grade students, with IA students had an average GPA of 2.91 while Comparison students had an average GPA of 2.55

Researchers performed a linear regression to ascertain the predictive value of 8th grade SBA, IA group membership, 9th grade math grades, 10th grade math grades, and 11th grade math grades on 10th grade SBA scores. Results show that 8th grade SBA scores and IA group membership were statistically significant, positive predictors of 10th grade SBA scores. the total R squared of the model is .442, meaning 44% of the variance is accounted for with these variables.

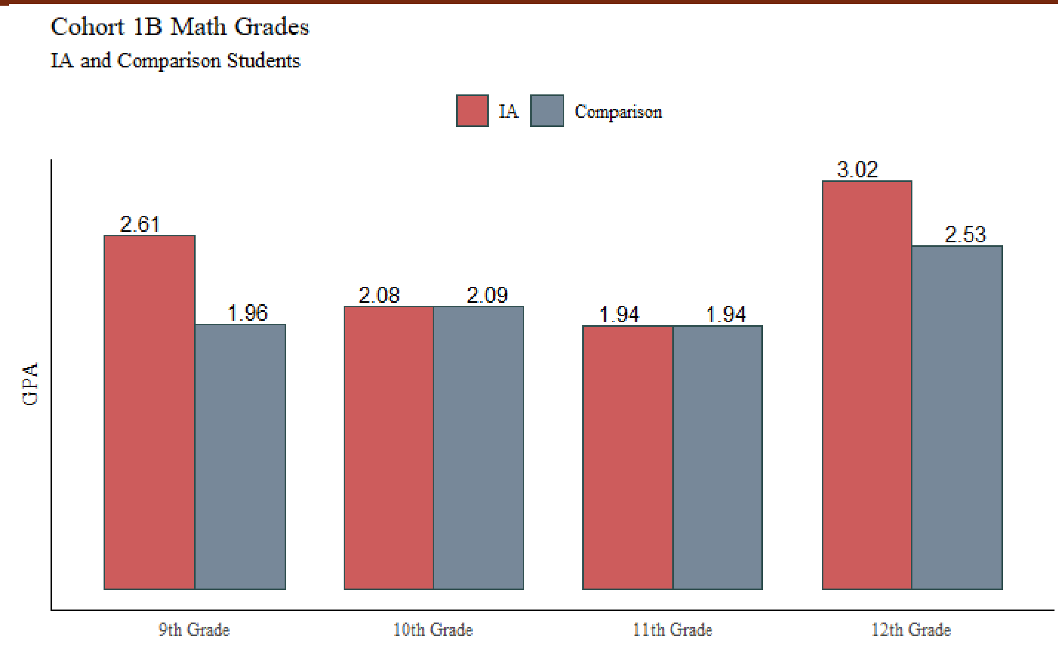


Figure 12

Cohort 1C students have three years of grade data. Figure 13 shows math grades of Cohort 1C IA students and Cohort 1C comparison Algebra students over time. Researchers performed a MANOVA to compare 9th, 10th, and 11th grade math grades of Cohort 1C IA students to Cohort 1C comparison students. The MANOVA shows a statistically significant difference in Algebra grades between Cohort 1C IA students and Cohort 1C Comparison students. There was no statistically significant difference in 10th grade math courses. There was a statistically significant difference in 11th grade GPA, with IA students averaging a 2.6 while Comparison students averaged a 2.37.

Researchers performed a linear regression to ascertain the predictive value of 8th grade SBA, IA group membership, 9th grade math grades, and 10th grade math grades on 10th grade SBA scores. Results show that 8th grade SBA scores and IA group membership were statistically significant, positive predictors of 10th grade SBA scores. the total R squared of the model is .393, meaning 39% of the variance is accounted for with these variables.

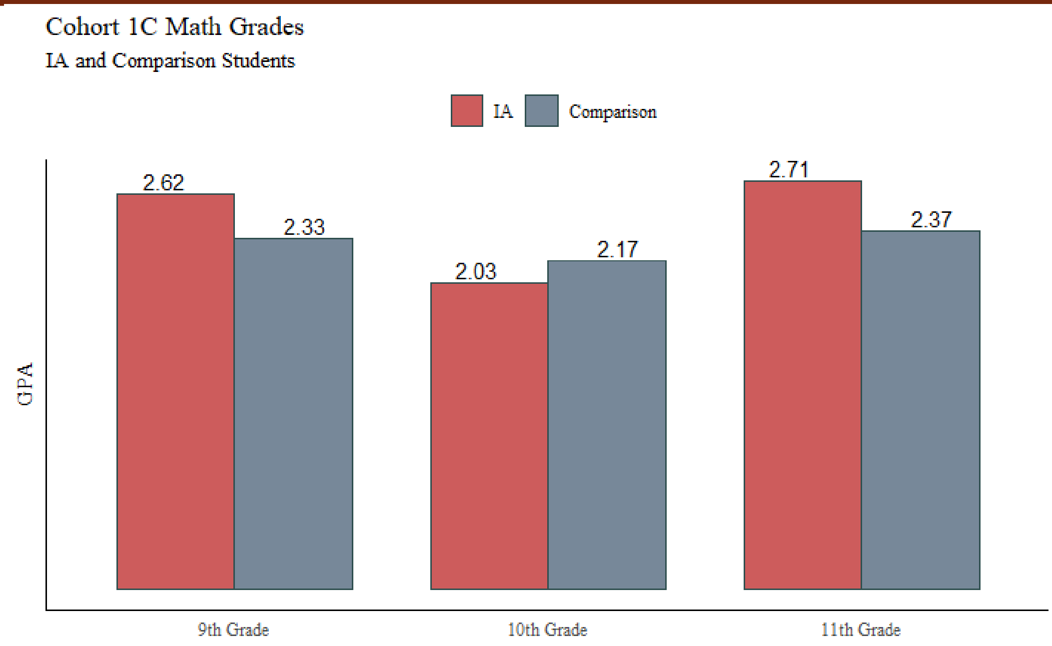


Figure 13

Cohort 2A students have three years of math grades data (Figure 14). Researchers performed a MANOVA to compare 9th, 10th, and 11th grade math grades of Cohort 2A IA students to Cohort 2A comparison students. The MANOVA shows a statistically significant difference in Algebra grades between Cohort 2A IA students and Cohort 2A Comparison students. There was also statistically significant difference in 10th grade math courses or 11th grade math courses, with IA students performing better than their comparison students.

Researchers performed a linear regression to ascertain the predictive value of 8th grade SBA, IA group membership, 9th grade math grades, and 10th grade math grades, and 11th grade math grades on 10th grade SBA scores. Results show that 8th grade SBA scores, IA group membership, 9th grade math grades, and 10th grade math grades were all statistically significant, positive predictors of 10th grade SBA scores. The total R squared (practical effect) of the model is .550, meaning 55% of the variance is accounted for with these variables.

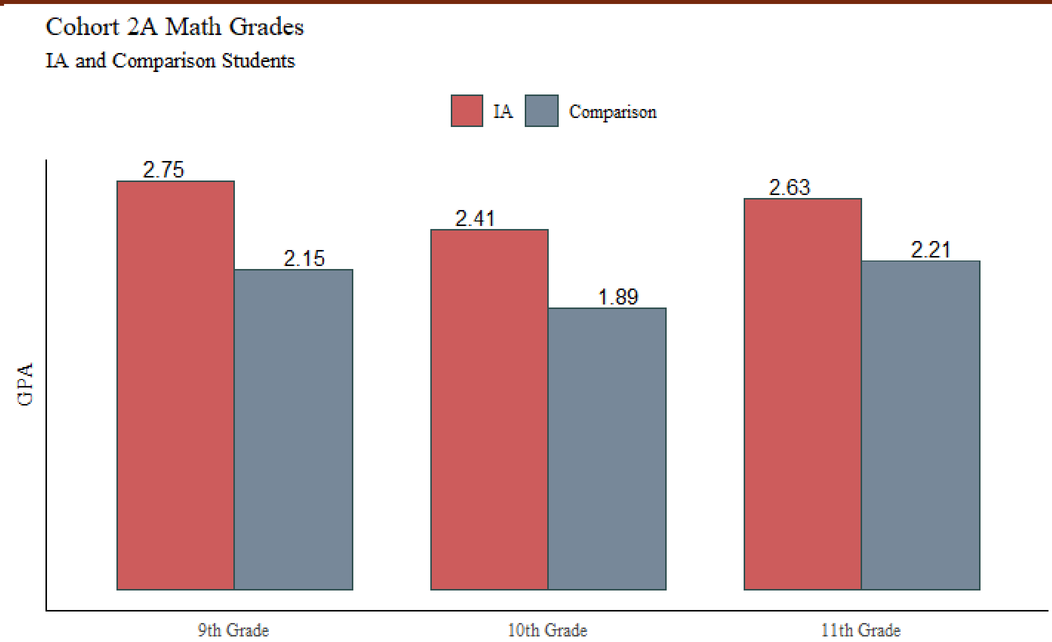


Figure 14

Cohort 2B students had two years of math grades data (Figure 15). Researchers performed an multivariate analysis of variance (ANOVA) to compare 9th and 10th grade math grades of Cohort 2B IA students to Cohort 2B comparison students. The ANOVA showed a statistically significant difference in Algebra grades and 10th grade math grades between Cohort 2B IA students and Cohort 2B Comparison students.

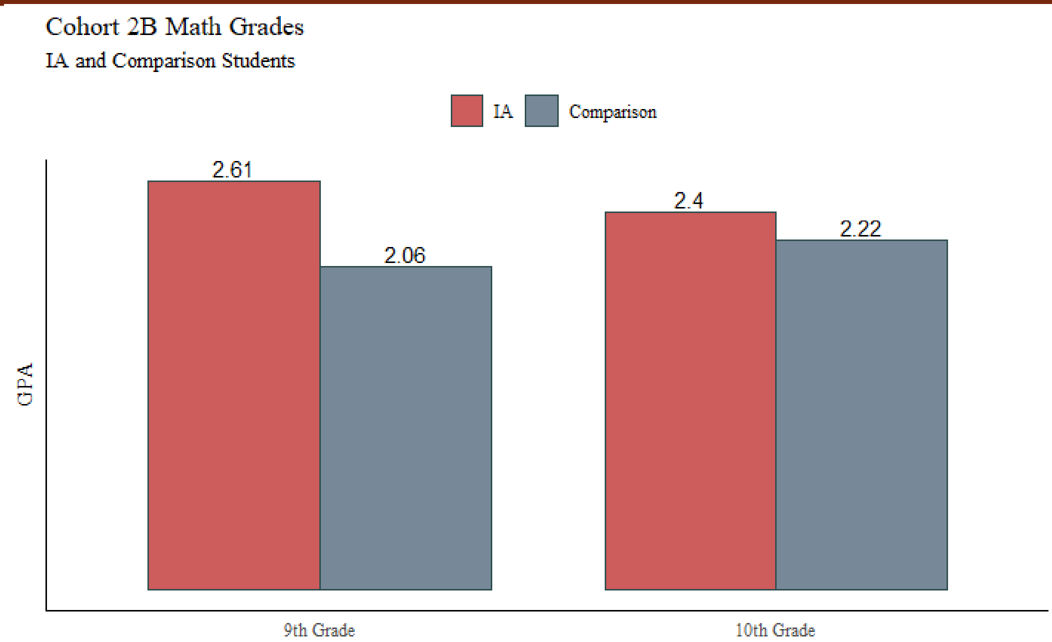


Figure 15

Cohort 2C students had one year of math grades data (Figure 16). Researchers performed an analysis of variance (ANOVA) to compare 9th grade math grades of Cohort 2C IA students to the comparison student group. The ANOVA showed s statistically significant difference in 9th grade math grades, with IA students earning a 2.75 average GPA while comparison students earned a 2.18 average GPA.

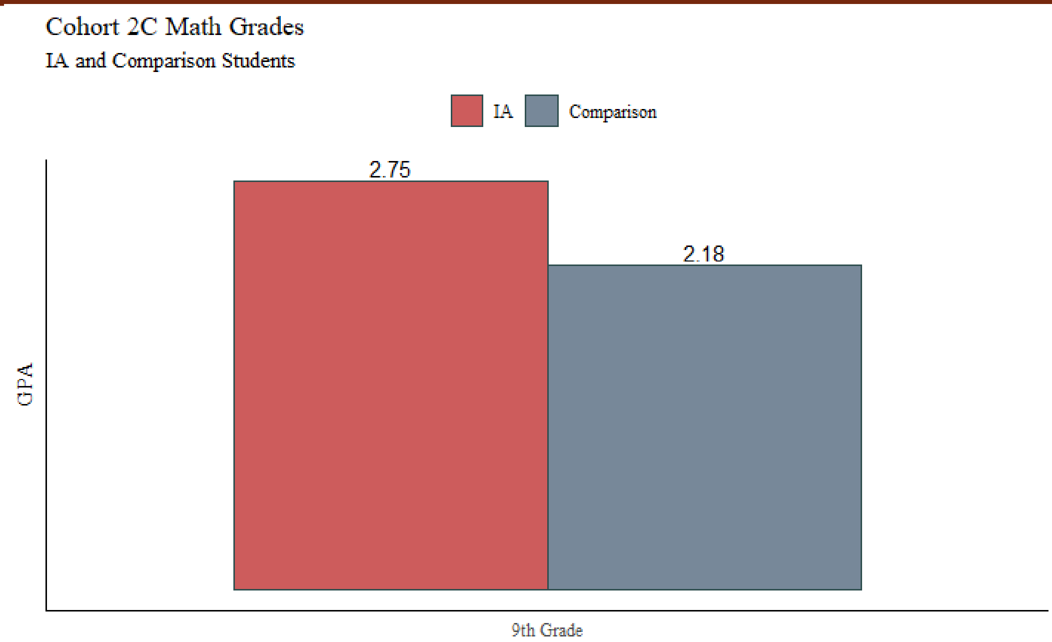


Figure 16

Cohort 3A students had two years of math grades data (Figure 17). Researchers performed a multivariate analysis of variance (MANOVA) to compare 9th and 10th grade math grades of Cohort 3A IA students to Cohort 3A comparison students. The analysis showed a statistically significant difference in Algebra grades between Cohort 3A IA students and Cohort 3A Comparison students but not in 10th grade math grades.

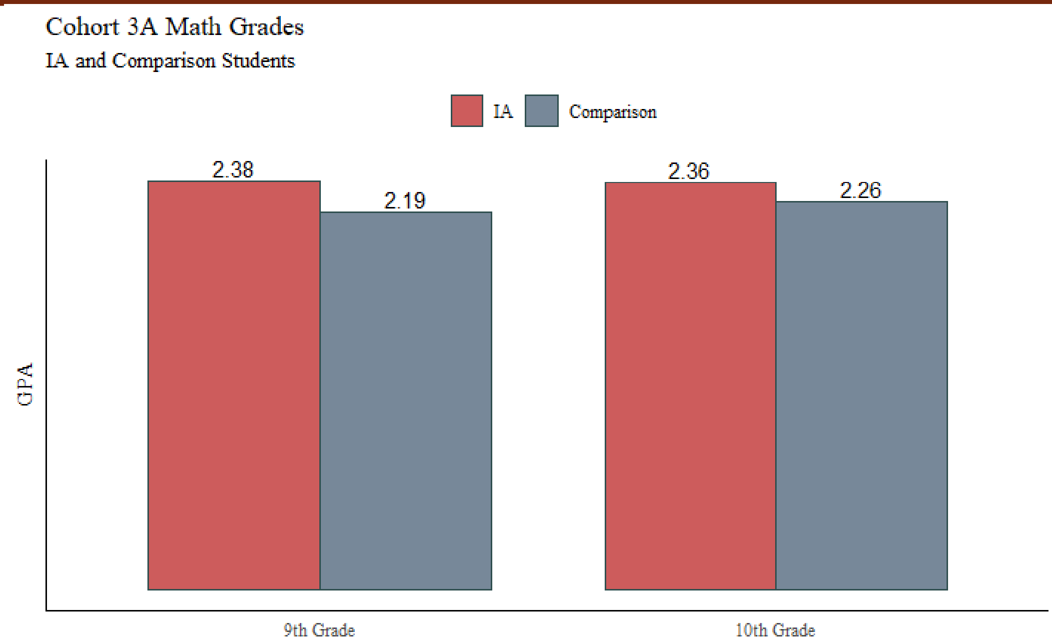


Figure 17

Cohort 3B Students have one year of math grade data. Researchers performed an analysis of variance (ANOVA) to compare 9th grade math grades of Cohort 3B IA students to Cohort 3B comparison students. The ANOVA showed no statistically significant difference in Algebra grades between Cohort 3B IA students and Cohort 3B Comparison students.

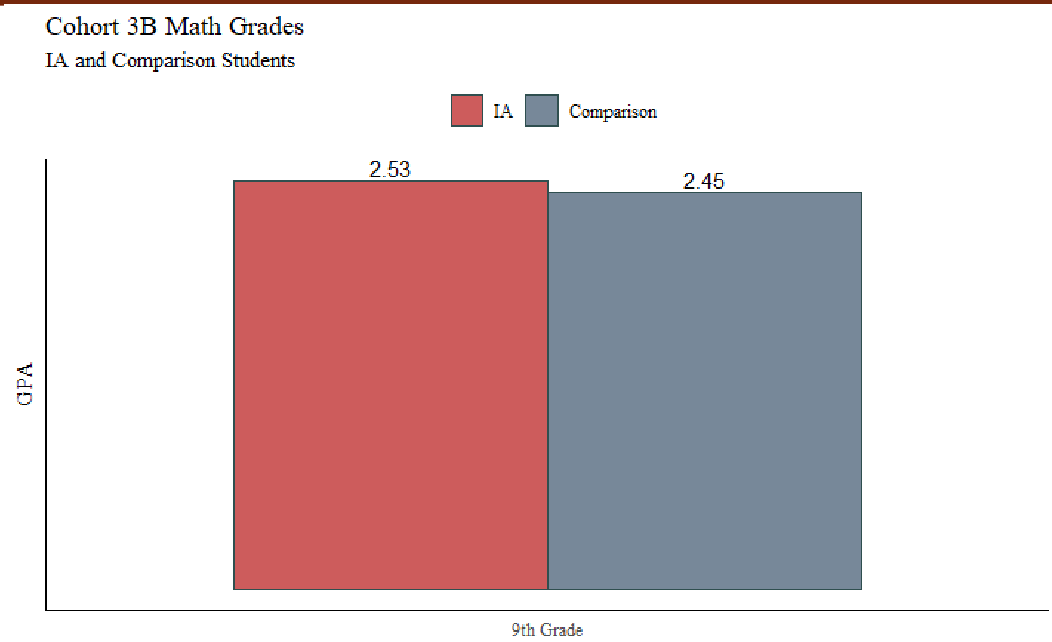


Figure 18

Postsecondary Analysis for Cohort 1A

Researchers were able to compare postsecondary outcomes for Cohort 1A students that attended a postsecondary institution in their first year after high school graduation. Figure 19 shows the comparison of enrollment into any postsecondary institution. There was no statistically significant difference in the number of IA students and comparison students enrolling in a postsecondary institution. Researchers also compared the number of students taking at least one college level math course in their first year of postsecondary enrollment. There was no statistically significant difference in the number of IA students and comparison students taking at least one college level course in their first year.

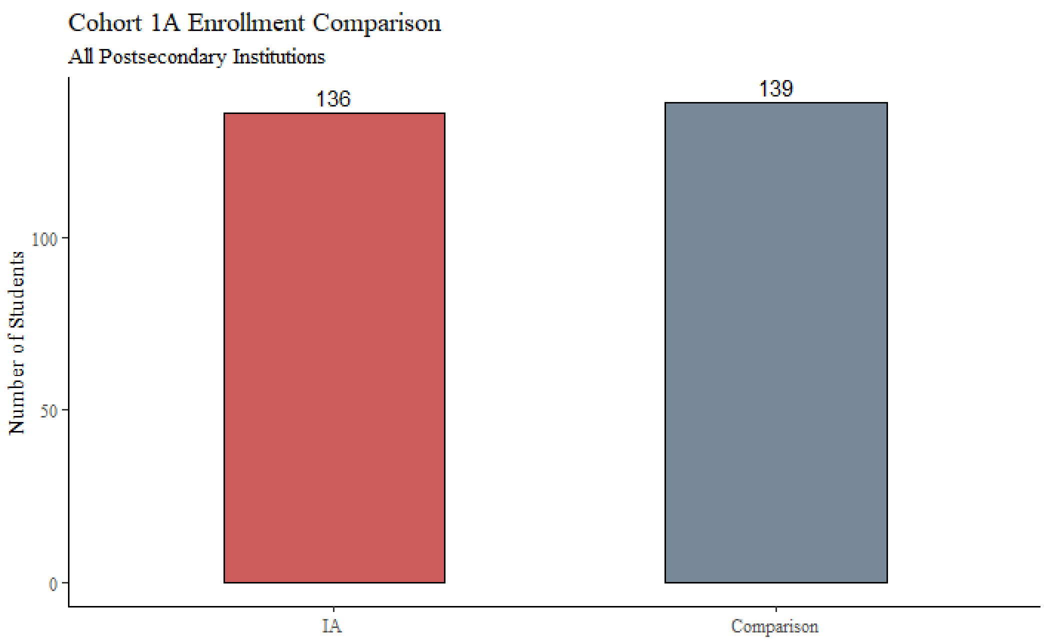


Figure 19

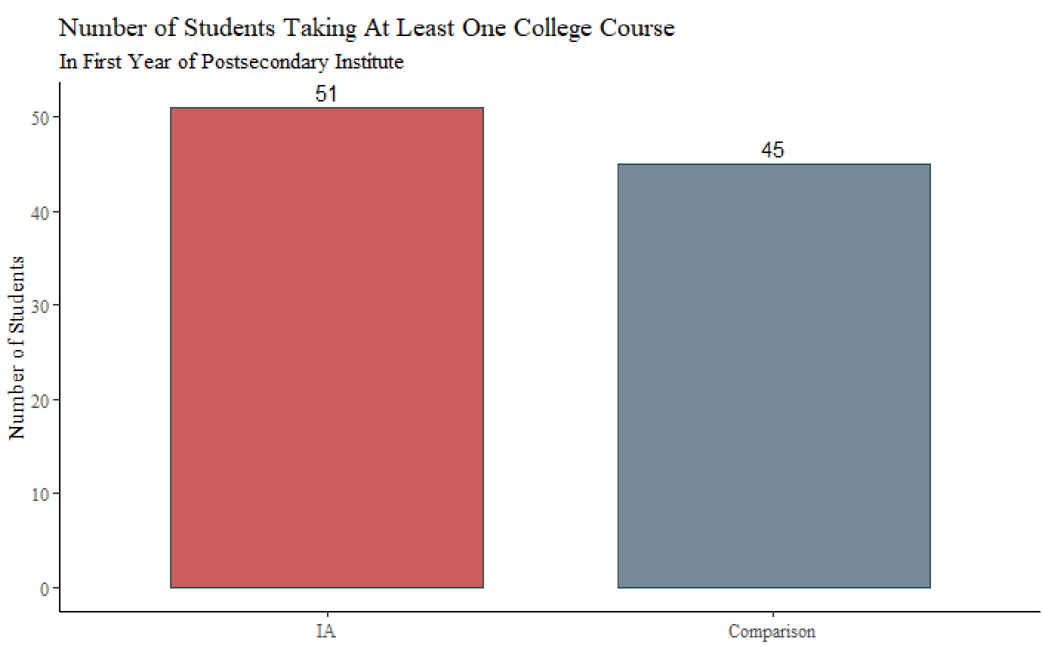


Figure 20

Quantitative Summary

The 2019-2020 IA data has reinforced several trends that researchers have uncovered over time and across many different groups of students. In all cohort groups except Cohort 3B, IA students had statistically significant higher grades than comparison Algebra students from the matched sample populations. This result with Cohort 3B could be attributed to the students only receiving half a year of instruction in person, as the Covid-19 pandemic forced low-quality distance learning across the state. This positive effect did not always carry over to subsequent years of math grades, as only some cohorts experienced higher grades in some years while others performed equal to the comparison groups. As in previous years, IA membership was predictive of higher 10th grade SBA scores, where data was available. These results, along with the qualitative data, suggest that students are responding positively to the unique curriculum, professional development, and pedagogy of IA courses. Membership in IA shows better grades and lower failure rates in 9th grade math courses than comparison groups, which is crucial for future success and graduation from high school. For the first time, postsecondary data was provided for Cohort 1A students. Though a small percentage of the whole Cohort 1A group attended college, enough attended to perform some analyses. Though there was no difference in enrollment or college course-taking behavior between IA students and comparison students, the smaller sample size could be the culprit.

These findings can support funders, district leaders, teachers, and program administrators as they discuss the best ways to implement courses that have an impact on student outcomes. Specifically, when considered in conjunction with the qualitative evidence supporting IA, it becomes important to engage in discussions about what characteristics of the IA curriculum are having the greatest impact, and how those features could be replicated to support students once they transition from the IA course into higher level math. The pedagogical habits that come from IA supports and professional development can be used in other math courses, with IA teachers serving as teacher leaders in their buildings.

Intensified Algebra Summary Qualitative Report

Introduction

Agile Mind and the Charles A. Dana Center developed Intensified Algebra 1 (IA), an intervention program for students struggling in math. This 70- to 90-minute daily math course utilizes a strengths-based approach to build on students' assets and to develop their academic skills through engaging learning experiences. Intensified Algebra targets conceptual understanding, provides integrated problem-solving strategies, supports distributed practice, reengages learners through multiple representations of mathematical ideas, integrates interventions from social psychology to motivate students' positive beliefs, encompasses enhanced formative assessment strategies, and includes support for struggling students and for literacy and language development.

Within CSW's Math Initiative, IA was delivered to 8th, 9th, and 10th grade students who were one to three years behind in math. The intent of this program was to have more students become successful in Algebra 1 by passing the course the first time and by increasing the percentage of students scoring at or above standard on the Smarter Balanced Assessment.

Throughout the duration of the College Readiness Math Initiative, qualitative responses to Intensified Algebra (IA) have trended positive and become predictable over time. Schools across Washington state have shared similar experiences regarding the implementation and impact of the curriculum on their students' sense of math efficacy and understanding of algebra concepts. This perception aligned with quantitative data measuring the success of IA. IA students' math GPA was statistically significantly higher than a matched group of Algebra 1 peers within multiple cohorts of students participating in the initiative.

Grantees have identified strengths and challenges, and school district leaders and IA supports have worked capitalize on those strengths and mitigate perceived challenges overtime. This comprehensive, collaborative, and responsive approach was integral to the success of the project. Agile Mind and College Spark leaders, OSPI representatives, and evaluators met monthly to discuss progress, identify programmatic needs, and explore data. Project leaders were able to use data formatively to drive decision making, and evaluation reports were considered when planning for professional development opportunities or adjusting curricular materials and training. Agile Mind leaders held regular webinars to present data to grant participants and increased their responsiveness and support during the pandemic.

During the initial years of grant implementation, schools worked to find opportunities to integrate IA into their master schedules and their school culture. The selection of students and faculty was an undeveloped process, leading to variability in course make-up among participating schools. As programming became more consistent and familiar, schools were better able to identify the students they felt would most likely benefit from the IA curriculum, and selection practices became more sophisticated and streamlined. District teams considered math skill level from 8th grade state assessments, social-emotional needs, prior experience in math, and math efficacy. They also looked at attendance and discipline, which were placement categories that districts continued to disagree about throughout all three cohorts. While some districts continued to eliminate students with poor attendance from the course, others recognized that those might be the students most in need of support. Several teachers argued that the design of the course, which relied heavily on group work and building classroom culture, was made more difficult with poor attendance, however others felt that discipline problems in class were more problematic. During the pandemic, the shift to online learning altered the conversation around attendance, as student attendance suffered across schools, and IA students tended to be slightly more engaged during online learning, possibly due to the relationship and classroom culture building promoted by the curriculum.

While student selection into the course was one variable contributing to the successful implementation of IA, teacher selection was also discussed regularly throughout the years of evaluation. There were perceived characteristics of a successful IA teacher, including flexibility, persistence, and a willingness to follow the curriculum and take some risks with students. Growth mindset was critical, for teachers and students, as was the ability to follow the curriculum with fidelity while adapting instructional strategies to meet the needs of students. During discussions with teachers over the past 6 years, it became evident that participating in IA led to more teacher collaboration among IA teachers within the same building, as well as between IA teachers in different buildings and districts. IA teachers also shared that they were incorporating components of the math mindset activities into their other courses, and sharing those ideas with peers in math departments. In several schools, administrators acknowledged the value of the mindset work, sharing their plans to push this content out into other math classes. In addition to finding the right combination of teachers and students to participate in IA, there were several contextual factors contributing to the implementation of grant components. These included: teacher capacity, experience, and interest; support from Agile Mind and school administration; scheduling and prioritization of IA; the marketing of IA to students and families; and the pandemic.

Teacher capacity, experience, and interest

In the early years of the grant, teachers were unfamiliar with the curriculum, requiring time to learn new strategies and reflect on their practice. Teachers spoke about the shift in thinking required to dedicate time to the mindset work at the beginning of the school year, noting that at first it felt they were not "getting to math" quickly enough. Teachers also commented on the pacing of the lessons, and the amount of content embedded in the course. For schools where IA teachers remained consistent throughout the duration of the grant, the perception of the course seemed to shift favorably over time. Teachers began to see the value of learning about the brain and building up student efficacy through small successes and group work. Similarly, in schools where at least one original IA teacher remained consistent, the course seemed to carry a more positive perception among the teachers and administrators. This was critical to the success of the curriculum, as teacher buy-in was important to communicating the value of IA to students who had to sacrifice an elective to participate in this double-block math course, as well as families, who often felt the course was remedial. One administrator noted, "The biggest sell of the program is our two teachers. They are charismatic. They can get the kids to do anything. And they talk to the parents and usually convince them to be in the program. The parents feel comfortable because the teacher makes it homey for the kids, really nurtures them and helps them out." Similarly, one IA teacher shared,

> I think you really have to have a passion to want to shift mindsets, not just show up and teach math- you have to sell it early on in the year- you cannot be phony around the curriculum- you need to make the students believe that you believe in the brain research- once I saw the training, and learned about the program- you need to see the front end, and believe in the actual curriculum to be able to teach it. I think you also have to truly believe that all of the students in your class are truly capable and can be successful- you can't dismiss certain kids. And, you have to be all about relationships- Yes, the connection piece is huge.

Support

Throughout the duration of grant, the support that schools received to implement the IA curriculum was seen as a strength by teachers and school administrators. From initial interviews with teachers and administrators in 2016 to final online interviews during the pandemic, participants' perceptions of the value and quality of the support they received solidified. Most schools communicated regularly with their Agile Mind consultant. The Agile Mind team built relationships by offering onsite support and coaching, modeling lessons to demonstrate strategies, helping to modify the curriculum to adapt to the needs of individual schools, and providing suggestions for deepening student learning and building classroom culture with a focus on growth-mindset and math efficacy. Additionally, during the most recent years of grant administration during the pandemic, Agile Mind consultants were integral in supporting the continued use of IA online, helping schools to modify and prioritize to address student needs in a consistently shifting environment.

Teachers and administrators participated in a final round of interviews in Spring 2021 to provide a clear perspective on supports offered for grant implementation specifically during the pandemic. Interviewees discussed the resources and time provided to help them through the difficult transition to online or hybrid learning. Several teachers noted that their Agile Mind consultant worked with them to prioritize lessons to meet shorter, less frequent classes. One teacher shared, “[Our IA consultant] gave us a priority google sheets for each lesson, looking at which slides and activities to focus on. That was the most helpful thing this year, and it still helps us choose which ones to skip and adapt to online and hybrid.” Another commented, “[Our consultant] had a suggested pacing guide for us, with things to focus on, and things to cut out. That has provided a template sharing plans back and forth, and assessments back and forth.”
In addition to the support from AM, support from school administration was important in building capacity for the implementation of IA. In several schools, if principals were able to build a master schedule with IA incorporated as a double-block course, teachers were able to implement the curriculum as intended. In some schools, administrators created common planning time for IA teachers to collaborate, and supported weekly meetings to help with pacing and course organization. One teacher shared, “Being new to IA, I have benefited from the weekly meetings. I am probably absorbing more and giving less than older teachers. But it’s helpful to have the conversations around what to emphasize and what to cut out. Because we are making huge modifications to the nature of the course.” Another school team acknowledged that while they did not require the support of the Agile Mind team, they benefit from having a team of peers to work with. One member of their team shared, “I think we are at the point that everyone here has worked with the curriculum for many years. The issue is not the curriculum, but how to embed it into our time. The issues are more instructional.”

Scheduling and Prioritization of IA

A consistent point of discussion throughout the duration of the grant was the ability for schools to prioritize a double block math course in their schedules. In initial years of the grant, schools mostly followed the guidance from Agile Mind of at least 90 minutes of IA per day to support students, with the first section of class focused on learning the content, and the second on providing opportunities to work collaboratively with peers to solidify the concepts through practice. In schools that were able to utilize this model, there were positive perceptions of the course from teachers, administrators, and students. This structure allowed time for classes to build culture, and students learned how to engage in academic discourse and work with peers to solve problems. They also felt more comfortable to make mistakes and take risks with their learning. Although students initially shared that they were dubious of a double block of math, they ultimately saw the value in having time in school to develop their math skills. One administrator shared,

> The students in [the IA class] class really appreciate their mathematic ability, and how they see themselves as more efficacious- they might say there were challenges, and they were shy at first, but now they like talking, and they like the activities that the teacher does- it takes them a few months to come out of their skin and start talking about their learning- they really don't know how to talk academically- being intentional about how you pair the kids- but now they feel more confident in their math skills.

With the introduction of Cohorts 2 and 3, and changes in statewide credit expectations for graduation, several grantees moved to a trimester system. This greatly impacted the intended IA delivery model. In combination with the pandemic, school leaders and IA teachers acknowledged that the original plan for 90 minutes of IA a day was no longer tenable. As a result, teachers were challenged with balancing the mindset and group work components of the course with the need to address a significant amount of content. Many teachers had to reduce the time spent on building growth mindset and collaboration skills, which may have altered the impact of the course on student self-efficacy.

The Marketing of IA to Students and Families

Regardless of the quality and effectiveness of a curriculum, if students and families do not understand its purpose or are not willing to sacrifice an elective for placement in the course, it is not likely to have an impact on student achievement. This message was communicated regularly throughout the duration of the grant. While some schools prioritized communications with families about the intent of the course, others were less communicative. This led to assumptions about the course being "remedial," which may have discouraged students who could have benefit from IA.

Several administrators spoke to the need to message the course correctly, and to highlight the importance of building math efficacy through research-based strategies. At times, it was difficult to convince students and families that this benefit outweighed the opportunity to have classes the students perceived as more fun. It may have also been related to poor math experiences in the past; students who had received bad grades or felt unsuccessful in math in middle school may have been worried about two periods a day of feeling awful about themselves in school, while families may have been worried about the impact of two math grades on GPA. Although this is speculative, it speaks to the need for messaging and communication that is strengths-based and encouraging, focusing on how the course will help students build skills that will ultimately encourage success across academic disciplines. In schools that were able to do this, teachers' perceptions for their time implementing IA seemed more positive.

The Influence of the Pandemic

The pandemic, which had a global impact on learning, created barriers and challenges to delivering the IA curriculum as well. IA teachers expressed significant frustration with the transition to online and hybrid learning, although they acknowledged there was ample support from the Agile Mind team. The parts of the curriculum that they most appreciated were difficult to implement during remote learning, including the mindset work, and student collaboration. One teacher shared, "[IA] breaks down when you do remote. No partners and groups, which is the strength. I started following the program fully, but I wasn't getting the work back, so I needed a format where it was easier for kids to get the work done. I still use the components of IA, but the assignments I use are from the Algebra 1." Another teacher confirmed this perspective, noting, "It's been hard to implement the curriculum remote. It's not built for that; the students we are working with need more support to turn and talk and collaborate. Without us there to direct it, it's been more challenging."

Teachers and administrators also shared that student engagement in school changed significantly during the pandemic. Many students did not log into school during the initial months of the pandemic, or refused to turn cameras on and interact. For some IA teachers, they felt that their IA students were a bit more willing to participate in online learning, but the evidence was mostly anecdotal. Even when students returned to school in a hybrid model, they were less familiar and comfortable with their teacher and peers, impacting the culture and sense of community that was the hallmark of an IA classroom pre-pandemic. One teacher shared, "I think the students did not like online. And I didn't either. I didn't get the interaction level that I do in class. We really missed out on the beginning of the year, learning to talk and communicate…Even now with the 6 foot distance, it is different."

In addition to changes in student engagement and participation during the pandemic, IA delivery models changed in response to state guidance for schools, making it more difficult to identify trends or to understand what was working well, or how the curriculum was impacting a new class of students. Some schools abandoned the IA model altogether, while others tried to implement with more fidelity. Several schools were only able to see their IA students twice a week during the pandemic, while others managed four or five times weekly, but in shorter class periods. With regard to understanding quantitative outcomes from IA, this shift in delivery makes it more difficult to determine the impact of the course on student scores during the 2019-2020 and 2020-2021 school years, although students did have a more typical delivery of IA from September 2019- March 2020. Teachers were able to identify several positive aspects of the IA curriculum that they were able to use during online/ hybrid learning, despite overall feelings of dissatisfaction with modifications to the curriculum. One teacher noted, “It was nice using the slides for the lessons, that went well. The animations were great. We used the Guided Assessments online too. I felt like those went well since they do give kids hints and have some type of coaching better than the other curriculum.” Other teachers also commented on the use of “break-out rooms” to encourage small group work during remote learning. One shared, “The growth mindset [lessons] were great but I wish they were in person because online doesn’t work as well. We had to adapt them too because of the virtual learning and depending on the adapting and keeping up with the content and students lost that flow. But we incorporated when we could.”

Leadership Implementation Survey Summary Results

To quantify grantee implementation efforts, researchers developed the Intensified Algebra Implementation Survey, administered via Survey Monkey in Spring 2021 to Cohort 2 and 3 school leaders. Cohort 1 school leaders were not surveyed, as their participation in the grant had ended. The results for Cohort 1 are included below to give a longitudinal view of project implementation. Respondents were asked 21 questions focused on five implementation categories. These categories included: *Planning; Infrastructure, Resources and Materials; Integration and Alignment of Resource; Monitoring Implementation Progress; and Professional Development.* Likert style questions were used to determine the level of implementation fidelity, with a score of “1” demonstrating weak implementation fidelity, and a score of “4” representing strong implementation fidelity. Surveys are administered each spring throughout the duration of the grant.

Cohort 1

Over time, Cohort 1 implementation practices have become more aligned with the desired level of IA implementation, particularly regarding infrastructure and integration of resources and materials. During Year 4, the majority of school leaders that completed the survey indicated that *Planning*, *Monitoring Implementation Progress*, and *Professional Development* continued to be areas of weaker alignment, while the *Infrastructure*, *Resources and Materials*, and *Integration and Alignment of Resources* were considered areas of strength.

Implementation Survey Cohort 1

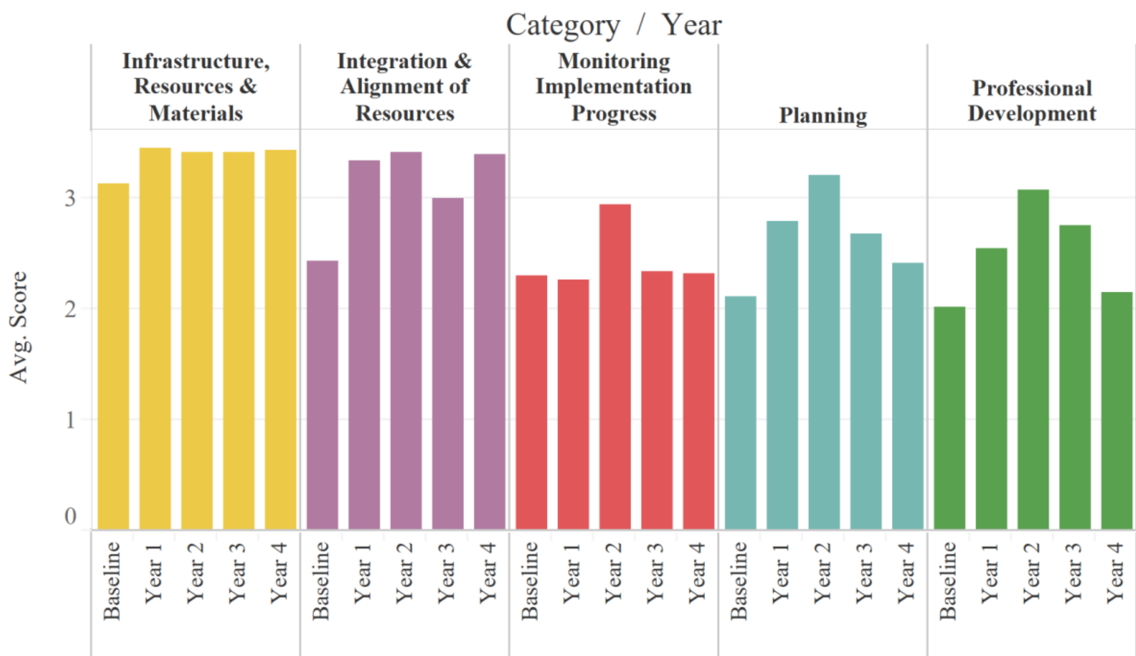


Figure 21.

Cohort 2

During the fourth year of implementation, Cohort 2 leaders reported that 4 of the 5 implementation categories remained consistent or improved throughout their years of participation in the grant. *Planning* and *Professional Development* saw the most growth in positive responses during the Year 4 survey administration. Scores in *Integration & Alignment of Resources* dropped in Year 4 to the level from Year 1.

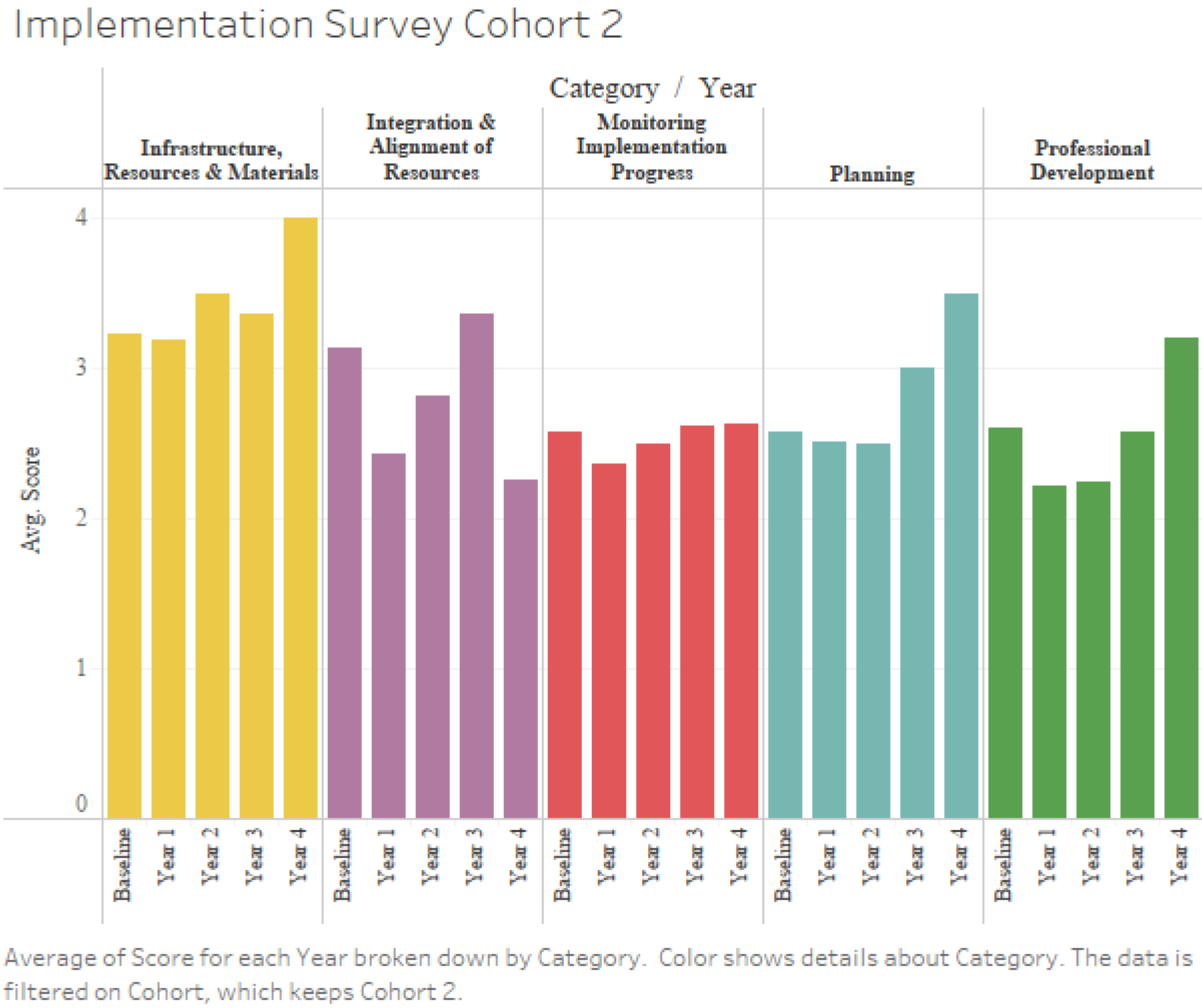
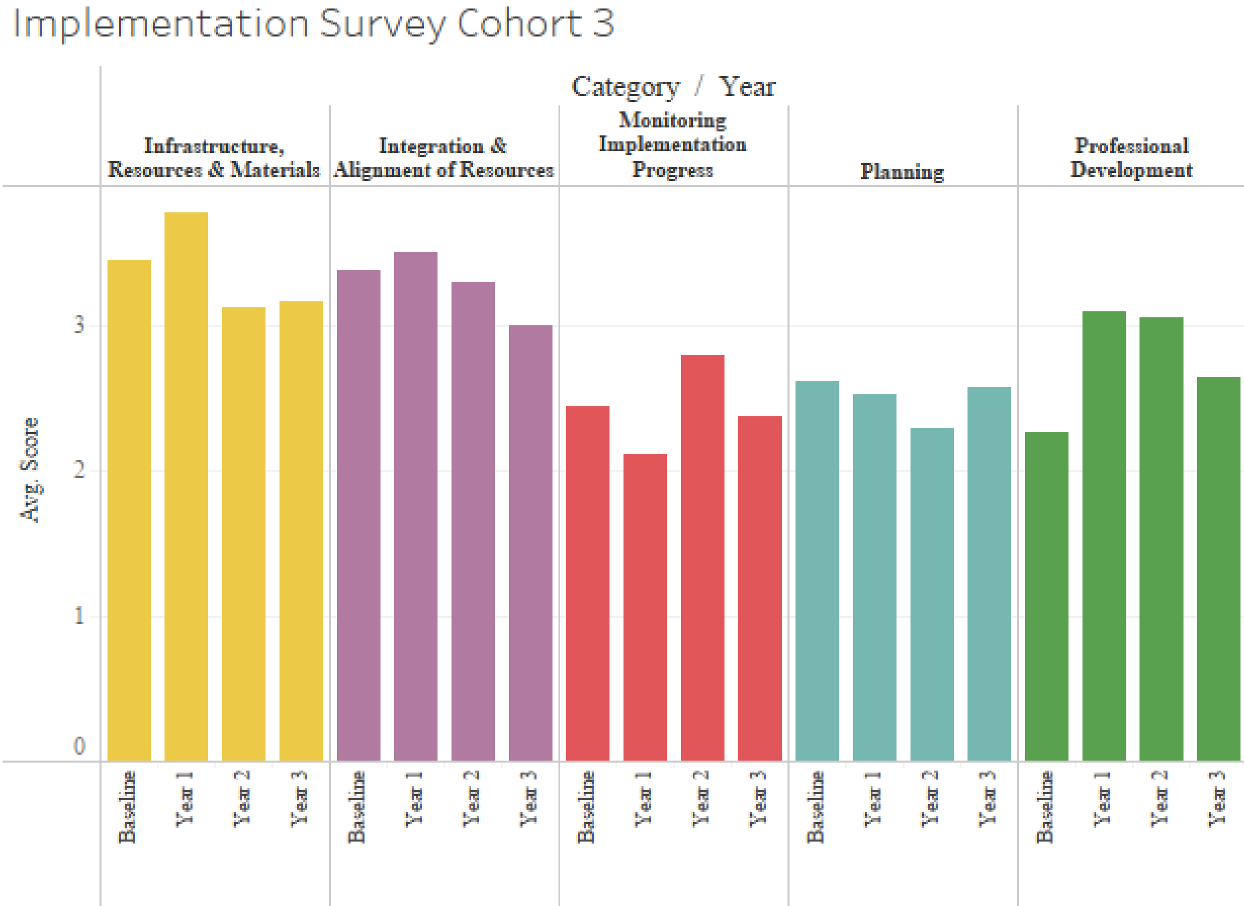


Figure 22

Cohort 3

Implementation scores were less consistent or level with Year 3 across the four of the five categories for Cohort 3 building leaders during the Year 3 survey administration. Scores in *Monitoring Implementation Progress* decreased during the 2020-2021 school year, along with scores in the *Integration & Alignment of Resources* and *Professional Development* were lower than Year 2. Building leaders rated *Infrastructure, Resources & Materials* as a high implementation category but it did not improve in Year 3.



Average of Score for each Year broken down by Category. Color shows details about Category. The data is filtered on Cohort, which keeps Cohort 3.

Figure 23

Appendices

Appendix A. Intensified Algebra Grantee Schools

Table 4. Intensified Algebra Cohort 1 Grantee Schools

District/Consortium	*School*
Bellingham	Bellingham High School
Bellingham	Sehome High School
Bellingham	Squalicum High School
Granite Falls	Crossroads High School
Granite Falls	Granite Falls High School
Manson	Manson High School
Mount Baker	Mount Baker High School
Oroville	Oroville High School
Tonasket	Tonasket Middle School
Granger	Granger High School
Wahluke	Wahluke High School
Walla Walla	Walla Walla High School
Wapato	Wapato High School

Table 5. Intensified Algebra Cohort 2 Grantee Schools

District/Consortium	*School*
Bethel	Graham-Kapowsin High School
Bethel	Bethel High School
Bethel	Spanaway Lake High School
Edmonds	Edmonds-Woodway High School
Edmonds	Lynnwood High School
Mt. Adams	White Swan High School
Sequim	Sequim High School
Yakima	Davis High School
Yakima	Eisenhower High School

Table 6. Intensified Algebra Cohort 3 Grantee Schools

District	*School*
Arlington	Arlington High School
Cashmere	Cashmere High School
Edmonds	Mountlake Terrace H.S.
Edmonds	Meadowdale High School
Ellensburg	Ellensburg High School
Elma	Elma Middle School
Mount Vernon	LaVenture Middle School
Mount Vernon	Mt. Baker Middle School
Mount Vernon	Mt. Vernon High School
Nine Mile Falls	Lakeside High School
Ocean Beach	Ilwaco High School
Orting	Orting High School
Othello	Othello High School
Prosser	Housel Middle School
Prosser	Prosser High School
Rochester	Rochester High School
Stanwood-Camino Is.	Stanwood High School
Sumner	Sumner High School
Sumner	Bonney Lake High School
Woodland	Woodland High School

Appendix B. Intensified Algebra Comparison Schools

Table 7. Agile Mind Cohort 1 Comparison Schools

District/Consortium	*School*
Chimacum School District	Chimacum Elementary School
Entiat School District	Entiat Middle and High School
Everett School District	North Middle School
Everett School District	Sequoia High School
Granger School District	Granger Middle School
Klickitat School District	Klickitat Elem & High
Montesano School District	Montesano Jr-Sr High
Moses Lake School District	Moses Lake High School
Mukilteo School District	ACES High School
North Kitsap School District	North Kitsap High School
North Thurston School District	River Ridge High School
Sequim School District	Sequim Middle School
Toppenish School District	Toppenish High School
Toutle Lake School District	Toutle Lake High School
Tumwater School District	Tumwater High School
Vancouver School District	Jason Lee Middle School
Vancouver School District	Hudson's Bay High School
Warden School District	Warden Middle School
Warden School District	Warden High School

Table 8. Agile Mind Cohort 2 Comparison Schools

District/Consortium	*School*
Bridgeport School District	Bridgeport High School
East Valley School District	East Valley High School
Evergreen School District	Evergreen High School
Kent School District	Kent-Meridian High School
Clover Park School District	Lakes High School
Spokane School District	Lewis & Clark High School
Highline School District	Mount Rainier High School
North Mason School District	North Mason Senior High School
Shoreline School District	Shorewood High School
Chehalis School District	W F West High School

Table 9. Agile Mind Cohort 3 Comparison Schools

District/Consortium	*School*
Spokane Public Schools	Lewis And Clark High School
Bridgeport School District	Bridgeport High School
Highline Public Schools	Evergreen High School
Highline Public Schools	Mount Rainier High School
Shoreline School Districts	Shorewood High School
Kent School District	Kent-Meridian High School
Chehalis School District	W F West High School
North Mason School District	North Mason Senior High School
Clover Park School District	Lakes High School
East Valley School District	East Valley Middle School
East Valley School District	East Valley High School