2023

The Landscape of Advanced Coursework Participation: Understanding Disparities and Intersectionality

Chin-Chih Chen
Virginia Commonwealth University, ccchen@vcu.edu

Chris Parthemos
Virginia Commonwealth University, csparthemos@vcu.edu

David Naff
Virginia Commonwealth University, naffdb@vcu.edu

See next page for additional authors

Recommended Citation

Chen, C.-C., Parthemos, C., Naff D., Ross, E., Palencia, V., Fowler, E. S., Herndon, A, & Fludd-Flanagan, B. (2023). The Landscape of Advanced Coursework Participation: Understanding Disparities and Intersectionality. Richmond, VA: Metropolitan Educational Research Consortium.

VCU
School of Education

THE LANDSCAPE OF ADVANCED COURSEWORK PARTICIPATION: UNDERSTANDING DISPARITIES AND INTERSECTIONALITY

a MERC research report

ABOUT THIS REPORT

This population-based study explored students' participation in advanced coursework in elementary schools (gifted/talented programs), middle schools (Algebra I+)[1], and high schools (Advanced Placement) to address enrollment equity. The study identified demographic disparities and the intersectionality of multiple identities to achieve two research aims: 1) to explore how advanced course-taking varies by student demographics, and 2) to understand how disparities in advanced course-taking vary by student demographics and intersectional identities. The findings indicate that disparities in advanced course-taking are related to students' race, ethnicity, disability status, English learner (EL) status, socioeconomic status, as well as the intersection of these variables. The report includes implications for policies and practices that consider complex school system variables that affect advanced course enrollment. This report is part of the Equitable Access and Support for Advanced Coursework (EASAC) study by the Metropolitan Educational Research Consortium. Interpretations of findings as well as implications and recommendations have been drafted in partnership with PK-12 leaders and educators.

To access an interactive version of the data in this report, including additional details about demographic comparisons for each academic year, please see our MERC data dashboard that accompanies this report.

Publication Date

November 2023

Recommended Citation

Chen, C.-C., Parthemos, C., Naff D., Ross, E., Palencia, V., Fowler, E. S., Herndon, A, & Fludd-Flanagan, B. (2023). *The Landscape of Advanced Coursework Participation: Understanding Disparities and Intersectionality*. Richmond, VA: Metropolitan Educational Research Consortium.

Acknowledgement

We appreciate and acknowledge the support of the Virginia Department of Education (VDOE) and the Virginia Longitudinal Data System (VLDS) throughout this study. Their provision of comprehensive longitudinal data enabled us to conduct in-depth analyses and gain valuable insights into advanced coursetaking. The support was instrumental in drawing meaningful conclusions and making recommendations to improve advanced course policies and practices.

We also extend our appreciation to the EASAC study and research teams for their collaborative efforts. Their continuous feedback, insights, and expertise significantly enriched our understanding of the challenges and opportunities in the field of advanced

[1] Refers to Algebra I and other high school level math courses taken in middle school

coursetaking. The entire EASAC study and research teams, particularly the members of the secondary data team (Jenna L., Pete L., Ciana C.), have played a crucial role in the success of this research.

We also express our gratitude to all individuals and stakeholders in our MERC school divisions involved in this collaborative endeavor. Your contributions, support, and participation have greatly enhanced the quality and impact of this study. We highly value the collective effort invested in promoting equitable and inclusive educational opportunities for all students.

A report by the Metropolitan Educational Research Consortium

Established in 1991, the Metropolitan Educational Research Consortium (MERC) is a research alliance between the School of Education at Virginia Commonwealth University and metropolitan Richmond's school divisions, including Chesterfield, Goochland, Hanover, Henrico, Petersburg, and Richmond Public Schools. Through its Policy and Planning Council, MERC collaborates with division superintendents and other leaders to identify issues affecting students and educators. MERC then conducts research studies to explore these issues and ultimately makes recommendations for policy and practice. Guided by five core principles—Relevance, Impact, Rigor, Multiple Perspectives, and Relationships—MERC strives to conduct high-quality research that informs and improves education in metropolitan Richmond.

CONTENTS

EXECUTIVE SUMMARY

- Black, Latina/o/x, and low-income students tend to be underrepresented in advanced coursework across PK-12 education, including elementary gifted programs, middle school Algebra I, and high school Advanced Placement (AP) classes. This is also true for students with disabilities and multilingual learners.
- To explore this issue in the metropolitan Richmond region, MERC researchers conducted a population-based study using data from the Virginia Longitudinal Data System (VLDS) exploring the landscape of advanced coursetaking in the five years prior to the COVID-19 pandemic.
- This data collection was part of the MERC Equitable Access and Support for Advanced Coursework study, which has also produced other reports, podcast episodes, and seminars that help answer the question "who takes advanced courses?"
- There is a **companion dashboard** to this report where the user can interact with the data and explore how advanced course taking varies in the region based on student demographics.
- Findings indicated that students who were economically disadvantaged (ED) were consistently less likely to participate in elementary gifted programs than their non-ED peers, and that ED Black and Latina/o/x students were the least likely to participate. In fact, non-ED Black and Latina/o/x students participated at similar rates as ED White and Asian students.
- Similarly, ED students were consistently less likely to participate in Algebra I or other high school level math courses while in middle school, although the disparities were less pronounced than in gifted programs. ED Black students tended to have the lowest representation in middle school Algebra I (or higher) of any racial or ethnic group in all five years of the data.
- This trend continued at the high school level, where ED students were consistently less likely to take AP classes than their non-ED peers, and ED Black and Latina/o/x tended to be the least represented of any racial or ethnic group. Non-ED Asian students tended to be more represented in AP classes than ED Black and Latina/o/x students across all five years of the data. Again, these disparities were not as pronounced as in elementary gifted programs.
- Students with disabilities and multilingual learners were the least likely to participate in advanced coursework across PK-12, with disparities being particularly pronounced in elementary gifted programs.
- The report concludes with a series of implications and recommendations for policy and practices, jointly crafted by practitioners in the MERC region. Key recommendations for making advanced coursework programs more equitable include the use of multiple identification criteria and school-based identification committees for elementary gifted programs, developing multiple creative pathways to complete Algebra I by the end of middle school, and actively communicating about the availability of AP coursework and resources while also providing alternative options for earning college credit in high school, like Dual Enrollment.

THE LANDSCAPE OF ADVANCED COURSE TAKING IN METROPOLITAN RICHMOND SCHOOLS

Racial and socioeconomic disparities in advanced coursework participation, preparedness, and performance have been well-documented and are a significant equity issue. This includes gifted and talented programs in elementary school,[2] Algebra I in middle school,[3] and advanced programs such as Advanced Placement (AP), International Baccalaureate (IB),[4] and Dual Enrollment (DE)[5] in high school. As part of the Equitable Access and Support for Advanced Coursework study by the Metropolitan Educational Research Consortium (MERC), this project explores the landscape of advanced course-taking across grades 3-12 in the metropolitan Richmond, Virginia area. Its goal is to increase understanding of enrollment equity by identifying demographic disparities and intersectionality of multiple student identities.

MERC is a longstanding researcher-practitioner partnership (RPP) between the School of Education at Virginia Commonwealth University and six school divisions in metropolitan Richmond, Virginia, representing urban, rural, and suburban contexts. MERC school division leadership commissioned a study in 2019 to explore equitable access and support in advanced coursework in the region. With population-based data integrated in the Virginia Longitudinal Data System (VLDS), a federated network of state agency data systems, researchers at MERC investigated the landscape of advanced coursework from elementary to high school, specifically examining how advanced course taking varies by student demographics (gender, race/ethnicity, socioeconomic status, disability status, and EL status) and the effect of intersectionality of multiple identities. The research aims included: 1): To explore how advanced course taking varies by student demographics, and 2): To understand how disparities in advanced course taking vary based on student demographics and intersectional identities. In the following section we review research that captures disparities in advanced courses, including gifted and talented programs in elementary school, Algebra I in middle school, and AP classes in high school.

Elementary School Gifted and Talented Programs

Gifted and talented programs offer enrichment opportunities in Science, Technology, Engineering, and Math (STEM), problem-solving, and critical thinking.[6] Through such programs, students gain access to increased rigor and opportunities that they may not have in a traditional classroom.[7] This exposure and participation can positively impact

[2] Ford (2006)
[3] Nomi et al. (2021)
[4] Theokas & Saaris (2013)
[5] Allen & Dadgar (2012)
[6] Callahan et al. (2017)
[7] Ford (2010)

academic achievement.[8] However, evidence of the long-term academic benefits of gifted and talented programs are mixed.[9] One clear benefit of gifted participation for elementary students is that it sets them on a pathway that affords access to more rigorous coursework at the middle and high school levels. For example, students identified as gifted in elementary school are more likely to enroll in AP classes in high school.[10] Consequently, identification and participation in gifted services are important both short-term (for academic enrichment and opportunity) and long-term (for greater participation in future advanced coursework and postsecondary enrollment).

Examining gaps in practice reveals that inequity between groups persists in elementary gifted identification and participation, resulting in barred opportunity and a loss of potential. There is a racial and ethnic gap in identification, enrollment, and access to gifted and talented programs and advanced courses.[11] At the elementary level, Black and Latina/o/x students are less likely to be identified as gifted, even when comparing students of similar socioeconomic status and high achievement on standardized tests.[12] Nationally, Asian and White students are overrepresented in almost every single state, and Black and Latina/o/x students are conversely underrepresented.[13] This pattern also holds true in Virginia for elementary school identification and referrals.[14] In addition to race/ethnicity, there is also a gifted identification gap for students of low socioeconomic status, as well as receiving services, with individual- and school-level free or reduced-price lunch qualification being negatively predictive of a student's chances of being identified as gifted, even after controlling for achievement scores.[15] Grissom and colleagues (2019) found that students in the highest quintile of SES were six times more likely to receive gifted services than students in the lowest quintile.[16]

Gender is another factor in gifted and talented programs, both in identification and teacher referral, and may result from biases and educator expectations.[17] Differences in gender and gifted identification are evident at the elementary level and for students who are identified with standardized tests.[18] When utilizing teacher referral, gender can significantly influence a teacher's decision to refer for gifted services.[19] Furthermore, language ability may obscure a student's inherent giftedness or academic potential. Often, the focus of EL education is the acquisition of English, thus identification of giftedness may be overlooked, especially if tests used for identification are in English.[20] Fernández and Abe (2018) argued

---

[8] Callahan et al. (2015)
[9] Long et al. (2012)
[10] Crabtree et al. (2019)
[11] Naff et al. (2020)
[12] Grissom et al. (2019); Naff et al. (2020)
[13] Naff et al. (2020)
[14] The most recent data available: https://www.doe.virginia.gov/data-policy-funding/data-reports; Naff et al. (2020)
[15] Hamilton et al. (2018); Peters et al. (2019)
[16] Grissom et al. (2019)
[17] Bianco, et al. (2011)
[18] Petersen, J. (2013)
[19] Bianco, et al. (2011)
[20] Gubbins et al. (2018); Mun et al. (2020)

cultural influence further complicates the validity of the testing and identification process for ELs.[21] A narrow definition of giftedness is another potential reason for underrepresentation both in ELs, as well as those with disabilities.[22] Disability status impacts a student's chances of being identified for gifted education; students with identified disabilities are often the least likely demographic to be identified as gifted,[23] and there is a potential for overlooking students who are "twice exceptional" due to masking of ability.[24] Identifying students within this category is a compounding challenge as it often relies on standardized assessments of intelligence or achievement.[25] Giftedness may be masked by disabilities such as processing speed, which often result in lower test scores.[26]

While scholars in gifted education contend that equity gaps exist for systematically excluded groups by race/ethnicity, gender, EL status, socioeconomic status, and disabilities, the intersectionality between these groups is less understood and researched.[27] Further compounding this issue is that many of the categories measured by the federal and state government may be overly broad, treating dynamic individuals and subgroups as a monolith. The research that currently exists regarding intersectionality is mostly qualitative and theoretical in nature.[28] As a result, research analyzing the intersectionality between the aforementioned groups remains underexplored, especially regarding gifted education and access.[29]

Middle School Algebra I

While advanced coursework in elementary school often centers on participation in gifted and talented programs, one of the key indicators in middle school is the completion of Algebra I. Taking Algebra I in middle school tends to be a prerequisite and/or gateway to rigorous math and science classes in high school, such as AP.[30] Research suggests that students who take Algebra I by the 8th grade are more likely to take mathematics courses throughout high school and attend college at a greater rate than their peers who do not.[31] McEachin and colleagues (2020) found that enrollment in 8th grade Algebra I boosted student enrollment in advanced mathematics courses in the 9th and 11th grade by 30 and 16 percentage points respectively. Data from the National Assessment of Education Progress (NAEP) also demonstrates that in 2019,[32] students who took Algebra I in middle school tended to have scores on their 12th grade NAEP math assessment that were approximately 25.3% higher than their peers who took Algebra I in high school. These findings suggest

[21] Gubbins et al. (2018)
[22] Gubbins et al. (2018)
[23] Peters et al. (2019)
[24] Baum et al. (2017); Peters et al. (2019)
[25] Ruban & Reis (2005)
[26] Ruban & Reis (2005)
[27] Hodges et al. (2022)
[28] Becares & Priest (2015)
[29] See the 2020 MERC literature review on gifted and talented programs for more information.
[30] Naff et al. (2021)
[31] Spielhagen (2006)
[32] The most recently available as of this report

that there are clear academic benefits to students taking Algebra I prior to their completion of middle school.

There are also well-documented disparities in who takes Algebra I in middle school based on students' race/ethnicity, socioeconomic status, gender, disability status, and EL status. According to the data from the National Center for Education Statistics (NCES) and Virginia Department of Education (VDOE) in the 2020-21 academic year, Black 8th grade students accounted for about 66% of their expected representation in Algebra I in the US and 80% of their expected representation in Virginia, and Latina/o/x students accounted for about 83% and 87% of their expected representation, respectively. Meanwhile, White and Asian students were both overrepresented in the course compared to their share of the 8th grade population. McEachin and colleagues (2020) also found that Black and Latina/o/x students and female students tended to disproportionately benefit from early Algebra enrollment, suggesting the potential to address persistent academic achievement and opportunity disparities through middle school Algebra I. These disparities are somewhat attributable to disparate access to Algebra I in racially segregated middle schools, where Black and Latina/o/x students are more likely to attend than their White and Asian peers.[33] Research also suggests that these disparities result from early tracking in elementary school, whereby Black and Latina/o/x students are less likely to be identified as gifted[34] and more likely to be placed in less rigorous math pathways, leading to insufficient preparation for enrollment in future rigorous math courses.[35]

The findings on gender disparities in middle school Algebra I are mixed.[36] Data from the NCES and VDOE indicate that both male and female students tend to be roughly proportionate in their 8th grade Algebra I representation. This runs somewhat counter to the literature indicating that female students tend to be underrepresented in math courses compared to their male counterparts due to reasons like stereotype threat,[37] as well as lower interest and higher anxiety in math courses.[38] The above data may be emblematic of efforts like algebra for all programs or recent increases in female student representation in STEM-related coursework and careers.[39]

Data from the US Office of Civil Rights (OCR) for Virginia also show that students with disabilities and ELs tend to be underrepresented in middle school Algebra I. Students with disabilities participate in Algebra I in the 8th grade at approximately one fifth of their expected rate of representation, while ELs participate at less than half of their expected rate. While these disparities may be partially attributable to academic preparedness for students with disabilities or language barriers for ELs, research also suggests that they may

[33] Morton & Riegle-Crumb (2019)
[34] Naff et al. (2020)
[35] Ford (2006), Olszewski-Kubilius & Corwith (2018)
[36] Male and female were the only gender categories provided by NCES and VDOE
[37] Makarova et al. (2019)
[38] Ganley & Lubienski (2016); Huang et al. (2019)
[39] Charlesworth & Banaji (2019)

be related to early academic tracking, whereby students are overlooked for more advanced coursework opportunities due to their perceived limitations.[40]

Students from lower socioeconomic (SES) backgrounds are also less likely to take and succeed in middle school Algebra I than their higher SES peers.[41] This may be attributable, in part, to the higher likelihood of low-SES students attending high-poverty schools where there are fewer resources available for academic support, as well as lower likelihood of offering Algebra I as a course option.[42] These students are also more likely to be tracked into less rigorous math pathways in elementary school, limiting their likelihood of enrolling in Algebra I by the 8th grade.[43]

The question of whether all students should be expected to take Algebra I before high school (also known as “algebra for all” programs) has been debated for decades.[44] Proponents of algebra for all initiatives base their advocacy on evidence that students who complete Algebra I before the 8th grade are more likely to have access to rigorous math and science courses in high school as well as stronger academic achievement and postsecondary opportunities.[45] Opponents argue that not all students are sufficiently prepared to be successful in Algebra I by the 8th grade, and that requiring them to do so potentially sets them up for failure with corresponding consequences for their self-efficacy in mathematics.[46] Evidence of the effectiveness of algebra for all programs in middle school is mixed, with some research showing that the practice led to detracking and more equitable preparation for mathematics in elementary school,[47] and other research showing evidence that the practice was actually related to lower academic achievement in the 10th grade for students who would have otherwise not been enrolled in middle school Algebra I.[48] Research also shows that effective implementation of algebra for all initiatives requires an investment in supplemental academic support to ensure students are prepared to be successful in the course.[49] Regardless of policies granting universal access to Algebra I, research is clear that there are benefits to completing the course before high school when students are academically prepared to do so.

High School Advanced Placement (AP)

AP classes are the most prominent college preparatory curriculum in the US designed to help students transition successfully from high school to college by exposing them to college-level coursework.[50] The curriculum is developed by the College Board, which states that the program's purpose is to "develop college-level knowledge and skills.” AP

[40] Montgomery (2006)
[41] Torbey et al. (2020)
[42] Balfanz et al. (2006)
[43] Grissom et al. (2019)
[44] Spielhagen (2006)
[45] Spielhagen (2006)
[46] Dougherty et al. (2015)
[47] Domina et al. (2015); Dougherty et al. (2015)
[48] Domina et al. (2015)
[49] Nomi & Raudenbush (2016)
[50] https://ap.collegeboard.org/

coursework promotes postsecondary achievement, college persistence, college completion, and potential financial benefits from saving money on tuition for college credits already completed in high school.[51] Given the potential benefits of AP, disparate access and participation can have lingering impacts.

Access to AP coursework has historically been distributed inequitably between historically marginalized students and their peers,[52] with persistent gaps identified based on race/ethnicity,[53] gender,[54] and socioeconomic status (SES).[55] This manifests in two ways: lack of course offerings within schools or districts, and disproportionality in AP enrollment.[56] Lack of AP access is especially detrimental as such courses can gate keep future educational opportunities.[57] Nationally, Black and Latina/o/x students are less likely than their White peers to attend high schools where advanced courses are offered, and schools that offer those courses enroll Black and Latina/o/x students at lower rates than their White and Asian peers.[58] Urbanicity is an oft-cited factor in access, as rural students are less likely than suburban or urban students to have access to a full complement of AP courses across subject areas.[59] Disparity in access to AP coursework is one factor in enrollment inequity but may not fully explain it.

Research has established disparities in AP enrollment for Black and Latina/o/x students regardless of school urbanicity and AP availability.[60] Kettler & Hurst's (2017) analysis found that gaps persisted between Black and Latina/o/x AP enrollment and White AP enrollment over a ten-year period (2001-2011). Socioeconomic status is also a factor in AP enrollment disproportionality. Black and Latina/o/x students from low-income families are often less likely to enroll in higher-level coursework.[61] Some research has indicated that the intersectional identities of race/ethnicity and SES may have an additional impact on enrollment and access.[62] Despite being the fastest-growing group of public-school students at the national level,[63] ELs also experience lower access. While less is known about AP access among students with disabilities,[64] this group is less likely to enroll in college[65] and typically takes longer to complete a degree than their peers,[66] which may be indicative of lower preparedness for college, which AP coursework could help facilitate.

---

[51] Scafidi et al. (2015)
[52] Naff et al. (2021)
[53] Barnard-Brak et al. (2011)
[54] Clark et al. (2012)
[55] Scafidi et al. (2015)
[56] Naff et al. (2021)
[57] Naff et al. (2021)
[58] Naff et al. (2021); Theokas & Saaris (2013)
[59] Gagnon & Mattingly (2016)
[60] Cha (2015); Garland & Rapaport (2018); Kettler & Hurst (2017)
[61] Cha (2015); Crabtree et al. (2019); Shores et al. (2020)
[62] Cha (2015); Crabtree et al. (2019); Shores et al. (2020)
[63] Parsi (2016)
[64] Freeman-Green et al. (2018)
[65] Lindsay et al. (2018)
[66] Knight et al. (2018)

The persistent nature of these enrollment disparities has driven additional research to understand factors that may shape enrollment. Disparities in enrollment access seem to persist regardless of school factors such as urbanicity and the availability of AP coursework.[67] In other words, even at schools where AP courses are more plentiful, certain students (e.g., Black, Latina/o/x, low SES, ELs, disabilities) still participate at lower levels.[68]

Research Purpose and Questions

Underrepresentation of students in advanced coursework across K-12, whether due to race/ethnicity, disabilities, SES, or ELs status, coupled with a lack of access, means that certain groups of students face barriers that have lasting implications not only for themselves, but for the economy as a whole. Considering how advanced coursework participation occurs in a pipeline from elementary through high school and into postsecondary education, it is important to explore data at every available level and identify opportunities for offering support. In response to this, the current study utilized VLDS data to better understand the landscape of participation in elementary gifted and talented programs, middle school Algebra I programs, and high school AP programs in the MERC region. It explored the following research questions:

1. What are the demographic characteristics of students who participate in advanced coursework in the MERC region?

2. How does race/ethnicity intersect with economic status in relation to students' participation in advanced coursework in the MERC region?

RESEARCH DESIGN, DATA, ANALYSIS

This project featured a cross-sectional, population-based study that investigated demographic disparities and intersectionality of race/ethnicity with socioeconomic status in students' participation in advanced coursework. We obtained de-identified data from VLDS for all 3rd-12th grade students in the MERC region (comprising six school divisions) from the 2014-15 to 2018-19 school years. The data range was determined based on the availability at the time the request was made and the rationale for understanding trends prior to the COVID-19 pandemic. The data includes student demographics, such as gender, race/ethnicity, EL) status, economically disadvantaged (ED) status (defined as eligible for Free/Reduced priced Meals, receiving TANF, eligible for Medicaid, or identified as either Migrant or experiencing Homelessness), disability status, and student enrollment in gifted and talented programs in elementary school, Algebra course-taking in middle school, and AP enrollment in high school. The VLDS is a data repository maintained by the Virginia Department of Education, providing public school student records in the Commonwealth of Virginia to support research and insights for enhancing the well-being of citizens in the Commonwealth. The database enabled researchers to leverage resources and expertise,

[67] Cha (2015); Garland & Rappaport (2018); Kettler & Hurst (2017)
[68] See the 2021 MERC literature review on AP programs for more information.

maximizing the potential benefits of the research for stakeholders, including students and educators in Virginia.

Basic descriptive analyses were conducted to examine students' participation in advanced coursework. First, we presented sample characteristics to provide an overview of the average gender, race/ethnicity, disability status, EL status, and ED status of elementary, middle, and high school students from 2014-15 to 2018-19 (see Figures 1, 9, and 17). Second, we analyzed the overall average enrollment in elementary gifted/talented programs, middle school Algebra I+,[69] and high school AP courses for each school year to identify trends over five years (see Figures 2, 10, and 18). Third, we used basic descriptive statistics (percentages) to describe the demographics of students who participated in gifted and talented programs in elementary school, took Algebra I+ in middle school, and enrolled in AP courses in high school from 2014-15 to 2018-19. Lastly, we conducted cross-tabulations for each school year to investigate how race/ethnicity, and economic status intersected with students' participation in advanced coursework.

FINDINGS

This section depicts analyses of VLDS data from the 2014-15 through the 2018-19 academic year for the MERC region. It includes demographic and intersectional comparisons based on student participation in gifted and talented programs in elementary school, Algebra I and other high school level math classes[70] in middle school (Algebra I+), and AP classes in high school. Interpretations of data analyzed in this section were provided by not only researchers from VCU, but also MERC educators and school division leaders on the study team. To access an interactive version of this data, including additional details about demographic comparisons for each academic year, please see our MERC data dashboard that accompanies this report.

Elementary School Gifted/Talented Program

Demographic Disparities on Gifted/Talented Program

The number of 3rd-5th grade students in the MERC region based on VLDS data ranged from 37,179 in 2014-15 to 37,398 in 2018-19. Figure 1 shows the average distribution of student demographics during that timespan. The numbers shown in each bar graph represent the average percentage of each response within a demographic category for the whole region. The VLDS dataset uses the term “Hispanic” as an ethnic category describing Latina/o/x students. The category of "Other" in this dataset could represent Indigenous students or other unlisted racial categories.

[69] Refers to Algebra I and other high school level math courses taken in middle school
[70] We term this “Algebra I+” in our analyses

Figure 1. Demographics of Elementary (3rd-5th) Students in the MERC Region, 2014-15-2018-19

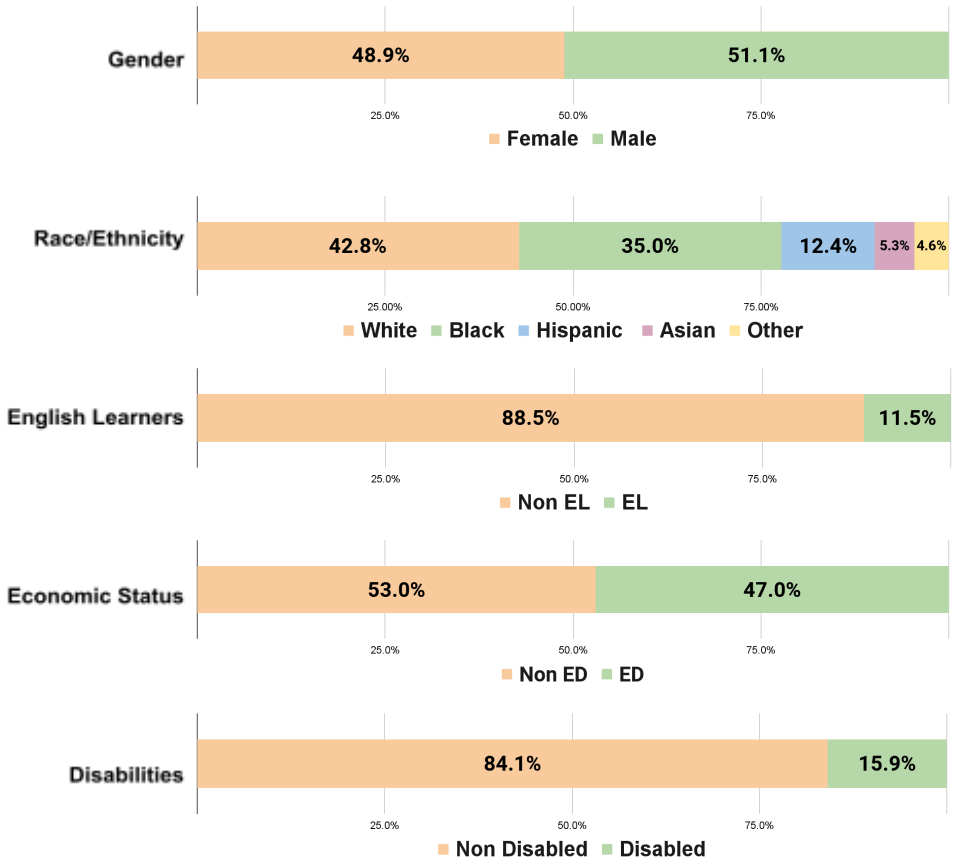
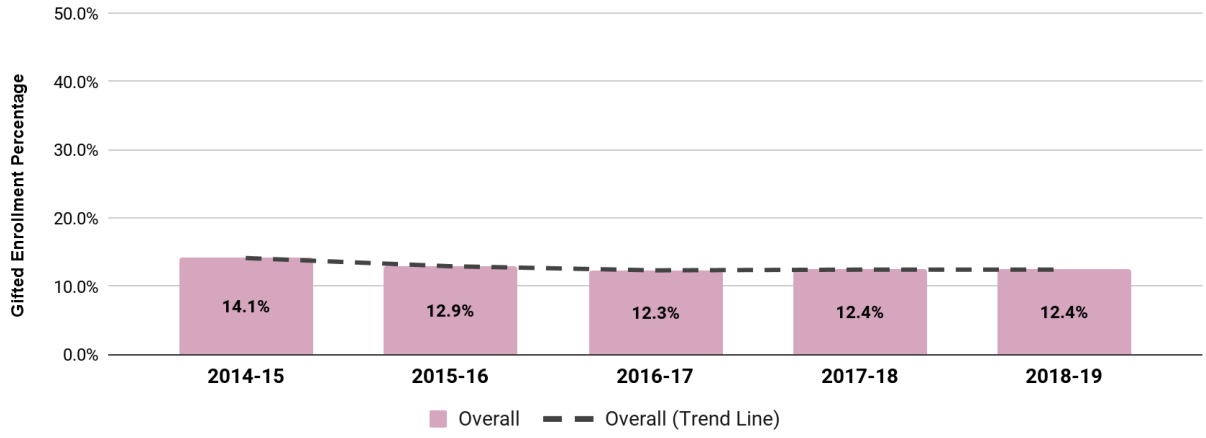


Figure 2 shows overall enrollment in gifted education for students in 3rd-5th grade within the MERC region. During this time period, overall enrollment gradually declined from 14.1% in 2014-2015 to 12.4% in 2018-2019 - an overall decrease of 1.5%. It experienced a drop in 2014, followed by a more or less sustained enrollment trend.

Figure 2. Overall Enrollment in Gifted Programs



The following charts display the results of a descriptive analysis of gifted education enrollment among elementary school students within the MERC region during the school years from 2014-2015 to 2018-2019. Each chart compares the percentage of students within a given demographic category who are enrolled in gifted education.

Figure 3 shows student participation in elementary gifted education in the MERC region by gender. Overall, both male and female students slightly decreased their enrollment percentages over time, which was in line with overall enrollment. Though the gender breakdown looks equivalent, the enrollment rates of male students are slightly lower than those of female students from 2015-16 to 2017-18, falling. A relatively higher percentage of male students were enrolled in gifted education than female students in 2014-15 and 2018-19 (range = 1-2%).

Figure 3. Gifted Enrollment by Gender

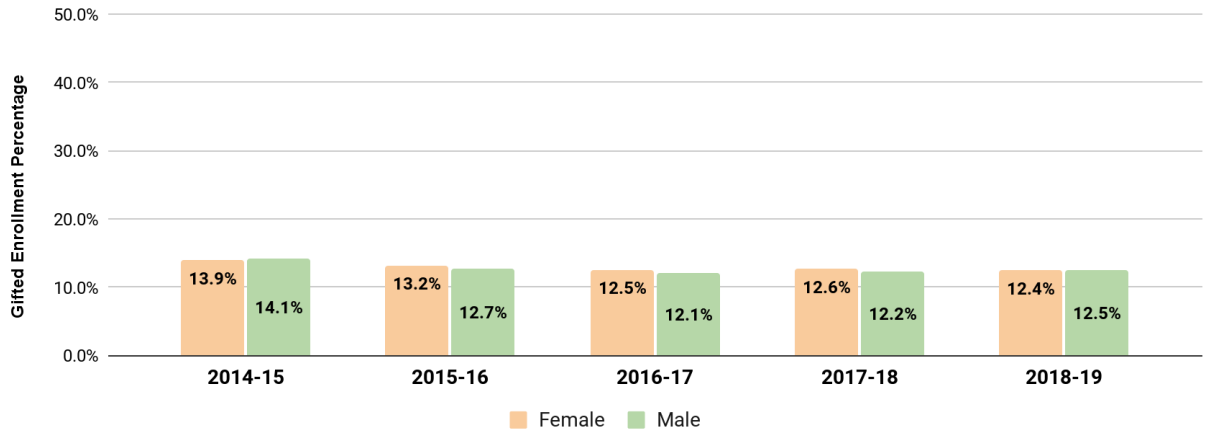


Figure 4 shows student participation in elementary gifted education in the MERC region by race and ethnicity. Overall, the order of race and ethnicity representation remains persistent over time, even though the numbers may fluctuate slightly. Enrollment rates of White, Asian, and "Other" students were consistently greater than those of Black and Latina/o/x students across all school years.

Figure 4. Gifted Enrollment by Race/Ethnicity

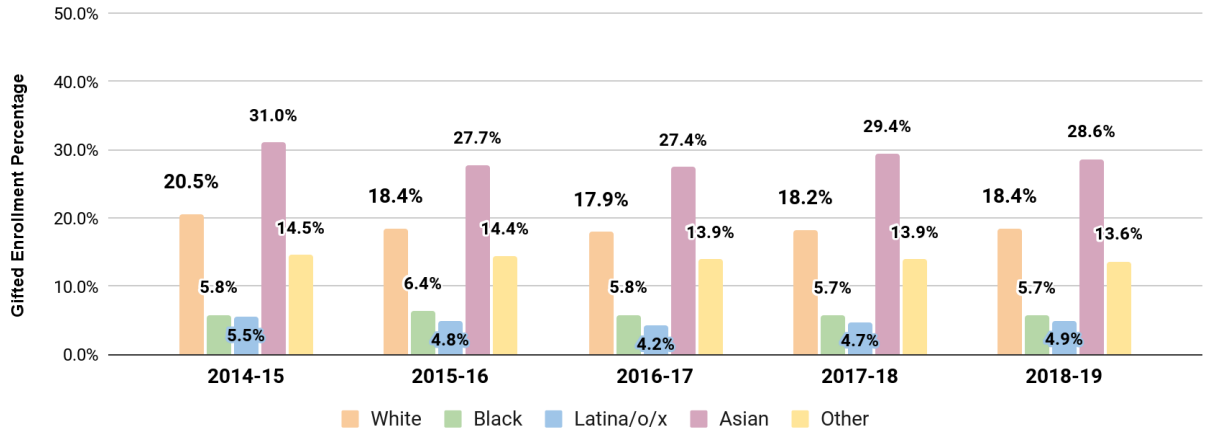


Figure 5 shows student participation in elementary gifted education in the MERC region by EL status. Overall, the enrollment rates for both EL and non-EL students experienced a drop in 2014-15 and 2015-16, followed by a sustained trend over time. Non-EL students consistently had higher enrollment rates (range = 13.3-15%) than EL students (range = 3.2-4.6%) across all school years. EL students were consistently underrepresented in gifted programs, with an enrollment rate approximately one-third that of non-EL students.

Figure 5. Gifted Enrollment by EL Status

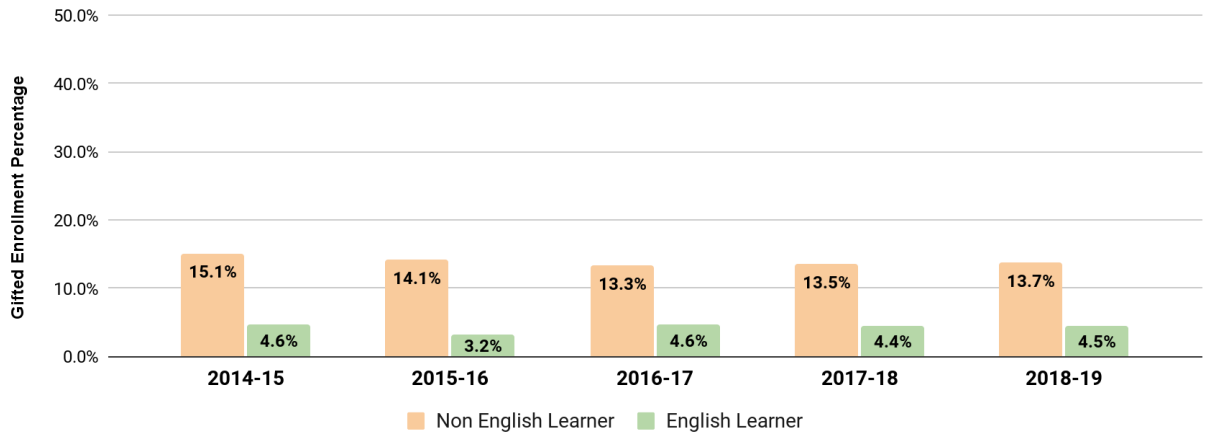


Figure 6 shows student participation in the elementary gifted education in the MERC region by ED status. Overall, the enrollment rates for both ED and non-ED were relatively stable over time. The enrollment rates of non-ED students (range = 19.1-21.2%) were consistently greater than ED students (range = 4.5-5.4%) across school years. ED students were consistently underrepresented in gifted programs, with an enrollment rate approximately one-fourth that of non-ED students.

Figure 6. Gifted Enrollment by Economic Disadvantage

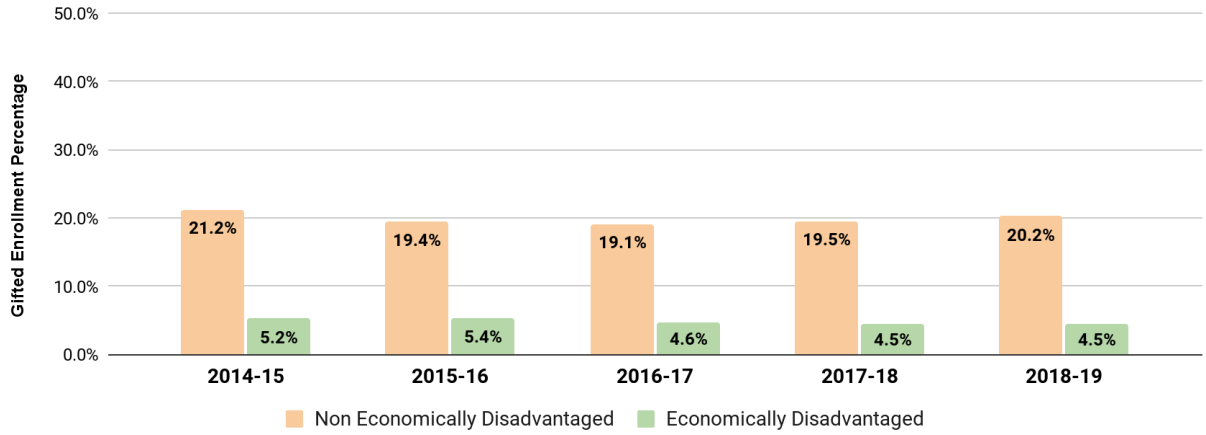
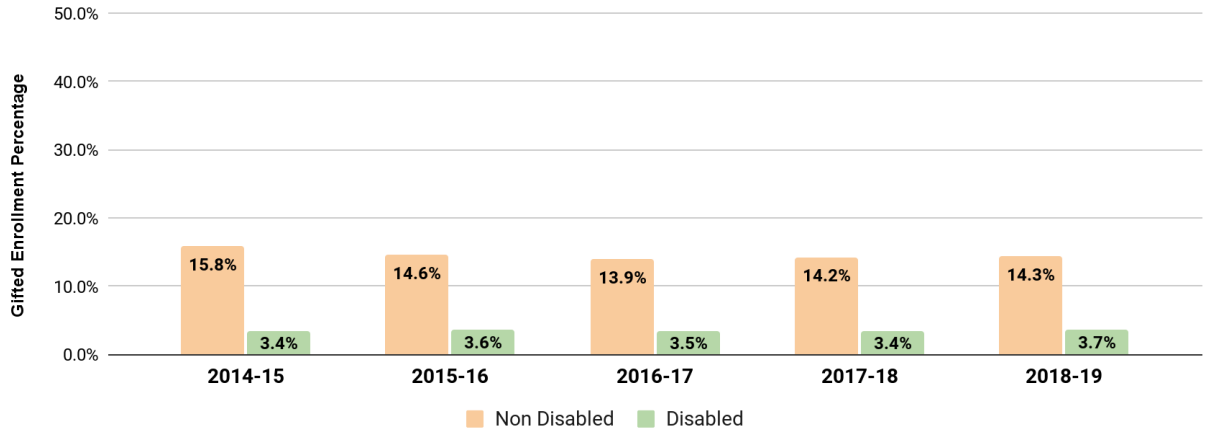


Figure 7 shows student participation in elementary gifted education in the MERC region by disability status.

Figure 7. Gifted Enrollment by Disability Status



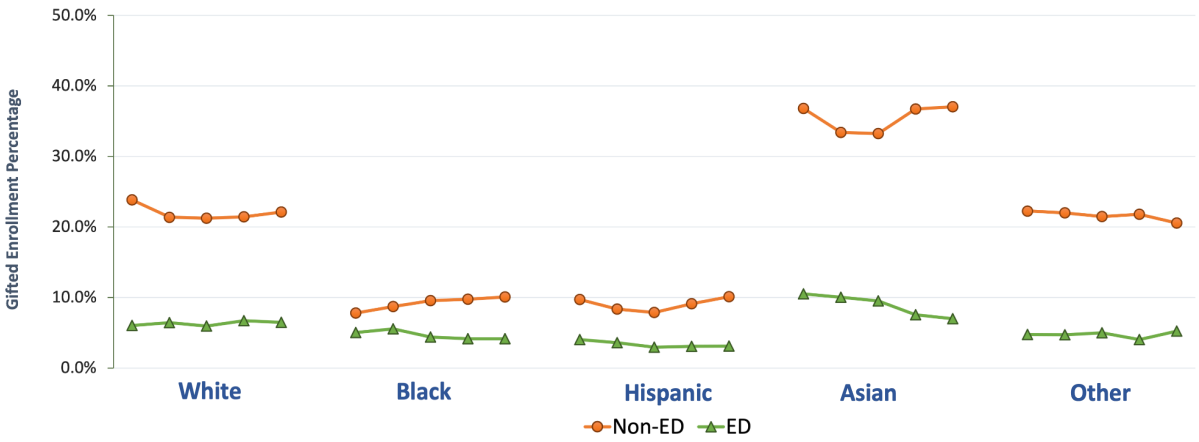
Overall, enrollment rates for both groups were relatively stable over time. The enrollment rates of students without disabilities (range = 13.9-15.8%) were consistently greater than

students with disabilities (range = 3.4-3.7%) across school years. Students with disabilities were consistently underrepresented in gifted programs, with an enrollment rate approximately one-third that of non-disabled students.

Intersection of Race/Ethnicity, and Economic Disadvantage

Figure 8 displays the breakdown of student enrollment in gifted education by race and ethnicity and economic disadvantage status. We specifically emphasized the intersection of these two critical social determinants in this report.

Figure 8. Gifted Enrollment by Race/ethnicity and Economic Disadvantage



Overall, within each racial and ethnic group, students who were economically disadvantaged consistently enrolled in gifted education at a lower rate than those who were not economically disadvantaged. Among non-ED students, the Asian, White, and "Other" groups enrolled in gifted education at a relatively higher rate than the Black and Latina/o/x groups. Notably, the enrollment rates for non-ED Black and non-ED Latina/o/x students were lower than the overall enrollment rates of gifted education for 3rd-5th elementary students in the MERC region over time. Among ED students, the Asian, White, and "Other" groups enrolled in gifted education at a slightly higher rate than the Black and Latina/o/x groups. Furthermore, the disparity between ED and non-ED students is least noticeable among Black and Latina/o/x students, while it is most significant among White and Asian students. This suggests that Black and Latina/o/x students of higher socioeconomic status may receive fewer advantages in terms of gifted enrollment than their White and Asian peers.

Middle School (MS) Algebra I+

Demographic Disparities on Algebra I+

The number of 6th-8th grade students in the MERC region based on VLDS data ranged from 36,251 in 2014-15 to 37,710 in 2018-19. Figure 9 depicts the average distribution of

student demographics during that timespan. The numbers shown in each bar graph represent an average of the percentage of each response within a demographic category within the whole.

Figure 9. Demographics of Middle School Students in the MERC Region, 2014-15-2018-19

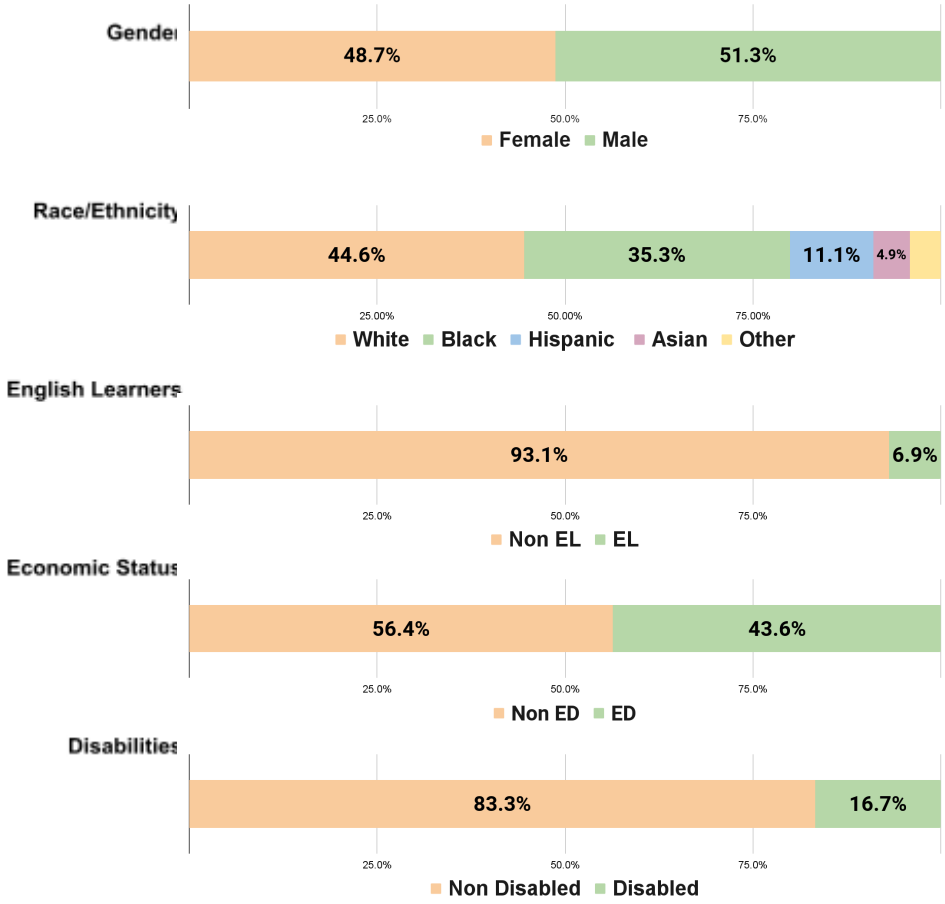
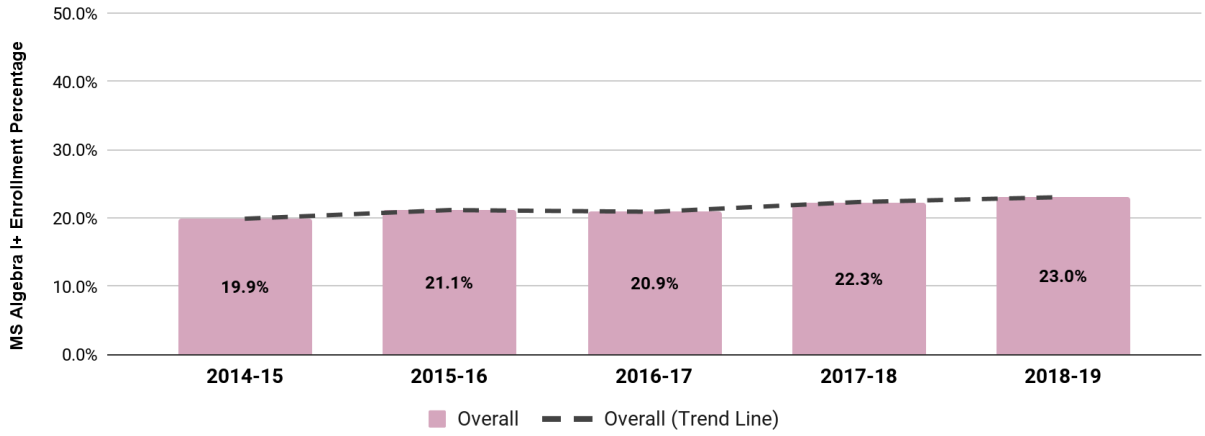


Figure 10 depicts overall participation in MS Algebra I+ from 2014-15 - 2018-19.[71] Enrollment rose from 19.9% in the first year to 23% in the final year - an overall increase of just over 3%. The increase occurred gradually and steadily, with little to no variability in the trend.

[71] Note that some MERC divisions implement an "algebra for all" policy that likely produced higher overall average Algebra I+ participation in middle school for the region.

Figure 10. Overall Enrollment in MS Algebra I+



The following charts display the results of a descriptive analysis of Algebra enrollment among middle school students in the MERC Region during the school years from 2014-15 to 2018-19. Each chart compares the percentage of students enrolled in Algebra coursework within a given demographic category.

Figure 11 shows student participation in MS Algebra I+ in the MERC region by gender. Overall, the enrollment rates of male students are consistently lower than those of female students within each school year and across school years. Over the course of this time period, both female and male students increased their enrollment percentages, except for a slight decrease in 2016-17, after which enrollment continued to increase again.

Figure 11. MS Algebra I+ by Gender

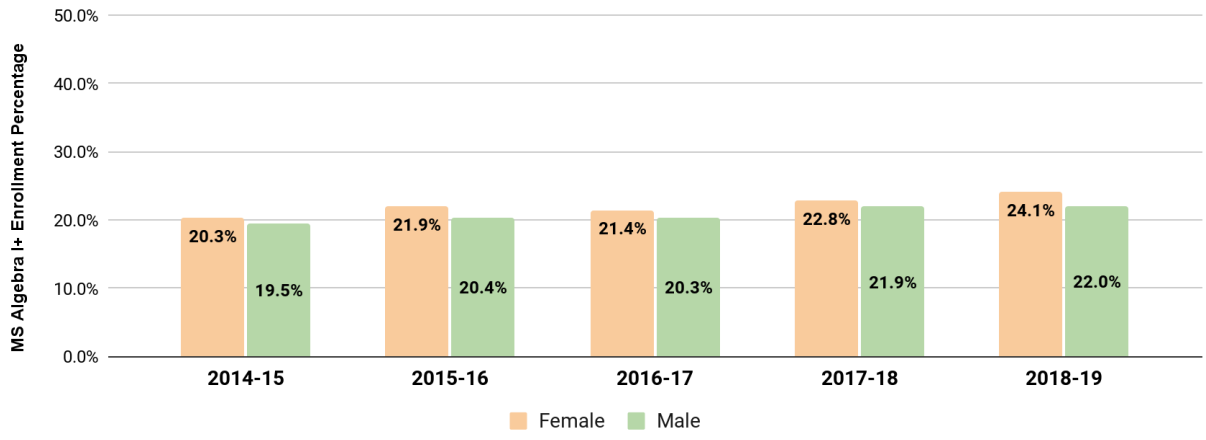


Figure 12 shows student participation in MS Algebra I+ in the MERC region by race/ethnicity. Overall, the order of race/ethnicity representation remained consistent

over time, with an increasing participation trend observed for all groups. The enrollment rates of White and Asian students are consistently higher than those of Black, Latina/o/x, and students from other races within each school year and across school years. White, Asian, and "Other" students consistently exceed the overall MS Algebra I+ enrollment rates across school years, except in 2015-16, where "Other" students were below the overall MS Algebra I+ enrollment. Black and Latina/o/x students are consistently below the overall MS Algebra I+ enrollment across school years.

Figure 12. MS Algebra I+ Enrollment by Race/Ethnicity

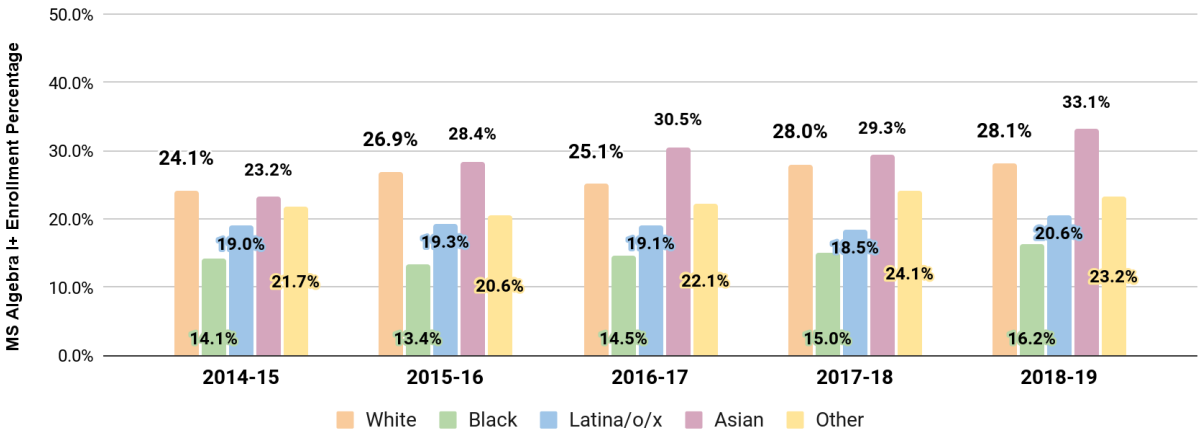
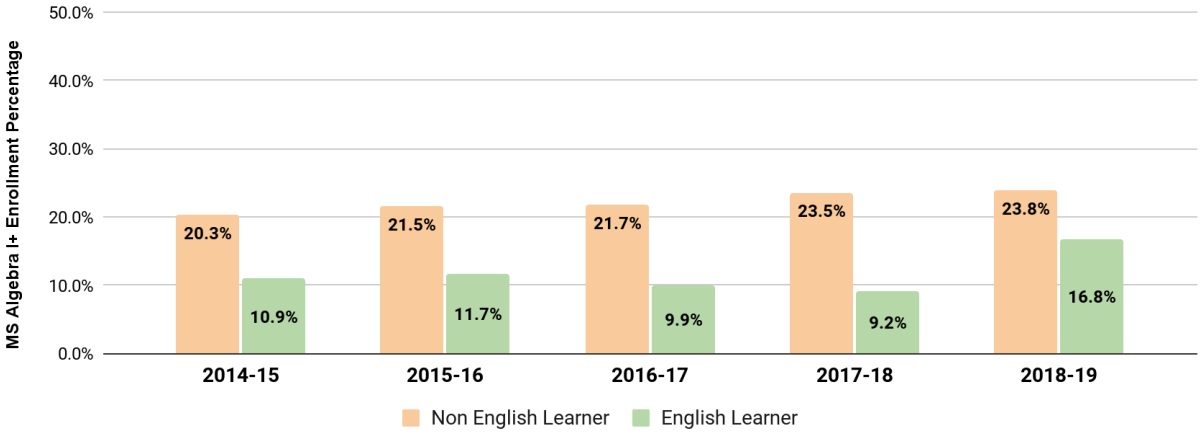


Figure 13 shows student participation in MS Algebra I+ in the MERC region by EL status.

Figure 13. MS Algebra I+ Enrollment by EL Status



Overall, the enrollment rates of non-EL students were consistently greater than EL students within and across school years. ELs experienced decreased enrollment between 2015-16 and 2017-18. However, there was a clear increase of 7.6% for ELs in 2018-19.

Figure 14 shows student participation in MS Algebra in the MERC region by ED status. Overall, there is an increasing trend over time for both the ED and Non-ED groups. The enrollment rates of Non-ED students consistently exceed those of ED students within each school year and across multiple school years, with a difference of approximately 10 percentage points. In 2016-17, there was a decrease in enrollment for non-ED students, but in 2017-18 it continued to increase. ED students increased at a slow and consistent rate between 2014-15 and 2017-18, but in 2018-19 they increased by 3%.

Figure 14. Middle School Algebra I+ Enrollment by Economic Disadvantage

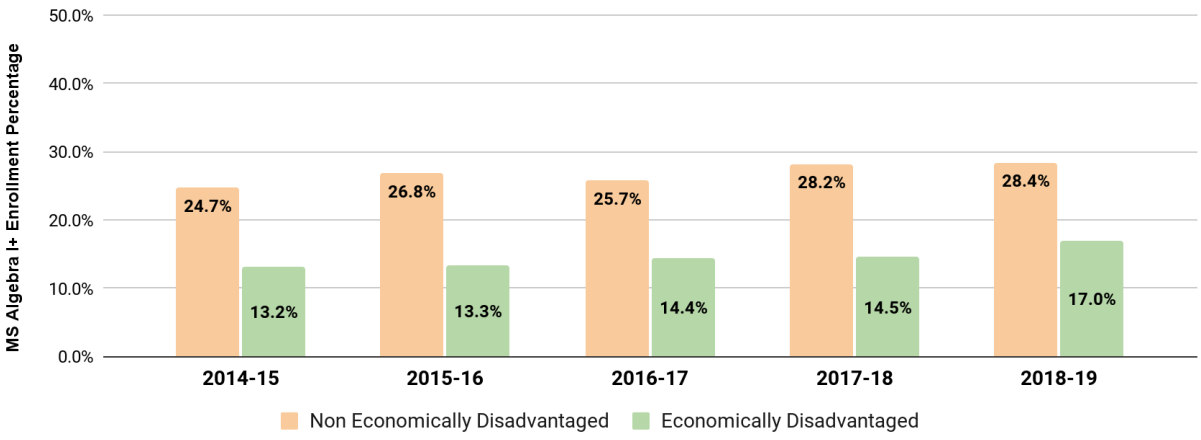
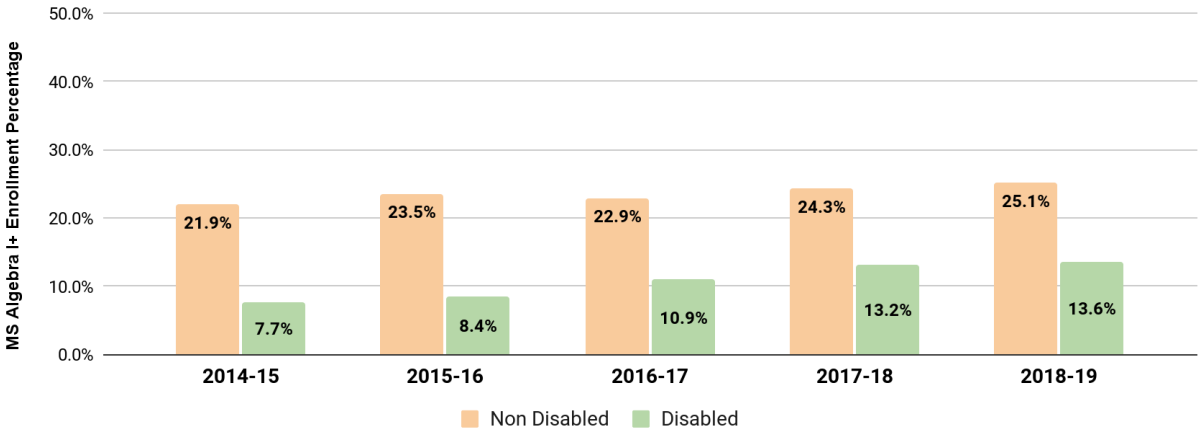


Figure 15 shows student participation in MS Algebra I+ in the MERC region by disability status. Overall, there is an increasing trend over time for both groups. In 2016-17, non-identified students had a decrease in enrollment. However, in 2017-18, their enrollment continued to increase. The enrollment rates of students without disabilities are consistently greater than those of students with disabilities within each school year and across school years, with a difference of approximately 10 to 15 percentage points.

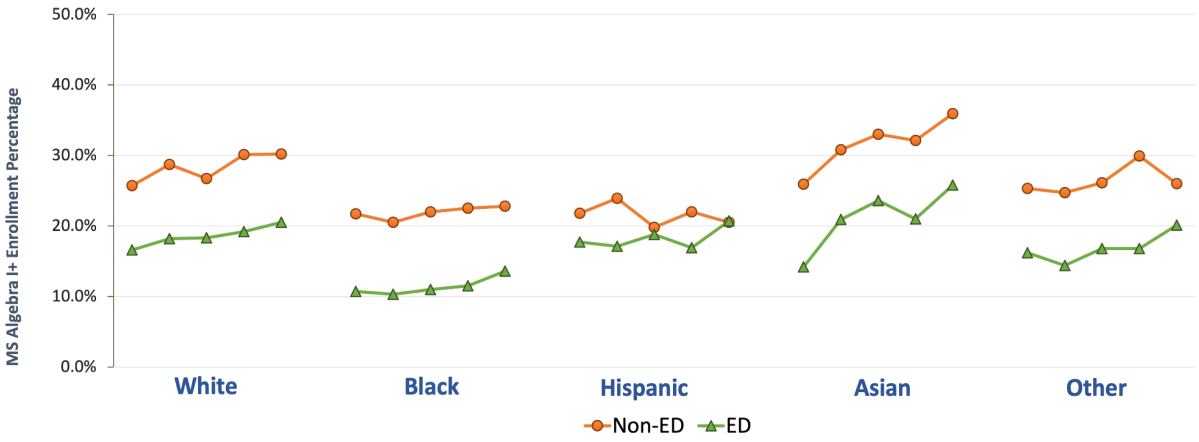
Figure 15. MS Algebra I+ Enrollment by Disability Status



Intersection of Race/Ethnicity and Economic Disadvantage

Figure 16 breaks down the enrollment of MS Algebra I+ classes by race/ethnicity and economic status.

Figure 16. MS Algebra I+ Enrollment by Race/Ethnicity and Economic Status



Overall, within each racial and /ethnic group, students who were economically disadvantaged enrolled in MS Algebra I+ at a lower rate than those who were not economically disadvantaged consistently over time. Among non-ED students, Asian, White, and "Other" groups enrolled in MS Algebra I+ at a relatively greater rate than Black and Latina/o/x groups. Notably, the enrollment rates for non-ED Black and non-ED Latina/o/x students were lower than the overall enrollment rates of MS Algebra I+ in the MERC region over time. Among ED students, the Asian, White, and "Other" groups enrolled in MS Algebra I+ at a higher rate than the Black and Latina/o/x groups. Furthermore, the disparity between ED and non-ED students is least noticeable among Black and Latina/o/x students,

while it is most significant among White and Asian students. This suggests that Black and Latina/o/x students of higher socioeconomic status may receive fewer advantages in terms of MS Algebra I+ enrollment than their White and Asian peers.

High School Advanced Placement (AP)

Demographic Disparities on AP

The number of 9th-12th grade students in the MERC region based on VLDS data ranged from 48,755 in 2015-16 to 49,707 in 2018-19. Figure 17 depicts the demographic makeup of high school students within the MERC Region during that timespan.

Figure 17. Demographics of High School Students in the MERC Region, 2014-15-2018-19

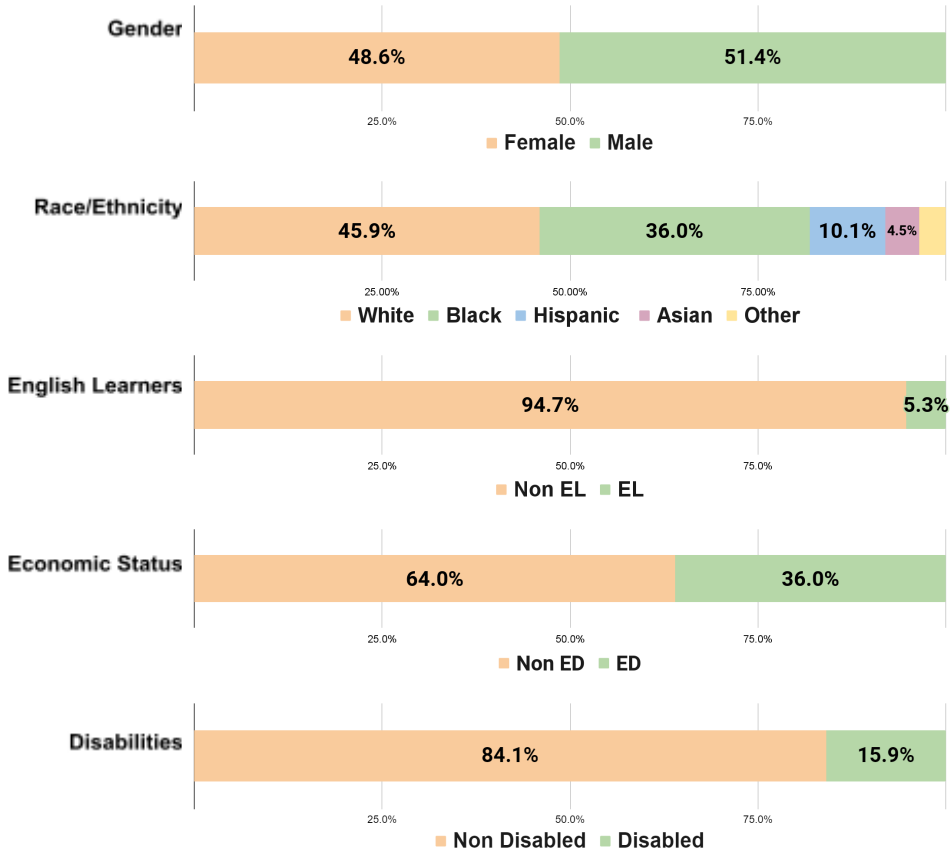
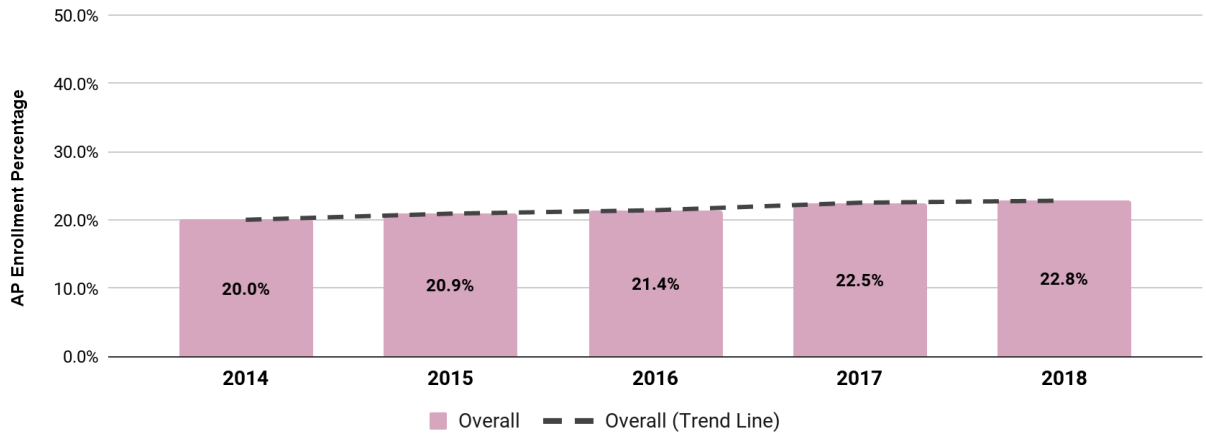


Figure 18 shows the overall level of enrollment in AP coursework of high school students within the MERC region during the school years from 2014-2015 to 2018-2019. During this time period, overall enrollment gradually increased in the region, from 20% of the high school population enrolled in at least one AP course in 2014-2015 to 22.8% in 2018-2019 - an overall increase just short of 3%. The increase took place gradually and steadily, with little to no variability in its upward trend.

Figure 18. Overall Enrollment in AP



The following charts show the results of a descriptive analysis of AP enrollment among high school students within the MERC region during the school years from 2014-2015 to 2018-2019. Each chart will compare the percentage of students within a given demographic category enrolled in AP coursework.

Figure 19 compares AP enrollment percentages among high school students based on their gender. Over the course of this time period, both female and male students increased their enrollment percentages at a comparable, steady pace. Both groups increased at a rate consistent with overall enrollment, which saw a steady, incremental increase of about 3%. Throughout the time period, a higher percentage of female students were enrolled in AP courses than male students. The gap between genders remained fairly consistent, falling within a 6-7% difference in each academic year.

Figure 19. AP Enrollment by Gender

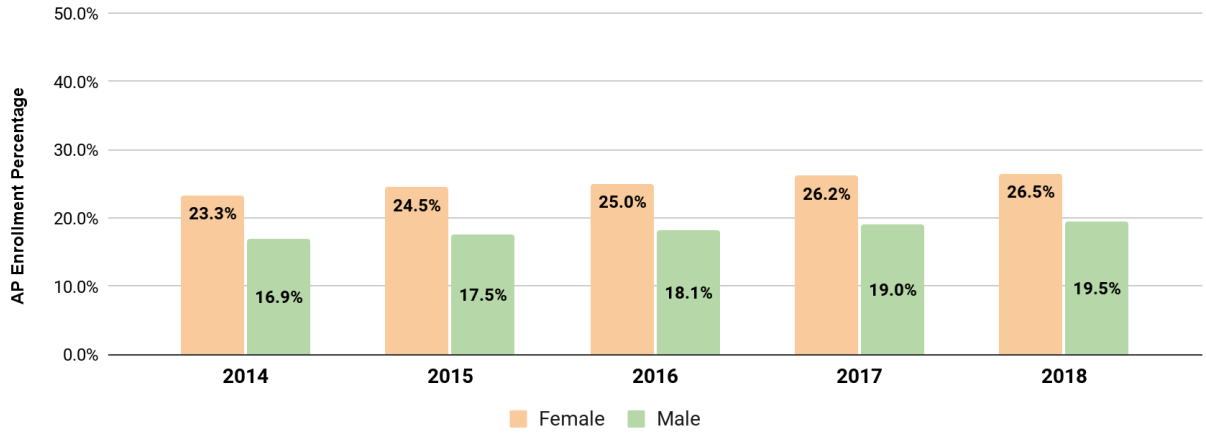


Figure 20 compares AP enrollment percentages among high school students based on race/ethnicity. Over this time period, Asian, White, Black, and “Other” students saw an overall increase in AP enrollment. Asian, white, and "Other" students had a somewhat faster rate of increase than the overall enrollment, with a steady rise of about 4-5% over time. Black students' enrollment increased at a slower rate, with a steady rise of about 1.5%. In contrast, Latina/o/x students did not experience an increase in enrollment overall and had a slightly lower enrollment rate in 2018-19 than in 2014-15. Asian students had the highest overall level of enrollment, around 5-6 percentage points higher than white students, who had the second-highest rate. White students' enrollment was about 6-7% higher than that of "Other" students throughout the period. Black and Latina/o/x students had comparable levels of enrollment, which were the lowest among the racial or ethnic categories. These students had enrollment rates about 25% lower than Asian students and about 20% lower than White students.

Figure 20. AP Enrollment by Race/Ethnicity

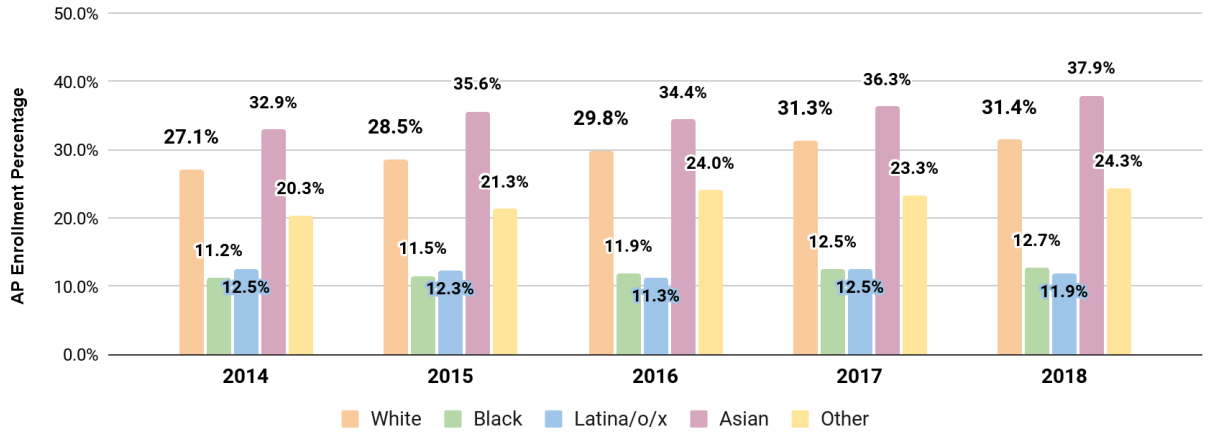


Figure 21 compares AP enrollment percentages among high school students on the basis of EL status. Over the course of this time period, both EL and non-EL students increased their enrollment percentages. Non-EL students increased at a rate in line with overall enrollment, a steady, incremental increase of about 4%. EL students’ enrollment increased notably less, with less than a 1 percentage point increase. Throughout the time period, a higher percentage of non-EL students were enrolled than EL students. The gap between the groups increased over time, from about 17% in 2014-15 to almost 21% in 2018-19.

Figure 21. AP Enrollment by EL Status

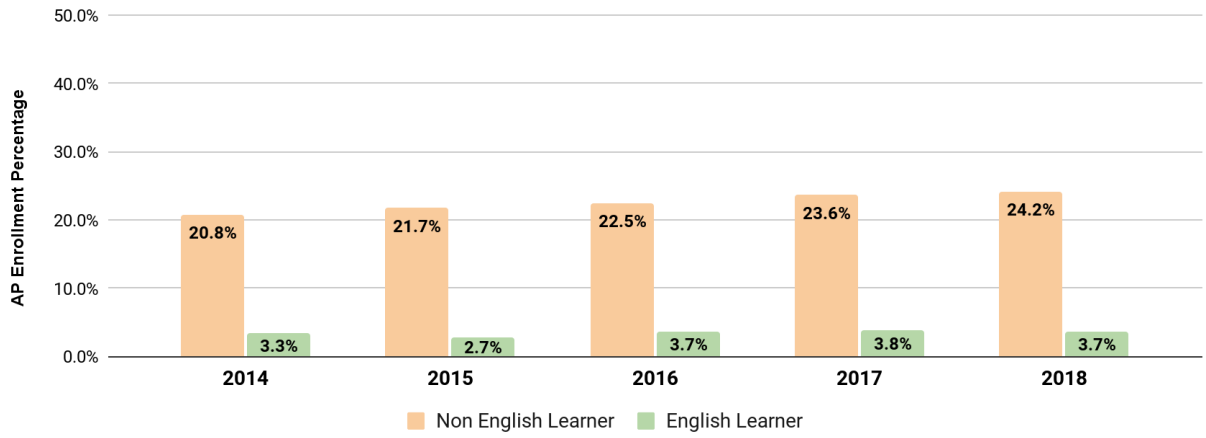


Figure 22 compares AP enrollment percentages among high school students on the basis of ED status. Over this time period, both ED and non-ED students increased their enrollment. non-ED students increased at a considerably faster rate than overall enrollment, with a steady, incremental increase of about 6%. ED students' enrollment increased notably less, with about a 2 percentage point increase. Throughout the time period, a higher percentage of non-ED students were enrolled than ED students. The gap between the groups increased over time, from about 17% in 2014-15 to almost 21% in 2018-19.

Figure 22. AP Enrollment by Economic Disadvantage

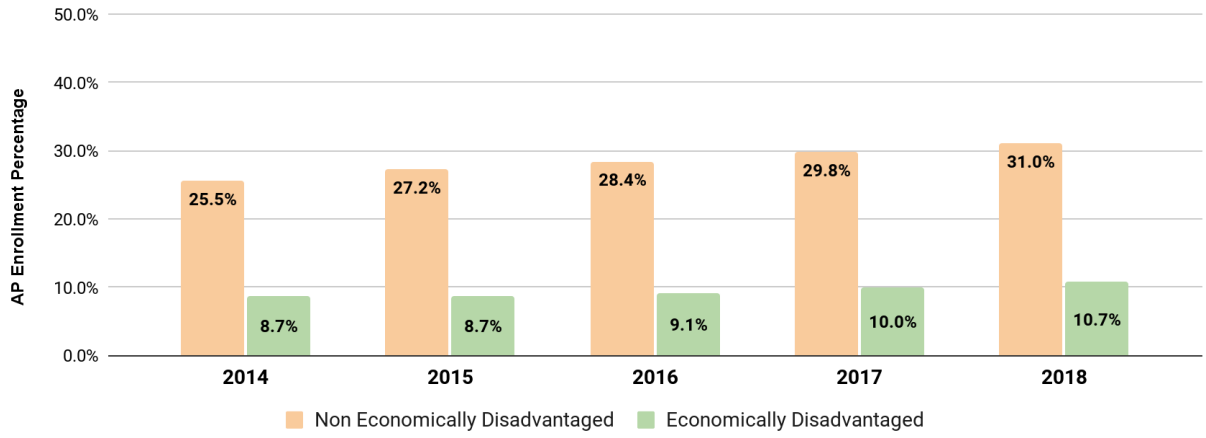
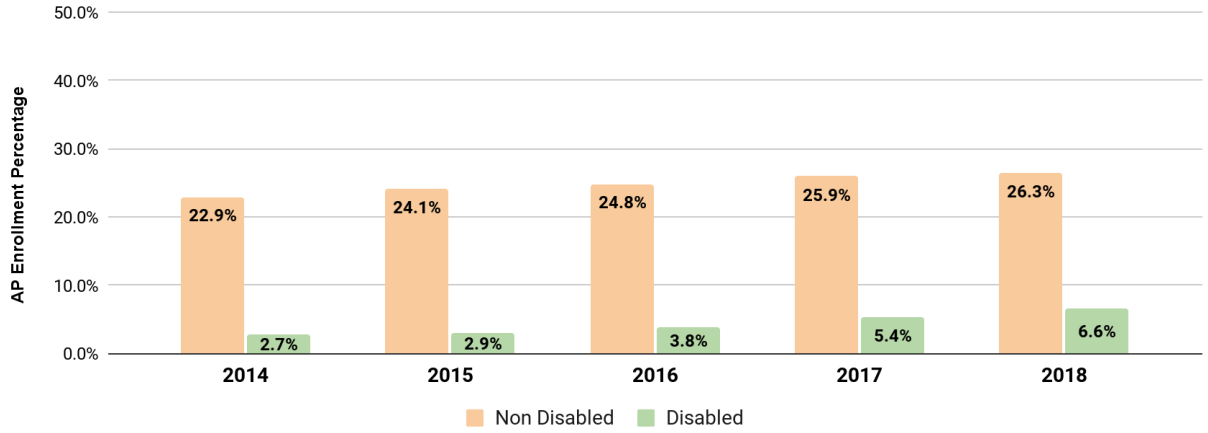


Figure 23 compares AP enrollment percentages among high school students on the basis of disability status. Over this time period, both identified and non-identified students increased their enrollment percentages. Both groups increased at a rate consistent with each other and with overall enrollment, a steady, incremental increase of about 3-4%.

Throughout the time period, a higher percentage of non-identified students were enrolled than identified students. This gap remained fairly consistent over time, between 20-21%.

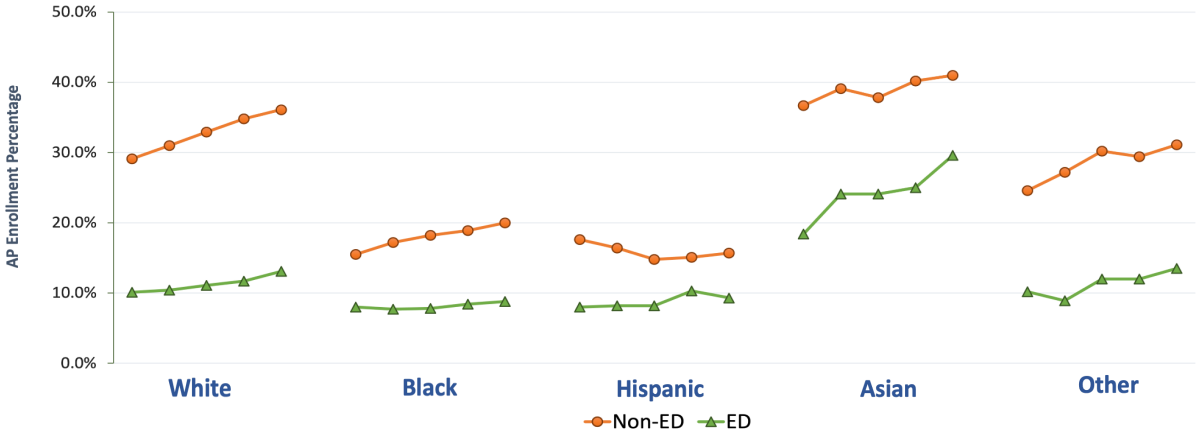
Figure 23. AP Enrollment by Disability Status



Intersection of Race/Ethnicity and Economic Disadvantage

Figure 24 displays the breakdown of student AP enrollment by race/ethnicity and economic disadvantage status.

Figure 24. AP Enrollment by Race/Ethnicity and Economic Status



Overall, within each racial/ethnic group, students who were economically disadvantaged consistently enrolled in AP at a lower rate than those who were not economically disadvantaged. Among non-ED students, the Asian, White, and "Other" groups enrolled in AP at a relatively higher rate than the Black and Latina/o/x groups. Notably, the enrollment rates for non-ED Black and non-ED Latina/o/x students were lower than the overall AP

enrollment rates in the MERC region over time. Among ED students, the Asian, White, and "Other" groups enrolled in AP at a higher rate than the Black and Latina/o/x groups. Furthermore, the disparity between ED and non-ED students is least noticeable among Black and Latina/o/x students, while it is most significant among White, Asian, and "Other" students. This suggests that Black and Latina/o/x students of higher income status may receive fewer advantages in terms of AP enrollment than their White and Asian peers.

DISCUSSION AND IMPLICATIONS

Analysis of VLDS data for the MERC region for the 2014-15 through 2018-19 academic years revealed demographic trends in advanced course taking that are largely consistent with existing research. Consistent patterns of demographic disparities in advanced course taking were identified across elementary, middle, and high school. These research findings are in line with prior literature on student participation in advanced course taking, which has consistently demonstrated disparities for Black, Latina/o/x, students with disabilities, and ED students.[72] These disparities have significant implications for students' academic trajectories, as the underrepresentation of marginalized students in advanced coursework can lead to reduced educational opportunities, lower levels of postsecondary education and graduation, and lower college persistence rates.[73]

One unique contribution of this study is its capacity to understand how race, ethnicity, and SES intersect to impact advanced course taking at the student level. Discrepancies in advanced course taking among students with different racial and ethnic backgrounds were compounded by ED status. Race, ethnicity, and SES were each found to relate to advanced course taking, and the intersection of these identities can collectively affect the likelihood of participation in advanced course taking. The findings suggest that Black and Latina/o/x students experienced the least benefit from not being economically disadvantaged in terms of advanced course enrollment, indicating that race and ethnicity may play a more persistent predictive role for this group, which is also consistent with existing literature.[74] The findings provided granular insights at the student level, which can inform future policy and research seeking to ameliorate demographic disparities in GT, Algebra I, and AP enrollment, rather than solely looking at aggregate enrollment patterns at the school level.

Implications for Policy and Practice

The aforementioned evidence regarding the landscape of advanced coursework participation in the MERC region provides an opportunity for data-driven recommendations for policy and practice to address these disparities. The following implications have been developed with the input of MERC school division leaders who strive to support students equitably in advanced coursework opportunities. These

[72] e.g. McEachin et al. (2020); Morton & Riegle-Crumb (2019); Senechal (2014)
[73] Kettler & Hurst (2017); Naff et al. (2021)
[74] Grissom et al. (2019)

implications are also informed by other school division representatives serving on the MERC study team, based on their reactions to the findings.

Elementary Gifted/Talented Program Access and Support

Policy implications: The National Association of Gifted Children (NAGC) recognizes that there are various procedures used to identify gifted students, emphasizing that no single determining factor should be relied upon in this process. The Virginia Department of Education also supports this view, outlining multiple criteria that can be considered when assessing a student's potential giftedness. While traditional gifted identification procedures focused primarily on intelligence, modern approaches often incorporate other factors such as aptitudes, creativity, and related traits. **This expansion of criteria helps move away from a narrow definition based solely on a strict cutoff determined by a single standardized measure of intelligence.** By incorporating areas like visual/performing arts, music, and technology, the range of gifted programs can expand, encompassing diverse ways in which students may exhibit giftedness.

It is recommended that **gifted identification committees be formed at the school level**, if possible, to increase the likelihood that educators making decisions about potential acceleration are personally familiar with the students. Moreover, these committees should intentionally include representation from diverse racial and ethnic backgrounds. Research indicates that students from underrepresented groups are more likely to be identified as gifted when assessed by educators who share similar backgrounds.[75] By ensuring diverse representation in the identification process, the likelihood of recognizing and supporting gifted students from underrepresented groups can be enhanced.

In order to promote equity in gifted education, it is crucial to **implement universal screening procedures** to counteract cultural biases and potential socioeconomic disparities in gifted identification. Families with higher financial means often have more access to resources like tutoring and private testing, which can impact the identification process. Universal testing ensures that all students have an equal opportunity to be referred to gifted programs. While universal testing is being implemented for some grades, there are still many students in other grades who are overlooked if teacher referrals remain the sole method of consideration. This highlights the need for a more comprehensive approach to gifted identification that involves multiple criteria and provides all students with the opportunity to take placement tests. Furthermore, research suggests that **using local norms, rather than national norms, can be beneficial in identifying more students for gifted programs**. By comparing students' performance against their peers within a school or district, rather than against national standards that may be culturally or socioeconomically biased, gifted programs can be expanded and better represent the school's context.

It is important to **consider a shift from a model of gifted "identification" to one of "talent development" to foster greater inclusivity in gifted programs.** This approach provides opportunities for students to accelerate their learning in different domains where they

[75] Grissom et al. (2019)

demonstrate potential for growth. By moving towards a talent development model, more students can benefit from advanced educational opportunities. These policy shifts can help improve the existing parameters of gifted education and promote a more inclusive and equitable environment for all students.

Practice implications: One of the challenges associated with implementing changes in gifted education policy is ensuring that educators who will be responsible for implementing them are on board with the new practices. This requires **acknowledging and addressing the role that biases can play in under-identifying students from underrepresented backgrounds** and committing to identification practices that are designed to mitigate these concerns. An additional challenge is teacher retention, especially in high-poverty contexts where robust gifted education programs are less likely to be available. In these situations, there may be a higher proportion of new teachers compared to higher socioeconomic (often suburban) environments. Therefore, it is important to **provide annual training on gifted identification practices,** clearly articulating the purpose of making them more equitable. This training should also be extended to administrators who may be responsible for leading subsequent training efforts in their schools. Considering that new teachers may be overwhelmed with competing demands and limited time for professional development, any training requirements should take this into account.

To effectively implement a gifted program that addresses the underrepresentation of marginalized student groups, it is necessary to **allocate sufficient resources in annual budgets to support the work. This includes staffing teams for gifted identification and program implementation**, especially in schools and districts where they are expanding or working to address underrepresentation issues. Investing in these programs and teams at the elementary school level can yield more equitable representation in advanced programs at the secondary level. Furthermore, having educators on gifted education teams embedded in schools can facilitate ongoing professional development and enable them to lead training for their colleagues in best practices for establishing equitable programs.

Parent communication and outreach are crucial components of establishing a more equitable gifted education program. Educators often encounter difficulties in contacting parents or guardians, with phone numbers frequently changing and email addresses being inaccurate, particularly among families from low-income backgrounds. This exacerbates enrollment disparities for students in these contexts. To address this issue, **family outreach about gifted education opportunities should collaborate with other school and district efforts aimed at ensuring accurate parent contact information**. This can involve partnering with registrars, school social workers, school counselors, and administrators. Parents play a crucial role in the gifted identification process, including providing potential referrals and appeals when necessary. Therefore, schools must make every effort to ensure they have the necessary information to make informed decisions about their children's participation in accelerated programs, including delivering this information in a language comprehensible to the families. **Establishing robust Parent Teacher Organizations (PTOs) in schools with less developed gifted programs, particularly in high-poverty environments, can further enhance access for students**. When approaching parental outreach efforts, it is important to consider research suggesting that parents from Black,

Latina/o/x, and low-income backgrounds may not always perceive a trusting relationship with their child's school. Therefore, it is necessary to simultaneously prioritize relationship building while working on improving access and communication. It is essential to understand that familial barriers may not reflect a lack of interest from parents, but rather a need to determine the most effective methods for strengthening the connection between parents and the school.

Middle School Algebra I+ Access and Support

Policy implications: Educational divisions are encouraged to **develop multiple creative math pathways that provide opportunities for students to access Algebra I before the end of middle school**. Instead of relying on a single decision point that may occur as early as third grade, it is important to offer various pathways to prevent a culture of elitism where Algebra I in middle school is accessible to only a select few. The goal should be to embrace a trend where Algebra I is available to most, if not all, middle school students, but also to ensure that they are sufficiently prepared to be successful in the course.

When designing these pathways, factors such as student mastery of preceding coursework and abstract reasoning skills should be considered as prerequisites for Algebra I instruction. **Strategies like course sequencing, compacting, 4x4 scheduling, and summer sessions can be employed to create these multiple onramps at different grade levels**, leading to Algebra I in middle school. This approach allows for flexibility in determining the grade at which a student can accelerate their mathematical study and opens the door to middle school Algebra I for a wider range of students.

Once these pathways are established in the curriculum, **it is crucial to ensure that both parents and students understand the opportunities and requirements to access them.** Transparent communication should be provided, particularly regarding any high school specialty programs that require Algebra I prior to 9th grade for admission. Moreover, communication about the various pathways should be available in multiple formats and languages to accommodate diverse audiences. Infographics, in-person or virtual information sessions, and pre-recorded videos are effective means of conveying information about the opportunities to access Algebra I in middle school.

Practice implications: School teams are encouraged to engage in reflective practices by analyzing school-level disaggregated data, such as the MERC Student Participation in Advanced Coursework dashboard, current math course enrollments, and student assessments at the division and state levels. This analysis will help identify and understand opportunities to connect underrepresented learners to Algebra I. It is important to develop specific interventions and support systems tailored to Black and Latina/o/x students, enabling them to access and progress successfully in the Algebra I pathway. Active recruitment strategies should also be employed to increase opportunities for underrepresented learners.

Expanding access points to Algebra I throughout middle school can be achieved by **implementing combined and/or compacted math courses, offering summer "bridge courses," or providing flexible scheduling** (i.e. placing high-achieving 6th graders in an

Honors 7th grade math class). These additional on-ramp opportunities provide students with the chance to complete Algebra I before entering high school. Communication and recruitment efforts for these opportunities should be targeted towards underrepresented learners and should be available in multiple languages.

The concept of "**recommending up" challenges the deficit thinking paradigm held by educators and school leaders**. It involves recognizing that students have the capacity to meet and exceed expectations, even if their potential may not yet be evident to them. Affirming their potential, coupled with an understanding of the support available, increases the likelihood that students will pursue accelerated math learning. Professional development opportunities and exploration of alternative instructional delivery models (e.g., Algebra I courses that meet daily or for an extended period) can contribute to creating a culture that fosters potential and supportive classroom climates focused on growth.

By utilizing data, implementing targeted interventions, expanding access points, promoting positive mindsets, and providing necessary support, schools can work towards increasing the representation of underrepresented learners in Algebra I and fostering their success in advanced math pathways.

High School Advanced Coursework Access and Support

Policy implications: While Advanced Placement (AP) programs offer one pathway for earning college credits, **it is important for educational institutions to expand their options and provide a diverse range of opportunities, such as dual enrollment**. By unlocking dual enrollment programs and offering single course options, schools can improve access to college credit for a wider range of students. Policies that aim to reduce barriers to enrollment in advanced coursework can also encourage more students to embark on and successfully complete advanced courses. These barriers may include complicated program applications, the need for teacher or school counselor recommendations, and associated fees for advanced coursework.

Educational divisions should **proactively assess their enrollment processes and systems to identify areas where access barriers can be minimized or eliminated**. While reductions and waivers for exam fees and course tuition are available, it is often the responsibility of families to seek out and request such financial assistance. To improve accessibility, a more proactive approach can be adopted. Divisions can conduct needs assessments to identify low-income learners who require fee reductions, ensuring that these students are connected to the necessary financial support.

Increasing access, enrollment, and positive outcomes for all students can be further facilitated by having divisions absorb the exam fees for Advanced Placement on behalf of all students whenever possible. Additionally, **recruitment materials, course descriptions, and information on advanced coursework outcomes should be provided to families early and frequently**. These resources should be made available in various languages and formats to ensure that a wide range of families can access them, thereby broadening access to educational opportunities.

Practice implications: In order to promote the enrollment and success of students in AP and dual enrollment courses, **educators should address any lack of knowledge or misconceptions that families and students may have about the benefits and accessibility of these programs**. It is essential to unpack and clarify any assumptions or misunderstandings, empowering students who may not have otherwise recognized the opportunities available to them. Teachers, counselors, and administrators play a crucial role in communicating this information early on, starting as early as middle school, to allow sufficient time for understanding and planning to access these courses. The information should be reiterated throughout high school, ensuring that students have multiple opportunities to access it. **Key aspects such as costs, fee waivers, academic expectations, and available academic support should be clearly communicated**. Teachers and counselors should also be educated on this information, ensuring that it is readily accessible to students from various sources. Beyond the school setting, **counselors should proactively collaborate with other entities to share information and engage communities that are historically underrepresented in advanced classes**. Partnering with organizations such as recreation centers, community centers, the NAACP, and churches can help spread the message to a broader audience.

From a curriculum perspective, schools can **make certain AP courses more accessible to a larger population by offering introductory courses with no recommended prerequisites**, such as AP Human Geography. Such courses can help build student confidence in advanced classes and serve as a stepping stone to other AP courses. **Resources like AP Potential™ can also be valuable in building confidence among students who may be hesitant about advanced classes. AP Potential™** uses PSAT results to identify students likely to earn a score of 3 or higher on specific AP exams. Educators and counselors can use this resource, which is often available in districts that administer the PSAT to an entire grade level, to recruit students for advanced courses. AP Potential™ results can also be shared directly with students. While AP Potential™ is a useful data source for identifying untapped potential, particularly among underrepresented populations, other relevant data points should not be overlooked. These may include a student's prior academic success, GPA, eligibility for dual enrollment coursework, and positive teacher recommendations. Each data point should be considered to expand the pool of potential AP students, rather than restrict it. Teachers, counselors, and other school personnel can then use both quantitative and qualitative data to recruit students from underrepresented backgrounds.

Recruitment is just the first step towards student success in advanced coursework. Strategies should also be implemented to support students once they are enrolled. These may include **AP preparation sessions, orientations, language development supports, ongoing academic support like that provided by Community College Career Coaches, and facilitating access to college resources such as tutoring centers**. These measures contribute to the overall success of students who are new to advanced coursework.

Limitations and Implications for Research

While this report provides valuable insights into the landscape of advanced course taking in the MERC region, there are important limitations to consider when interpreting the data.

Firstly, the study utilized data from the 2013-14 through the 2018-19 academic years, which may not reflect the most current information. Examining more recent data is essential to understand the impact of the COVID-19 pandemic on advanced course taking and its potential exacerbation of the disparities observed in this data. Future research can delve into the factors that contribute to the underrepresentation of marginalized student groups. Socioeconomic status is a significant factor, and exploring how student participation in advanced coursework varies across schools with different demographic compositions would be valuable. This analysis can address challenges specific to high-poverty and racially segregated school contexts. Additionally, multiple factors, such as school district resources and identification practices, can compound the issue and explain the persistence of gaps between groups. Requiring teacher recommendations for enrollment, for example, can be problematic when lower-income and underrepresented groups are less likely to be referred. Lastly, while the findings in this study focus on student outcomes, it is important to capture the perspectives of underrepresented groups themselves. Primary data collection should be prioritized in future research to gather the beliefs of underrepresented racial and ethnic minority and economically disadvantaged students regarding their experiences with advanced coursework, enrollment processes, and the level of support they receive. This will provide a more comprehensive understanding of the barriers and supports encountered by these students throughout their academic journey.

Summary

The findings from the analysis of VLDS data in the MERC region are consistent with existing literature and national/state trends, indicating the presence of disparities in participation in advanced coursework across K-12. In line with national trends, racial, ethnic, and socioeconomic **disparities are most pronounced in elementary gifted programs and least pronounced in middle school Algebra I+**. Lower socioeconomic status compounds lower enrollment in advanced coursework for all racial and ethnic groups, with a more significant impact observed for students from Black and Latina/o/x backgrounds. Moreover, the analysis reveals that **students with disabilities and ELs are the least likely to participate in advanced coursework across K-12, particularly in elementary gifted programs**. These findings align with existing research on participation in gifted programs at the elementary level, Algebra I in middle school, and AP courses in high school. They highlight the critical need for targeted policies and practices to address the underrepresentation of students in advanced coursework. The implications and recommendations derived from these findings are crucial for informing policy and practice in each of these areas. By acknowledging and addressing the identified disparities, educational stakeholders can work towards creating more equitable opportunities for all students to participate and succeed in advanced coursework throughout K-12 education.

REFERENCES

Allen, D., & Dadgar, M. (2012). Does dual enrollment increase students' success in college? Evidence from a quasi‐experimental analysis of dual enrollment in New York City. *New Directions for Higher Education, 2012*(158), 11-19. DOI: https://doi.org/10.1002/he.20010

Balfanz, R., & Byrnes, V. (2006). Closing the mathematics achievement gap in high-poverty middle schools: Enablers and constraints. *Journal of Education for Students Placed at risk*, *11*, 143-159. https://doi.org/10.1207/s15327671espr1102_2

Barnard-Brak, L., McGaha-Garnett, V., & Burley, H. (2011). Advanced Placement Course Enrollment and School-Level Characteristics. *NASSP Bulletin, 95*(3), 165–174. http://dx.doi.org/10.1177/0192636511418640

Baum, S.M., Schader, R. & Owen, S.V. (2017). To be gifted and learning disabled: Strength-based strategies for helping twice exceptional students with LD, ADHD, ASD, and more (3rd ed.). Waco, TX: Prufrock Press.

Becares, L., & Priest, N. (2015). Understanding the influence of race/ethnicity, gender, and class on inequalities in academic and non-academic outcomes among eighth-grade students: findings from an intersectionality approach. *PloS one*, *10*(10), e0141363. https://doi.org/10.1371/journal.pone.0141363

Bianco, M., Harris, B., Garrison-Wade, D., & Leech, N. (2011). Gifted girls: Gender bias in gifted referrals. *Roeper Review*, *33*(3), 170-181. https://doi.org/10.1080/02783193.2011.580500

Callahan, C., Moon, T., Oh, S., Azano, A., & Hailey, E. (2015). What works in gifted education: Documenting the effects of an integrated curricular/instructional model for gifted students. *American Educational Research Journal*, *52*, 137-167. https://eric.ed.gov/?id=EJ1049912

Callahan, C., Moon, T., & Oh, S. (2017). Describing the status of programs for the gifted: A call for action. *Journal for the Education of the Gifted*, 40(1), 20-49. https://doi.org/10.1177/0162353216686215

Civil Rights Data Collection [CRDC] (2017). https://ocrdata.ed.gov/

Cha, S. (2015). Exploring disparities in taking high level math courses in public high schools. *Kedi Journal Of Educational Policy*, *12*(1), 3-17.

Charlesworth, T. E., & Banaji, M. R. (2019). Gender in science, technology, engineering, and mathematics: Issues, causes, solutions. *Journal of Neuroscience, 39*, 7228-7243. https://doi.org/10.1523/JNEUROSCI.0475-18.2019

Clark, D., Moore, G. W., & Slate, J. R. (2012). Advanced placement courses: Gender and ethnic differences in enrollment and success. *Journal of Education Research, 6*(3), 265-277.

College Board. (2014, February 11). The 10th AP annual report to the nation. Retrieved from http://media.collegeboard.com/digitalServices/pdf/ap/rtn/10th-annual/10th-annual-ap-report-to-the-nation-single-page.pdf

Crabtree, L., Richardson, S., & Lewis, C. (2019). The Gifted gap, STEM education, and economic immobility. Journal of Advanced Academics, 30(2), 203-231. https://doi.org/10.1177/1932202X19829749

Domina, T., McEachin, A., Penner, A., & Penner, E. (2015). Aiming high and falling short: California's eighth-grade algebra-for-all effort. *Educational Evaluation and Policy Analysis, 37*, 275-295. https://doi.org/10.3102/0162373714543685

Dougherty, S. M., Goodman, J. S., Hill, D. V., Litke, E. G., & Page, L. C. (2015). Middle school math acceleration and equitable access to eighth-grade algebra: Evidence from the Wake County Public School System. *Educational Evaluation and Policy Analysis, 37*(1_suppl), 80S-101S. https://doi.org/10.3102/0162373715576076

Freeman-Green, S., Test, D. W., & Holzberg, D. (2018). Participation of students with disabilities in college ready programs. *International Journal of Special Education, 33*(3), 715–731.

Ford, D. Y. (2006). Closing the achievement gap: How gifted education can help. *Gifted Child Today, 29*(4), 14–18. https://doi.org/10.4219/gct-2006-10

Ford, D. (2010). Underrepresentation of culturally different students in gifted education: Reflections about current problems and recommendations for the future. *Gifted Child Today*, 33(3), 31-35. https://doi.org/10.1177/107621751003300308

Gagnon, D. J., & Mattingly, M. J. (2016). Advanced Placement and rural schools: Access, success, and exploring alternatives. *Journal of Advanced Academics, 27*(4), 266–284. https://doi.org/10.1177/1932202X16656390

Ganley, C. M., & Lubienski, S. T. (2016). Mathematics confidence, interest, and performance: Examining gender patterns and reciprocal relations. *Learning and Individual Differences, 47*, 182-193. https://doi.org/10.1016/j.lindif.2016.01.002

Garland, M., & Rapaport, A. (2018). Advanced course offerings and completion in science, technology, engineering, and math in Texas public high schools (REL 2018–276). Washington, DC: U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance.

Grissom, J. A., Redding, C., & Bleiberg, J. F. (2019). Money over merit? Socioeconomic gaps in receipt of gifted services. *Harvard Educational Review*, *89*(3), 337-369. https://doi.org/10.17763/1943-5045-89.3.337

Gubbins, E. J., Siegle, D., Hamilton, R., Peters, P., Carpenter, A. Y., O'Rourke, P., ... & Estepar-Garcia, W. (2018). *Exploratory Study on the Identification of English Learners for Gifted and Talented Programs.* Grantee Submission. https://eric.ed.gov/?id=ED602388

Hamilton, R., McCoach, D. B., Tutwiler, M. S., Siegle, D., Gubbins, E. J., Callahan, C. M. & Mun, R. U. (2018). Disentangling the roles of institutional and individual poverty in the identification of gifted students. *Gifted Child Quarterly*, *62*(1), 6-24. https://doi.org/10.1177/0016986217738053

Hodges, J., Mun, R., & Rinn, A. (2022). Disentangling inequity in gifted education: The need for nuance in racial/ethnic categories, socioeconomic status, and geography. *Gifted Child Quarterly*, *66*(2), 154-156. https://doi.org/10.1177/00169862211040533

Huang, X., Zhang, J., & Hudson, L. (2019). Impact of math self-efficacy, math anxiety, and growth mindset on math and science career interest for middle school students: The gender moderating effect. *European Journal of Psychology of Education, 34*, 621-640. https://doi.org/10.1007/s10212-018-0403-z

Kettler, T., & Hurst, L. T. (2017). Advanced academic participation: A longitudinal analysis of ethnicity gaps in suburban schools. Journal for the Education of the Gifted, 40(1), 3-19. https://doi.org/10.1177/0162353216686217

Knight, W., Wessel, R. D., & Markle, L. (2018). Persistence to Graduation for Students With Disabilities: Implications for Performance-Based Outcomes. Journal of College Student Retention: Research, Theory & Practice, 19(4), 362–380. https://doi.org/10.1177/1521025116632534

Lindsay, S., Lamptey, D.-L., Cagliostro, E., Srikanthan, D., Mortaji, N., & Karon, L. (2019). A systematic review of post-secondary transition interventions for youth with disabilities. *Disability and Rehabilitation, 41*(21), 2492–2505. https://doi.org/10.1080/09638288.2018.1470260

Long, M. C., Conger, D., & Iatarola, P. (2012). Effects of high school course-taking on secondary and postsecondary success. *American Educational Research Journal,* 49(2), 285-322. https://doi.org/10.3102/0002831211431952

Makarova, E., Aeschlimann, B., & Herzog, W. (2019). The gender gap in STEM fields: The impact of the gender stereotype of math and science on secondary students' career aspirations. *Frontiers in Education, 4*(60), 1-10. https://doi.org/10.3389/feduc.2019.00060

McEachin, A., Domina, T., & Penner, A. (2020). Heterogeneous effects of early algebra across California middle schools. *Journal of Policy Analysis and Management, 39*(3), 772-800. DOI: https://doi.org/10.1002/pam.22202

Montgomery D (2006) Double exceptionality: Gifted children with special educational needs in ordinary schools. In: Wallace B, Eriksson G (eds) *Diversity in gifted education: international perspectives on global issues*. Routledge, New York, pp 216–225

Morton, K., & Riegle-Crumb, C. (2019). Who gets in? Examining inequality in eighth-grade algebra. *Journal for Research in Mathematics Education, 50*, 529-554. https://doi.org/10.5951/jresematheduc.50.5.0529

Mun, R. U., Hemmler, V., Langley, S. D., Ware, S., Gubbins, E. J., Callahan, C. M., ... & Siegle, D. (2020). Identifying and serving English learners in gifted education: Looking back and moving forward. *Journal for the Education of the Gifted*, *43*(4), 297-335. https://doi.org/10.1177/0162353220955230

Naff, D., Siegel-Hawley, G., Jefferson, A., Schad, M., Saxby, M., Haines, K., & Lu, Z. (2020). Unpacking "giftedness": Research and strategies for promoting racial and socioeconomic equity. Richmond, VA: Metropolitan Educational Research Consortium. https://scholarscompass.vcu.edu/merc_pubs/113/

Naff, D., Siegel-Hawley, G., Jefferson, A., Schad., M., Saxby, M., Haines., K., & Lu, Z. (2020). *Unpacking "giftedness": Research and strategies for promoting racial and socioeconomic equity*. Richmond, VA, Metropolitan Educational Research Consortium. https://scholarscompass.vcu.edu/merc_pubs/113/

Naff, D., Parry, M., Ferguson, T., Palencia, V., Lenhardt, J., Tedona, E., Stroter, A., Stripling, T., Lu, Z., & Baber, E. (2021). Analyzing Advanced Placement (AP): Making the nation's most prominent college preparatory program more equitable. Metropolitan Educational Research Consortium. https://scholarscompass.vcu.edu/merc_pubs/121/.

Nomi, T., & Raudenbush, S. W. (2016). Making a success of "Algebra for all" the impact of extended instructional time and classroom peer skill in chicago. *Educational Evaluation and Policy Analysis, 38*, 431-451. https://doi.org/10.3102/0162373716643756

Nomi, T., Raudenbush, S. W., & Smith, J. J. (2021). Effects of double-dose algebra on college persistence and degree attainment. *Proceedings of the National Academy of Sciences*, *118*(27), e2019030118. https://doi.org/10.1073/pnas.2019030118

Olszewski-Kubilius, P., & Corwith, S. (2018). Poverty, academic achievement, and giftedness: A literature review. *Gifted Child Quarterly, 62*(1), 37-55. https://doi.org/10.1177/0016986217738015

Parsi, A. (2016). ESSA and English Language Learners. Policy Update. Vol. 23, No. 21. In National Association of State Boards of Education. National Association of State Boards of Education. https://eric.ed.gov/?id=ED571532

Peters, G. M., Whiting, G. W., & McBee, M. T. (2019). Who Gets Served in Gifted Education? Demographic Representation and a Call for Action. *The Gifted Child Quarterly*, *63*(4), 273–287. https://doi.org/10.1177/0016986219833738

Petersen, J. (2013). Gender differences in identification of gifted youth and in gifted program participation: A meta-analysis. *Contemporary Educational Psychology*, *38*(4), 342-348. https://doi.org/10.1016/j.cedpsych.2013.07.002

Ruban, L. M. & Reis, S. (2005). Identification and assessment of gifted students with learning disabilities. *Theory Into Practice*, *44*(2), 115-124. https://doi.org/10.1207/s15430421tip4402_6

Scafidi, B., Clark, C., & Swinton, J. (2015). Who takes Advanced Placement (AP)? Eastern Economic Journal, 41(3), 346-369. http://dx.doi.org/10.1057/eej.2014.21

Shores, K., Kim, H. E., & Still, M. (2020). Categorical inequality in Black and White: Linking disproportionality across multiple educational outcomes. American Educational Research Journal, 57(5), 2089-2131. https://doi.org/10.3102/0002831219900128

Spielhagen, F. R. (2006). Closing the achievement gap in math: The long-term effects of eighth-grade algebra. *Journal of Advanced Academics, 18*(1), 34-59. https://doi.org/10.4219/jaa-2006-344

Theokas, C., & Saaris, R. (2013). Finding America's missing AP and IB students. *Education Trust*. Retrieved from: https://edtrust.org/wp-content/uploads/2013/10/Missing_Students.pdf

Torbey, R., Martin, N. D., Warner, J. R., & Fletcher, C. L. (2020). Algebra I before high school as a gatekeeper to computer science participation. Policy Brief. Texas Education Research Center.

RESOURCES

Tell us how this report informs your work.

Access the dashboard that accompanies this report.

Listen to the podcast episode from *Abstract*.

Access additional resources from the study.

Stay up to date with research and resources like these by becoming a MERC Stakeholder.

What can we learn together?

merc.soe.vcu.edu