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MONTGOMERY COUNTY PUBLIC SCHOOLS, ROCKVILLE, MARYLAND

The Equal Opportunity Schools (EOS) Initiative: Examination of Changes in Participation and Success in AP/IB Courses

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Executive Summary

At the request of the Superintendent of Schools in Montgomery County Public Schools (MCPS), the Office of Shared Accountability (OSA) examined the enrollment and academic performance of students participating in Advanced Placement (AP) and International Baccalaureate (IB) courses in schools implementing the Equal Opportunity Schools (EOS) initiative.

Overview of EOS Initiative in MCPS

The EOS initiative began in four MCPS high schools in 2016–2017 (Cohort 1). Fourteen schools were added in the two years following (six in 2017–2018 [Cohort 2], and eight in 2018–2019 [Cohort 3]) to the partnership with Equal Opportunity Schools (EOS), bringing the total number to 18 participating high schools for the 2018–2019 school year (MCPS, 2018).

In a Memorandum of Understanding (MCPS, 2016), EOS and MCPS jointly committed to the three objectives below.

1. Fully close race and income participation gaps in AP/IB by fall of the following school year, as measured by equally high AP/IB participation rates for Hispanic or Latino, Black or African-American, and low-income students as compared to their peers.
2. Raise AP/IB performance by spring of the following school year, as measured by passing rates in the AP/IB exam.
3. Develop systems and structures for the district to sustain and improve upon these results in future years, catalyzing a higher sense of what's possible for students who have not taken an AP/IB course in 9th or 10th grade, and enabling further increases in college readiness and closure of opportunity and achievement gaps. (MCPS, 2016, p. 2).

The purpose of the partnership was twofold: a) to reduce barriers and increase access to advanced courses among underrepresented students—students of color and students impacted by poverty; and b) to support the participating students' success in AP and IB courses.

The goal of this evaluation was to: 1) examine trends in participation and success of students receiving Free and Reduced-price Meals System (FARMS) services and Black or African American and Hispanic/Latino students in AP/IB courses following the implementation of the EOS initiative in MCPS schools, 2) examine the progress toward attainment of school-level equity for enrollment and performance in AP/IB among participating schools, and 3) examine student performance (as measured by GPA and college and career readiness measures) for schools implementing EOS and schools without EOS during school years (SY) 2016 to 2019. The evaluation questions that guided this study were aligned with these three goals; key findings are reported below for each of the questions. It is envisioned that the findings from the study will inform MCPS' efforts to create and sustain equitable access and support for the success of low income and Black or African American and Hispanic/Latino students in AP/IB courses and their overall college and career readiness.

Summary of Methodology

Study Measures. To address the goals of this study, the following student data were examined: **s**tudent demographic information, course enrollment information, indicators of academic standing such as GPA and attendance, and official AP and IB test score files for students in Grades 9, 10, 11, and 12, as well as data from the EOS portal.

Analytical Samples. Analytical samples varied by evaluation question. Depending on the question, the analytical sample comprised either: (1) all students in EOS schools and non-EOS schools, (2) students who had not taken AP/IB courses by Grade 11, or (3) underrepresented students. For most of the analyses, outcomes for students in EOS Cohorts 1 and 2 schools were compared with outcomes of students in schools not yet implementing EOS. Outcomes for Cohort 3 (introduced in schools in 2018–2019; students enrolled in AP/IB courses in 2019–2020) were not available for this report.

Data Analysis Procedures. Summary statistics were applied to examine the percentage of students who enrolled in AP/IB courses and trends in AP/IB enrollment as well as success over three years in schools implementing EOS and non-EOS schools. Where applicable, analysis of covariance (to compare adjusted means) or logistic regression (to assess any differences in rates of taking and passing AP/IB courses) was applied to test differences in the AP/IB enrollment and performance of students attending schools implementing EOS and those in comparison schools.

Summary of Key Findings

Question 1: What were the characteristics of Grade 10 and 11 students who had not taken any AP/IB courses for each Cohort?

Overall, the majority of students in Cohorts 1 and 2 schools (53% and 57%, respectively) had not taken an AP/IB course when the EOS program was introduced; however, this percentage was lower for Cohort 3 schools (41%).

The percentage of Grade 10 and 11 students who had not taken any AP/IB course was higher among males than females and among Hispanic/Latino and Black or African American students than their peers of other races/ethnicities. In addition, almost two-thirds of students in Cohort 1 and 2 schools who received FARMS services had not taken any AP/IB courses when the EOS program started in their schools. In addition, more than 83 percent of Grade 10 and 11 students who received ESOL instruction had not taken any AP/IB courses.

Further analyses revealed that more than two-thirds of Hispanic/Latino students receiving FARMS services, more than 60 percent of Black or African American students receiving FARMS services, and more than half of White/Asian/all other groups receiving FARMS services did not have any AP/IB experience. In contrast, only slightly more than one third (35%) of Grade 10 and 11 White/Asian/all other groups of students who were not receiving FARMS services (monitoring group) had not taken an AP/IB course.

Question 2: What percentage of Grade 10 and 11 students in Cohort 1 and 2 schools who had not taken any AP/IP courses enrolled in an AP/IP course in the following year relative to peer schools without EOS? Was enrollment related to student demographic or academic characteristics?

Among Grade 10 and 11 students in Cohort 1 and 2 schools who did not have any AP/IB experience, 40 percent of the Cohort 1 students and 35 percent of the Cohort 2 students enrolled in an AP/IB course in the following year. In both cohorts, the percentage of students who enrolled in AP/IB courses the next year was significantly ($p<.001$) higher than the percentage of students enrolling in schools without EOS. Further, when controlled for prior achievement through GPA and student characteristics, results showed that being in a school with EOS had an even stronger positive relationship with taking an AP/IB course.

Question 3: What is the trend in AP/IB enrollment among all Grade 10 and 11 underrepresented students in Cohorts 1 and 2? How does it compare with the trend in the enrollment of all underrepresented students in schools not implementing EOS? Was enrollment related to student demographic or academic characteristics?

Prior to implementing EOS, the percentage of underrepresented students in Cohort 1 and 2 schools who had enrolled in an AP/IB course was significantly lower than the percentage of underrepresented students in comparison schools who had enrolled. (Underrepresented students included Black or African American, Hispanic/Latino, Two or More Races, Native Hawaiian or Other Pacific Islander, and American Indian or Alaskan Native students, as well as students of all race/ethnicity groups who were receiving FARMS services.) However, in the following two years, after partnering with EOS, the percentage of underrepresented students enrolled in AP/IB courses in Cohort 1 schools was significantly ($p<.01$) higher than the percentage enrolled in comparison schools. Among students in Cohort 2 schools, AP/IB enrollment rose to rates that were comparable to those of peers in the comparison schools.

In both Cohorts 1 and 2, underrepresented students were significantly ($p<.001$) more likely to enroll in AP/IB the year after EOS started relative to their peers in comparison schools when analysis controlled for gender, grade, and previous GPA.

Questions 4a: To what extent did Cohort 1 schools attain their specified school-level target of "students needed to achieve equity" in SY 2018, 2019, and 2020 relative to SY 2017? Did the attainment of within-school targets for AP/IB vary by student characteristics?

Equity gaps for schools with regard to enrollment in AP/IB courses are represented by the difference between the percentage of students from each student group needed to achieve equity in AP/IB participation (target), and the percentage of students from each student group enrolled in AP/IB for the first time. Equity gaps in all EOS schools were examined for students in the following focus groups: Non-FARMS Hispanic/Latino, FARMS Hispanic/Latino, Non-FARMS Black or African American, and FARMS Black or African American. Annual targets were based on the student groups with highest AP/IB enrollment, and each school reestablished its new targets for each student group at the beginning of each year. The goal was to 1) increase participation, while 2) working toward a comparable AP/IB participation rate for all students, regardless of their race/ethnicity or FARMS status.

Among the four Cohort 1 schools, Springbrook and Wheaton high schools made progress toward equity in AP/IB participation (reduced gaps) for most of the student groups in 2020 relative to 2017. Mixed results were observed for Col. Zadok Magruder and Northwest high schools in 2020 relative to 2017. Both schools showed improvements toward equity in AP/IB participation among Hispanic/Latino and Black or African American students receiving FARMS services and no progress for Hispanic/Latino and Black or African American students not receiving FARMS services.

Question 4b. To what extent did Cohort 2 schools attain their specified school-level target of "students needed to achieve equity" in SY 2019 and 2020 relative to SY 2018? Did the attainment of within-school targets for AP/IB vary by student characteristics?

Among the six schools in Cohort 2, James Hubert Blake High School (HS) showed improvements toward equity in AP/IB participation across all student groups in 2020 relative to 2018, especially among Hispanic/Latino students receiving FARMS services and Black or African American students who do not receive FARMS services. Clarksburg HS made progress toward equity in AP/IB participation among Black or African American students receiving FARMS services.

No progress toward equity in in AP/IB participation was observed in the remaining four Cohort 2 schools for different reasons: lower AP/IB participation in 2020 relative to established target (Kennedy); decrease in AP/IB participation in 2020 (Gaithersburg); and higher within-school targets in 2020 than 2017 even though the school reported higher AP/IB participation among some student groups (Watkins Mill).

Question 5: Among students in Cohort 1 and 2 who previously had not taken any AP/IB courses, what were the course taking and performance outcomes? How do these outcomes vary by student characteristics?

Course credits. Among students who enrolled in at least one AP/IB course, the range of AP/IB course credits taken by EOS students (Cohorts 1 and 2) and students in schools without EOS was similar, ranging from a minimum of 0.5 to a maximum of seven credits, with an average of 1.6 credits. However, Cohort 1 students on average took fewer AP/IB credits than students in schools without EOS (1.60 compared with 1.68, $p<.05$); Cohort 2 students took a comparable number of AP/IB credits to their peers in schools without EOS (1.59 compared with 1.61).

Course grades. The average AP/IB course grades were lower for Cohort 1 students compared with students in schools that had not yet implemented EOS (2.15 vs. 2.39, $p<.001$). The average AP/IB course grades were not significantly different between Cohort 2 students and comparison students at schools not yet implementing EOS.

Course performance with C or above. More than 75 percent of the students in Cohort 1 and 2 schools who previously had not taken an AP/IB course earned a C or above in one or more AP/IB courses. No statistically significant differences were observed in the percentage of students in Cohort 1 and 2 students who earned a C or above relative to students in the comparison groups, either as a whole group or at student group levels.

Number of AP/IB tests taken. Cohort 1 students averaged a higher number of AP/IB exams taken compared to students in schools without EOS (1.62 vs. 1.50, $p<.001$). Analyses of the five focus groups showed significantly higher numbers of AP/IB exams were taken by EOS Cohort 1 students compared with students in schools without EOS in three of the five focus groups. No significant differences were found in the number of exams taken by students in Cohort 2 schools relative to their peers in comparison schools except for the Non-FARMS Asian/White/All Other Student Groups where students in schools without EOS took significantly more AP/IB exams than students in EOS Cohort 2 schools.

Percentage of AP/IB tests with college-ready scores. About one-quarter of the AP/IB exams taken by students in Cohort 1 earned a college-ready score (3 or higher on AP; 4 or higher on IB) compared to 41 percent for the comparison group of students, reflecting a statistically significant difference ($p<.001$) in favor of the comparison group. Similar differences were observed for four of the five focus groups. The percentage of students in Cohort 2 schools who earned college-ready scores on AP/IB exams taken was comparable to that of their peers in the comparison group, for all students and for each of the MCPS focus groups.

Question 6: What was the overall level of AP/IB performance in the year following the implementation of EOS for Cohorts 1 and 2 for all students who took AP/IB courses? Did it vary by student characteristics?

Average number of AP/IB credits. Among all students who took an AP/IB course, the mean number of credits enrolled in by students in both cohorts was about 2.0 and ranged from 0.5 to 7.0. The focus groups in Cohort 1 with the highest average AP/IB credits were Hispanic/Latino students receiving FARMS (mean of 2.20 credits) and the Non-FARMS Asian/White/All Other Student Groups (mean of 2.19 credits). Among Cohort 2 students, the students groups with the highest average AP/IB credits were the Non-FARMS Asian/White/All Other Student Groups (mean of 2.15 credits) and White/Asian/all other students receiving FARMS (mean of 2.14 credits).

Average course grade. For all students who took at least one AP/IB course, the average course grade among Cohort 1 students was 2.88 and among Cohort 2 students was 2.83 (on A=4.00 scale). In both Cohort 1 and Cohort 2, the White/Asian/all other students not receiving FARMS had the highest average grade on AP/IB courses: 3.22 among Cohort 1 students and 3.23 among Cohort 2 students. Other groups earning an average course grade near 3.00 (B) were Hispanic/Latino students receiving FARMS in Cohort 1 (2.96) and White/Asian/all other students receiving FARMS in Cohort 2 (3.03).

Percentage of students earning a C or better. A very high percentage of students in both Cohort 1 and Cohort 2 earned a C or better in at least one AP/IB course (94% and 93%, respectively). The student groups with the highest percentages earning a C or better reflect the groups that earned the highest average grade in their AP/IB courses: in Cohort 1, the Non-FARMS Asian/White/All Other Student Groups (98%) and Hispanic/Latino students receiving FARMS (96%), and in Cohort 2, the Non-FARMS Asian/White/All Other Student Groups (97%) and White/Asian/all other students receiving FARMS (95%). At least 87 percent of each student group in both cohorts earned a C or better in at least one AP/IB course.

Average number of AP/IB tests. In both Cohorts 1 and 2, fewer students took at least one AP/IB test than enrolled in at least one AP/IB course. The average number of AP/IB tests taken by Cohort 1 students was 2.05 (with a range of 1 to 7), and by Cohort 2 students, it was 1.86 (with a range of 1 to 9). Student groups with the highest number of tests taken in Cohort 1 were Hispanic/Latino students receiving FARMS (average of 2.19) and the Non-FARMS Asian/White/All Other Student Groups (average of 2.17). In Cohort 2, the Non-FARMS Asian/White/All Other Student Groups averaged the highest number of tests taken (1.95).

Percent of tests with college-ready scores. Of the AP/IB, tests taken by students in Cohort 1 and Cohort 2 schools, about half earned a college-ready score (3 or higher on an AP test, and 4 or higher on an IB test). In Cohort 1, the mean percentage of tests taken that earned a college-ready score was 48 percent; in Cohort 2, the mean percentage was 50 percent. Among student subgroups, the Non-FARMS Asian/White/All Other Student Groups in each Cohort had the highest percent of college-ready scores (60% for Cohort 1 and 63% for Cohort 2). Only one other student group had 50 percent or more of tests earning college-ready scores: White/Asian/all other students receiving FARMS in Cohort 2 (50% of tests scored at college-ready level).

Question 7: How do the academic and behavioral outcomes (i.e., weighted GPA, 4-year cohort graduation rates, attendance, suspensions, taking courses in the Career and Technology Education (CTE) program or through dual enrollment options) of students in EOS schools compare with those of their peers in schools not yet implementing EOS?

Weighted GPA. Overall, the average weighted GPA for students in EOS Cohort 1 schools and comparison schools without EOS increased from 2017 to 2019. Significant differences in the average weighted GPA scores for all students were found in favor of comparison schools in these three years. Within Cohort 1 schools (which started EOS in 2017 and aimed at enrolling more students in AP/IB courses in the following years), the average weighted GPA in 2018 and 2019 was higher than in 2017. However, the same was true for comparison schools—weighted GPA was higher in 2018 and 2019 than in 2017—thus, maintaining a significant difference between EOS and comparison schools in each of these three years in favor of comparison group. Similarly, significant differences in the average weighted GPA were observed in favor of comparison schools within each grade level during the three years of analysis. Differences in the average weighted GPA between Cohort 1 and comparison schools varied by focus group and year of study.

The average weighted GPA for all students in EOS Cohort 2 and comparison schools without EOS increased from 2018 to 2019. Nevertheless, students in Cohort 2 schools had a significantly lower average weighted GPA than their peers in comparison schools for both years of analysis. Although Grade 11 and 12 students in both EOS Cohort 2 and comparison schools had a higher average weighted GPA in 2019 relative to 2018, a statistically significantly higher average weighted GPA was observed in favor of students in comparison schools across all the grades examined. All focus groups in Cohort 2 and comparison schools (except for Hispanic/Latino students receiving FARMS) attained a higher average weighted GPA in 2019 than 2018. Significant differences in weighted GPA were observed for three student groups in favor of students in comparison schools: White/Asian/all other students not receiving FARMS, Hispanic/Latino students not receiving FARMS, and Black or African American students receiving FARMS).

Four-year Cohort Graduation Rates. In general, the four-year cohort graduation rates had little variation from 2017 to 2019 for both EOS Cohort 1 and comparison schools without EOS. However, graduation rates in comparison schools were higher than the rates in Cohort 1 schools for all three years of analysis by at least 1.4 percentage points. Differences in graduation rates varied depending on the student group and the year examined.

Overall, the four-year cohort graduation rates remained at the same level (83.4%) in EOS Cohort 2 schools between 2018 and 2019, whereas it increased less than one percentage point (from 88.3% to 88.7%) in comparison schools during the same period. For the two years examined, graduation rates in comparison schools were higher than the rates in Cohort 2 schools by at least 4.9 percentage points, and they varied by student group and the year examined. Except for Hispanic/Latino students in 2018, graduation rates were higher in comparison schools than in Cohort 2 schools for both years of analysis for all student race/ethnicity groups.

Attendance. The average daily attendance of all students in EOS Cohort 1 schools and comparison schools decreased from 2017 to 2019, and significant differences were found in favor of comparison schools in these three years. Differences varied by grades, focus group, and year, with most differences favoring comparison schools.

Suspensions. The percentage of students with one or more suspensions in EOS Cohort 1 schools decreased from 3.6 percent in 2017 to 2.8 percent in 2019, whereas the percentage of students suspended in comparison schools increased from 2.0 percent in 2017 to 2.2 percent in 2019. Despite this decrease in suspensions in Cohort 1 schools from 2017 to 2019, suspension rates in Cohort 1 schools still were significantly higher than in comparison schools for each of the three years examined when analyzing rates for all students. However, most grades and focus groups did not show significant differences between EOS Cohort 1 and comparison schools in the two years following EOS implementation.

The percentage of students suspended in EOS Cohort 2 schools stayed at the same level (3.5%) from 2018 to 2019, whereas the percentage of students suspended in comparison schools decreased slightly from 2.3 percnet in 2018 to 2.2 percent in 2019. Students in Cohort 2 schools also had significantly higher suspension rates than those in comparison schools for both years of analysis. Differences in percentage of students with one or more suspensions between Cohort 2 and comparison schools by grade and focus groups varied.

Participation in Career and Technology Education (CTE) Courses. The percentage of students taking at least one CTE course in EOS Cohort 1 schools increased from 62.8 percent in 2017 to 67.5 percent in 2018, but decreased to 60.9 percent in 2019. In comparison schools without EOS, the percentage of students taking one or more CTE courses decreased from 2017–2019 (from 52.4% to 47.7%). In each of the three years, Cohort 1 schools had significantly higher percentages of students taking CTE than their comparison schools. Similar patterns were observed for all grades and student characteristics.

The percentage of students taking at least one CTE course in EOS Cohort 2 schools and comparison schools without EOS were lower in 2019 relative to 2018; however, higher percentages of students in comparison schools took at least one CTE course for both years of analysis. Differences in the percentage of students who took at least one CTE courses between Cohort 2 and comparison schools varied by grade and by student characteristics.

Dual Enrollment (DE). Overall, the percentage of students taking at least one dual enrollment course in EOS Cohort 1 and 2 schools was higher than in comparison schools without EOS for all years examined. Analysis by focus groups showed more dual enrollment participation in Cohort 1 and 2 schools than in comparison schools in two of the non-FARMS student groups, but several student groups had numbers too small for reliable analysis.

Question 8: What is the status of AP/IB course offerings in schools implementing EOS and schools without EOS from SY 2017 to SY 2019?

Overall, there is an upward trend in the mean number of AP/IB courses from SY 2017 to SY 2020. Nearly all the high schools offered 24 or more total AP and IB courses during this period. Schools with the highest number of AP/IB courses offered were Richard Montgomery, Bethesda-Chevy Chase, Springbrook, Albert Einstein, John F. Kennedy, Rockville, Seneca Valley, and Watkins Mill; each of these schools offered 40 or more AP/IB courses. The data also revealed that schools with IB programs had the highest combined total AP/IB courses offered each year, and schools in Cohort 3 had the highest percentage of its schools with IB programs and the highest number of courses across all years.

The Equal Opportunity Schools (EOS) Initiative: Examination of Changes in Participation and Success in AP/IB Courses

Introduction

At the request of the Superintendent of Schools in Montgomery County Public Schools (MCPS), the Office of Shared Accountability (OSA) examined the enrollment and academic performance of students in Advanced Placement (AP) and International Baccalaureate (IB) courses in schools implementing the Equal Opportunity Schools (EOS) initiative.

The goal of MCPS is to "prepare students to lead the workforce of the future. MCPS is committed to providing rigorous coursework, career exploration and engagement opportunities, and early access to college credit so that students have multiple pathways to choose from after graduation" (MCPS, 2018). This goal corresponds to the expectation of the College and Career Readiness and College Completion Act of 2013 (CCR-CCA) and the state of Maryland (Maryland State Department of Education [MSDE], 2020). The MCPS strategic plan has specified two objectives for achieving this goal: 1) expanding options, and access to programs and resources needed for all children to be academically successful and 2) College and Career Readiness, by offering rigorous courses and college-level course work in high school, such as AP, IB, and, Dual Enrollment (DE).

To support the above stated goal, MCPS entered into a partnership with EOS in 2016. The purpose was twofold: a) to reduce barriers and increase access to advanced courses among underrepresented students—students of color and students impacted by poverty; and b) to support the participating students' success in AP and IB courses. Therefore, the goals of this study were to: 1) examine trends in access and success of students receiving Free and Reduced-price Meals System (FARMS) services, Black or African American and Hispanic/Latino students in AP/IB courses following the implementation of the EOS initiative; 2) examine the progress toward attainment of school-level equity for enrollment and performance in AP/IB among participating schools; and 3) analyze trends in student performance (as measured by GPA and college and career readiness measures) for students in schools implementing EOS and schools without EOS from SY 2016 to present.

It is envisioned that the findings from the study will inform MCPS's efforts to create and sustain equitable access and support for the success of low income and Black or African American and Hispanic/Latino students in AP/IB courses and in their overall college and career readiness.

Background

In July 2016, MCPS entered into a partnership with EOS to create greater access to and success in AP and IB courses, especially for underrepresented student groups, to support the *Lead Higher* initiative (MSDE, 2018; 2019). The *Lead Higher* Initiative, a statewide effort supported by MSDE, focuses on working with selected schools to provide technical assistance toward reaching annual goals of growing all AP/IB programs to reflect school diversity while raising performance in those courses.

The *Lead Higher* initiative was created in April 2015 by a consortium that included Equal Opportunity Schools (EOS), College Board, International Baccalaureate, and lead philanthropic partner, the Jack Kent Cooke Foundation (MSDE, 2018; 2019). In 2016, *Lead Higher*, through EOS, chose Maryland through a competitive national process as the second state (after Illinois) to commit to closing access gaps by 2020. Equal Opportunity Schools collaborates with schools nationwide to build a culture of rigor, belonging, and success by finding and enrolling in advanced coursework students of color and those from low-income backgrounds (MSDE, 2019). Further**,** EOS collaborates with a school or district to close race and income enrollment gaps in AP and IB courses, while also maintaining or increasing the success of students in these programs (EOS, 2018; MCPS, 2018).

Figure 1 illustrates the Action for Equity (A4E) multi-phase model used by EOS to help schools build equity and sustainability at the highest levels of their academic course offerings (EOS, 2019). As depicted in Figure 1, EOS provides onsite technical assistance to analyze data, create a strategy to reach and recruit students, and provide ongoing planning support, data tools, and enrollment tracking. The expectation is that participating high schools receive expert leadership coaching, data consulting, and capacity-building support to fully close gaps in AP and IB participation and to increase student success. EOS also is expected to support schools in monitoring their growing equitable AP/IB programs for success, sustainability, and student belonging.

Figure 1
Action for Equity Multi-phase Model

Source: MSDE (2019) EOS Update

The process is chunked into three phases, carried out over multiple years:

1. *Year 1--Building the foundation*: EOS closely works with partner schools to gather context, examine critical data from the perspectives of students and staff, create a set of strategies for engagement and advocacy, and ultimately enroll diverse students in AP/IB classes.
2. *Year 2--Going deeper*: EOS builds on the work from year 1 to create structures and systems that will support equitable participation and success across the AP/IB program. Specifically, EOS supports schools in the use of tools and facilitation around attrition, supports, belonging, activation of learning mindsets, and student experiences.
3. *Year 3--Sustaining success*: EOS supports continued growth and monitors the program for participation and success through ongoing data analysis and tool delivery.

Role of EOS staff assigned to districts

EOS documents specify that a team of EOS staff is assigned to the district to perform EOS's responsibilities (G. Jones, personal communication, August 23, 2019). The partnership director and partnership managers are responsible for managing client relationships and EOS deliverables, as well as providing project management, strategic planning (re: the Collaboration), and coaching support to principals and district leadership. The partnership director or manager assigned to the district serves as a dedicated, strategic thought partner and project manager throughout implementation, and monitors and tracks progress during and between in-person visits throughout the year. An analyst from EOS liaises with MCPS, as the main point of contact for data uploads. Using these data from school districts, a portal or data repository is customized for each school and district. Subsequently, that school-specific information is used to address the unique needs of each school.

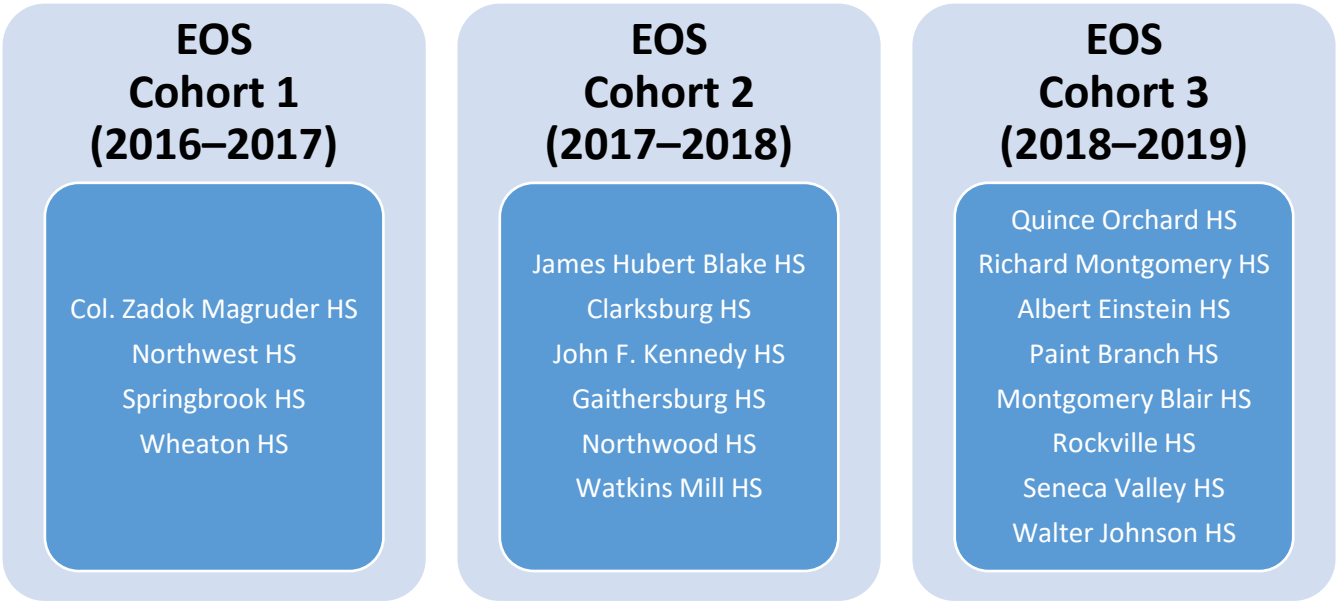
Overview of EOS Initiative in MCPS

Implementation of Equal Opportunity Schools Initiative in MCPS from 2016–2017 to 2018–2019

The EOS initiative began in four MCPS high schools in 2016–2017 (Cohort 1) (Figure 2). Fourteen schools were added in the two years following [six in 2017–2018 (Cohort 2), and eight in 2018–2019 (Cohort 3)] to the partnership with Equal Opportunity Schools (EOS), bringing the total number to 18 high schools for the 2018–2019 school year (MCPS, 2018).

Figure 2

MCPS Equal Opportunity Initiative (EOS) Schools by Cohort



Objectives of EOS and MCPS Collaboration

In a Memorandum of Understanding (MCPS, 2016), EOS and MCPS jointly committed to the three objectives below. The timelines for the targets were established initially for the four Cohort 1 EOS schools. Dates are indicated below to represent timelines for each Cohort relative to the school year they began participation.

1. Fully close race and income participation gaps in AP/IB by fall of following school year, as measured by equally high AP/IB participation rates for Hispanic or Latino, Black or African-American, and low-income students as compared to their peers.
2. Raise AP/IB performance by spring of following school year, as measured by passing rates on the AP/IB exam.
3. Develop systems and structures for the district to sustain and improve upon these results in future years, catalyzing a higher sense of what's possible for students who have not taken an AP/IB course in 9th or 10th grade, and enabling further increases in college readiness and closure of opportunity and achievement gaps. (MCPS, 2016, p. 2)

EOS Initiative Logic Model in MCPS

The logic model (see Figure 3) specifies the rationale or needs being addressed, resources, and activities (structural and organizational arrangements) and the expected short- and long-term outcomes of EOS in MCPS.

Figure 3

Logic Model of EOS Initiative

Logic Model for EOS in MCPS: Inputs, Activities, Expected Results, and Anticipated Outcomes **Goal:** Reversing the trend of inequitable participation in AP/IB					
Context/Needs and Issues	**Inputs**	**Outputs/Results**		**Outcomes**	
Rationale for EOS in MCPS	**Resources and Structures Instituted**	**Activities/structures: What we do/who we reach**	**Participation Metrics/Immediate results**	**Expected Short Term Changes**	**Expected Lasting Changes**
Students impacted by poverty and students of color missing from AP/IB courses in their schools	1 FTE coordinator for EOS schools 1 consultant (external) Annual survey of 9-12 students and teachers EOS Portal Student academic supports AP Summer Bridge program Semester AP/IB reports Belonging Workshops for Equity teams AP/IB exam costs covered	**Survey of student and staff** **PD differentiated for site and cohort needs** • **Workshops** • **Equity Leader Labs** **Instituting outreach plans** • Needs assessment • Finding students without previous AP/IB courses • Enrolling students without previous AP/IB courses • Supporting first time AP/IB course takers **Site Level management and coordination of EOS** • Establish Equity teams • Train advocates • Monitoring of student progress and needs **Who is reached?** teachers; counselors; principals; equity teams; parents; students	Number of low income and students of color enrolling in their first AP/IB class Number of low income and students of color passing their first AP/IB class Attendance in PD session and equity labs [# and role of staff who participated in PD] # and variety of structures and processes put in place to facilitate monitoring of access and success of students in AP/IB courses Types of academic support available to students taking AP/IB courses Number of students participating in support opportunities	• Decrease in roadblocks that impede equitable access (GPA cut-offs, recommendations, parent signatures, stringent prerequisites, AP/IB contract, registration fee) • Increased advocacy for student without any AP/IB course experience by Grade 11 • Increased feeling of belonging for students • Increase in AP/IB course offerings • Increased course requests • Students continuing to take AP/IB in 12th grade • Increase in percentage of students career and college ready	• Sustaining belonging rich learning environment for all students • Increased culture of rigor, belonging, and success • Equitable access and success in AP/IB for students of all backgrounds Trained support network accessible--teachers, counselors, advocates

Note. The Logic Model was developed by the Program Evaluation Unit in collaboration with MCPS EOS program representatives, 2019.

Literature Review

The following section is a brief review of literature related to rigorous high school courses and the relationship to college and career readiness, trends in AP/IB and dual enrollment participation, factors associated with inequitable access to rigorous high school courses, examples of promising approaches for achieving equity in AP/IB participation, and trends in AP/IB participation in MCPS schools.

Types of College Level Course Work in High School and Their Potential Benefits

College-level coursework for high school students is defined as an advanced curriculum that provides students with postsecondary learning experiences while they are still in high school, allowing students to earn college credit in some instances (US Department of Education, 2017). The growing demand for advanced courses in high school is supported by research that shows students who take these rigorous high school programs are better prepared for college, more successful in college admissions, get scholarships, do well in their classes, and graduate in four years (Finn & Scanlan, 2019; Kettler & Hurst, 2017; The College Board, 2020; Clinedinst & Patel, 2019). Specifically, participating in any of the AP, IB, and dual enrollment options affect GPA, class rank calculations, and access to specialized high school diploma credentials. For the high schools that offer students a weighted GPA for completing an AP, IB, or dual enrollment course, the GPA boost leads to a higher overall GPA and class rank, which, in turn, helps achieve college acceptance and a better chance of being granted a scholarship (Kettler & Hurst, 2017). Indeed, colleges and universities regularly cite taking rigorous high school coursework as one of the most important criteria for college admissions (Clinedinst & Patel, 2019; Klopfenstein & Thomas, 2009; Theokas & Saaris, 2013). Colleges also look to the difficulty of students' scheduled classes to ascertain a student's level of commitment to challenging his/herself throughout high school. In particular, most public 4-year colleges expect students to take three or four credits of math and science in high school and encourage students to take advanced courses (MSDE, 2020). In general, students with AP math experience are significantly more likely to be college-ready in math than students without AP math experience (Bowers & Foley, 2018).

Advanced Placement (AP). The AP program consists of 38 college-level courses in seven subjects with corresponding exams. Students can take one or more classes, depending on their school, schedule, and goals. Students must pass an exam to receive college credit and placement. Typically, a score of 4 or 5 is required to receive credit. Placement refers to a student being able to skip general education core courses usually required during the first years of college if the college honors AP courses (The College Board, 2020; MSDE, 2020).

International Baccalaureate (IB): The IB diploma is recognized worldwide as the benchmark of high achievement in a high school curriculum (International Baccalaureate Organization [IBO], 2020). In many high schools, students have the option to either take a few IB courses or pursue the prestigious IB diploma. College credits from IB courses are awarded only for the students who complete the full IB Diploma program and take the Higher Level (HL) exam. According to IBO, some colleges waive all the core requirements for IB Diploma holders. Notably, an IB student or any student for that matter can take AP exams without being enrolled in an AP class; a student must be enrolled in an IB class to take an IB exam.

Dual-Enrollment Courses. Across the nation, AP and dual enrollment are the most extensive and fastest-growing programs providing high schoolers with early access to college coursework (Fink, Jenkins, & Yanagiura, 2017; Datapoint, 2019; Xu, Fink, & Solanski, 2019). Unlike AP or IB, dual enrollment is 1) a broad category, including many types of college course-taking arrangements. To qualify for the credit, students have to meet the criteria set by their school district and participating colleges, and dual enrollment courses must be offered at a regionally accredited institution (MCPS, 2020a; MSDE, 2020a; MSDE, 2020b). Mainly, dual enrollment students enroll twice: they earn both high school and college credits for the same course. The increase in dual enrollment is associated with two trends: 1) an increase in policies that allow high school students to enroll in a community college or university courses, and 2) community colleges and 4-year institutions have built a pipeline for students moving from high school to college (Thompson, 2017; The National Center for Public Policy and Higher Education, n.d.). One of the critical differences between dual enrollment and AP/IB is that most dual enrollment classes provide students with in-class instruction at a college or university.

In some cases, such as MCPS, courses may be offered on a high school campus or online, making dual enrollment very convenient (MCPS, 2020). Similar to students taking IB courses, dual enrollment students may opt to take an AP exam to demonstrate their high degree of mastery of the subject matter. Lastly, for students whose goal is to reduce the costs of attending a state university, dual enrollment credits are a guaranteed discount (Fink, Jenkins, & Yanagiura, 2017). As such, dual enrollment also speeds the transition from high school to college or career, promotes college completion, and reduces college costs.

It is unclear, from the research at hand, how the increase in DE is affecting enrollment in AP/IB courses and how the characteristics of students in these options compare.

College-Level Coursework and College Admissions

Many students pursue rigorous college-level courses in high school, primarily from a career or college admissions-driven mindset (AP Central, 2020). Choosing to enroll in AP, IB, or dual enrollment can save a student time and money, help them accumulate college credits, improve their chances of acceptance at the schools of their choice, prepare them for the rigors of college academics, and raise their weighted GPA.

However, based on a review of college admission websites, colleges and universities do not automatically consider AP or IB, or dual enrollment harder or more impressive on a transcript. Since IB is a rarer program, colleges do not penalize students for not taking it. Dual enrollment locations, on the other hand, do matter when students are making college selections. Because of the differences in IB and AP course grading and availability, colleges—especially the most selective ones—explicitly tell applicants that they just want to see that a student has taken the most challenging course load available at the school. For example, on its admissions website, Princeton urges students to challenge themselves with the most rigorous courses possible, such as honors, AP, and dual enrollment (Princeton University, 2020). Nevertheless, AP and IB classes have been the most commonly promoted and well-known among the three options.

Trends in Participation and Success in AP/IB Courses

In the *College Board AP Program Results: Class of 2019 Report* (2020), it was indicated that in public high schools nationwide, more than 1.24 million students in the class of 2019 took 4.26 million AP exams (AP Central, 2020). Compared to 2010, the number of US public high school graduates who took an AP exam in 2019 had increased by 57 percent. Over the same time, the number of students who scored a 3 or higher on at least one AP exam increased by 60 percent.

Similarly, in 2019, the IB diploma program was offered in 942 schools in the United States. Between 2015 and 2019, the number of IB programs offered worldwide grew by 37.9 percent, and the number of IB diplomas awarded worldwide increased from 7,505 in 2015 to 10,735 in 2019 (IBO, 2020).

Also noticeable from the College Board data is that some groups —including Black or African American and American Indian or Alaskan Native students—have continued to be underrepresented among the participants in AP courses and those passing the tests. Based on these trends, researchers continue to emphasize the need to: 1) recruit and enroll AP students who reflect the overall demographics of a school, and 2) to make every effort to ensure the percentage of students scoring 3 or higher on an AP exam matches the proportion of that demographic group within the school (Finn & Scanlan, 2019; GAO, 2018; Patrick, Socol, & Morgan, 2020).

Access to AP and IB Courses

The most commonly cited academic barriers to access to AP/IB were: 1) students were behind academically before they get to high school, 2) students attended schools that did not have rigorous courses, and 3) schools had stringent requirements for enrollment in AP courses in the first place (GAO, 2018; Mathews, 2019; Theokas & Saaris, 2013). When Education Trust researchers, Theokas and Saaris (2013) examined AP and IB participation rates nationally, and by school, they found that many students of color and students from low-income backgrounds were "missing" from rigorous courses—that is, many who could benefit from the classes were not enrolled in AP/IB courses. The findings demonstrated how too many low-income students and students of color were missing out because within-school barriers were limiting access in both AP and IB. For the schools in the study, opportunity gaps were evident in many ways: between schools, types of programs offered, and within schools. Within a school, middle and high-income, White, and Asian students were three times as likely to enroll in an AP course as were low-income students. Notably, while participation rates existed between schools, the most evident advanced course opportunity gap was found within schools, not between. The study also pointed out that IB programs serve an even smaller proportion of students within their schools than do AP programs, from 1 in 19 in IB compared with 1 in 9 in AP. The research concluded that participation gaps and achievement gaps could be eliminated if every school with an existing AP program focused on finding its own “missing students.”

This seminal study influenced the initiation of the Lead Higher states consortium and equal opportunity schools (MSDE, 2019). Across these studies, factors and attitudes that delimit participation in the advanced courses include:

- Building the master schedule to support the AP program, which usually involves smaller class sizes.
- Teachers, counselors, parents, researchers, students, and administrators are skeptical and resistant.
- Students and parents are often unaware of the benefits of the AP program.
- The culture has been that "AP and advanced classes are only for the top students."
- Shortage of financial support to implement and sustain AP programs.

Nature of Differences in AP/IB and Dual Enrollment Participation

These disparities in student participation in rigorous high school courses are widely reported in a variety of settings (Theokas & Saaris, 2013; Fink & Scanlan, 2019; GAO, 2018; Kettrel & Hurst, 2017; Shores, Kim, & Sill, 2020; Blad, 2020; Reardon, Kalogrides & Shores, 2018; Patrick, Socol, & Morgan, 2020; Xu, Fink, & Solanki, 2019; US Department of Education, 2019a). According to Finn and Scanlan (2019), the disparities in academic performance are primarily connected with unequal access to quality schooling and other educational opportunities and resources, and such disparities are not limited to income. The authors noted that racial, geographical, and gender gaps also exist.

Kettler and Hurst (2017) analyzed the ethnicity gaps in AP, IB, and dual enrollment programs longitudinally from 2001 to 2011 in 117 suburban high schools. The results indicated that AP/IB/dual enrollment participation increased for all students over time. However, the differences in participation rates remained the same from 2001 to 2011 between ethnic/racial groups. Overall, the researchers found:

- AP is more prevalent in urban and coastal areas, and dual enrollment is more prevalent in rural communities and the middle of the country.
- AP and dual enrollment participation varied substantially among high schools within districts.
- Gaps in access to AP and dual enrollment programming were stratified by 1) race/ethnicity and 2) income-disparity (as measured by free lunch rates).
    - Income was a consistent and strong predictor of racial/ethnic gaps in both AP and dual enrollment.
    - AP/IB participation gaps between Black or African American and White students are most evident in schools with overall high achievement.
    - As the percentage of minority faculty in a school increased, the within-school differences in AP/IB participation rates for Hispanic/Latino students decreased.
- Districts in states with strong mandates for access to AP or dual enrollment programs, backed up by accountability systems, have significantly higher enrollment rates than do states with weak accountability or none at all.

Xu, Fink, and Solanki (2019) also reported racial/ethnic gaps in AP and dual enrollment participation across several thousand school districts and metropolitan areas in the US. In their study, a quarter of districts had racial/ethnic disparities equal to or larger than 10 and 7 percentage points for AP and dual enrollment, respectively. School districts with larger proportions of Black or African American and Hispanic/Latino and low-income students tended to have more significant racial/ethnic gaps in both AP and dual enrollment. Further, school district and state policies that require that students have completed a certain number of

credits and approval from parents/guardians and school administration for dual-credit programs make it difficult for students from underserved backgrounds to access the opportunity.

Several recent studies showed that students in relatively poor and small schools had less access to AP/IB/dual enrollment, especially in racially-diverse schools (Patrick, Socol, & Morgan, 2020; GAO, 2018; Excel*in*Ed, 2018). Overall:

- Student access to more advanced high school courses decreased as the level of school poverty increased.
- As school poverty increases, the percentage of AP courses offered decreases overall.
- Nationally, inequities are most evident due to: (1) schools that serve mostly Black or African American and Hispanic/Latino students not enrolling as many students in advanced classes as schools that serve fewer Black or African American and Hispanic/Latino students; and (2) schools – especially racially diverse schools – limiting Black or African American and Hispanic/Latino students' access to rigorous courses.

These findings highlight that in a variety of settings across the country, Black or African American, Hispanic/Latino, and American Indian students and students from low-income households are less likely to take Advanced Placement, dual-enrollment, and other challenging courses than their White, Asian, and more-affluent peers. Also, these findings reveal that access to rigorous instruction for Black or African American and Hispanic/Latino students and low-income students is more evident in racially diverse schools.

Promising Approaches to Increasing Equity in AP/IB Courses

Converging evidence demonstrates that the best approach to ensure equitable access to high-level courses is to ensure that all student groups enroll in these classes at the same rate. The first step is to recognize that advanced programs must be available to a broader group of students, not just the most talented (Theokas & Saaris, 2013; EOS, 2020; MCPS, 2020; Porter, 2019; Belcher, 2017; Finn & Scanlan, 2019; Hamilton et al., 2017). The most effective practices include:

- Expert leadership at the district and school level.
- School-wide administrator and teacher buy-in. This practice involves building a shared understanding of the institutional racism and classism, and implicit bias.
- Change in school wide policies and practices:
  1. Developing a shared comprehensive vision of an equitable environment at the school and district levels,
  2. Eliminating low-level courses with reduced academic expectations,
  3. Increasing the capability of staff to provide productive and inclusive learning environments for all students, and
  4. Providing information to parents about the benefits of participating in rigorous instructional programs.

In her report Porter (2019) summarizes how several districts have adopted a combination of these approaches to diversify enrolments in AP/IB. Two of the successful efforts are school districts that partnered with EOS: San Jose Unified School District in California and Columbia Public Schools in Missouri. San Jose Unified School District, for example, is reported to have more than doubled the number of low-income and minority students participating in AP or IB classes while maintaining their exam pass rate (Porter, 2019). Similarly, after noticing a lack of diversity in AP classes in two large high schools, Columbia Public Schools in Missouri partnered with EOS. The most critical challenge at the start of the EOS partnership was allying concerns of: 1) AP teachers who feared the AP pass rate would drop, 2) some counselors who questioned the readiness of students for the rigorous AP curriculum, and 3) students who were worried about the impact on their GPA. After recruiting the students missing from AP/IB classes, the schools instituted the following supports:

1. Added mandatory, ongoing academic support;
2. Provided academic interventions for all students, with an AP teacher;
3. Used organizational and study skills strategies;
4. Connected students with an adult mentor to assist the student in achieving and maintaining early success; and
5. Prevented the recruited students from dropping AP class without conferring with the principal about their decision or struggles.

Within a year, 238 low-income students and students of color enrolled in AP courses—four times the rates for previous years—and the AP pass rates were consistent with past years (Belcher, 2017),.

Participation and Performance in AP/IB in MCPS

Over the years, MCPS has made concerted efforts to provide more students with access to rigorous high school instruction (MCPS, 2019a; Liu, 2019; Liu, 2020). In 2019, all 25 MCPS comprehensive high schools offered AP courses, and eight schools provided IB programs. MCPS has witnessed sizeable increases in students enrolling and attaining passing scores in AP/IB courses as a result of a variety of efforts employed. In a report specific to the class of 2019, Liu (2020) reported that about two-thirds of 2019 MCPS graduates (67%) took one or more AP exams compared with 47 percent in the state of Maryland and 39 percent nationally. The number of exams taken in MCPS during the 2018–2019 school year accounted for 39 percent of all AP exams taken in the state of Maryland (MCPS, 2019b). With regard to student performance, more than one half (52%) of 2019 MCPS graduates earned at least one AP exam score of 3 or higher compared with 32 percent of the public-school graduates in the state of Maryland and 24 percent of the national graduates in public schools. At least one-fifth of students in the eight IB schools took one or more IB courses.

To boost access and success in AP/IB courses for all students regardless of racial, ethnic, and socioeconomic backgrounds, MCPS joined the *Lead Higher* initiative (MSDE, 2019) in 2015. The *Lead Higher* initiative for states was created by a consortium that included Equal Opportunity Schools (EOS), College Board, International Baccalaureate, and a lead philanthropic partner, the Jack Kent Cooke Foundation (MSDE, 2016). As a Lead Higher state, Maryland was committed to collaborating with EOS to increase student diversity in AP and IB courses. They had the following objectives:

1. Close the statewide race and income participating gap in AP/IB by 2019–2020.
2. Raise AP/IB performance by spring 2020–2021.
3. Develop systems and structures for the state to sustain and improve upon these results in future years.

The success of MCPS's partnership with EOS is detailed in the text, *Learning in the Fast Lane*, by Chester Finn and Andrew Scanlan (2019), who are two of the country's most respected education analysts. Beginning in 2016–2017, MCPS contracted with EOS to work with four of 25 high schools; six high schools were added in 2017–18 and eight more in 2018–19. The researchers reported that "In one year, every participating high school in the district added more than one hundred low-income students and students of color to their AP/IB programs. Across the first set of four high schools, the number of students of color and low-income students in AP/IB classes increased by 40 percent" (Finn & Scanlan, 2019, p. 6). In addition to increasing the numbers enrolled, MCPS emphasized increasing a sense of belonging for different groups of students enrolled in the AP/IB classes and persuading school-level teams that it was their responsibility to ensure that all students were successful (Finn & Scanlan, 2019, p. 23). The participating schools also worked on the timing of course selection, on school schedules, and to ensure that all schools have sufficient staff to teach AP/IB classes. Because a sense of belonging strongly influences students' enrolment and pass rates, the schools created teams to build a more inclusive attitude in AP/IB courses.

Methodology

Evaluation Scope

The purpose of this study was to examine:

1. Trends in participation and success of students receiving FARMS services and Black or African American and Hispanic/Latino students in AP/IB courses following the implementation of EOS initiative in MCPS schools;
2. Progress toward attainment of school-level equity for enrollment and performance in AP/IB EOS schools; and
3. Academic and behavioral outcomes (as measured by GPA and college and other specified career readiness measures) for students in each cohort of EOS schools, as well as schools not yet implementing EOS from SY 2016 to 2019.

Study Design

A non-experimental, design was applied in this study. To examine participation and sucess in AP/IB courses following the implementation of EOS, an EOS entry-year cohort study design was applied. Analysis of enrollments and performance in AP/IB courses were based on the year a school started implementing EOS, and each cohort of schools was followed for two or three years. The EOS initiative was introduced in 2016–2017 in Cohort 1 schools, in 2017–2018 in Cohort 2 schools, and in 2018–2019 in Cohort 3 schools. In each cohort, students were recruited for AP/IB enrollment in the year following EOS introduction. This study examines outcomes for students in EOS Cohorts 1 and 2; outcomes for Cohort 3 were not yet available for this report.

Evaluation Questions

The evaluation questions guiding this study were organized into two categories: 1) questions related to participation, and 2) questions related to performance and success in AP/IB courses.

Questions related to participation:

1. What were the characteristics of Grade 10 and 11 students who had not taken any AP/IB courses for each cohort?
2. What percentage of Grade 10 and 11 students in Cohort 1 and 2 schools who had not taken any AP/IP course enrolled in an AP/IP course in the following year relative to peer schools without EOS? Was enrollment related to student characteristics?
3. What is the trend in AP/IB enrollment among all Grade 10 and 11 underrepresented students in Cohorts 1 and 2? How does it compare with the trend in the enrollment of all underrepresented students in schools not implementing EOS? Was enrollment related to student characteristics?
4. a. To what extent did Cohort 1 schools attain their specified school level target of "students needed to achieve equity" in SY 2018, 2019, and 2020 relative to SY 2017? Did the attainment of within-school targets for AP/IB enrolment vary by student characteristics?

   b. To what extent did Cohort 2 schools attain their specified school level target of "students needed to achieve equity in SY 2019 and 2020 relative to SY 2018? Did the attainment of within-school targets for AP/IB enrolment vary by student characteristics?

Questions related to AP/IB performance and success:

5. Among students in Cohort 1 and 2 who previously had not taken any AP/IB courses, what were the course taking and performance outcomes in the year following EOS implementation? Did the course outcomes vary by student characteristics?
6. What was the overall level of performance in AP/IB courses for students in Cohort 1 and 2 schools in the year following the implementation of EOS? Did it vary by student characteristics?
7. How do the academic and behavioral outcomes (i.e., weighted GPA, 4-year cohort graduation rates, attendance, suspensions, taking courses in the Career and Technology Education (CTE) program or through dual enrollment options) of students in schools implementing EOS compare with those of their peers in non-EOS schools?
8. What is the status of AP/IB course offerings in EOS and non-EOS schools from SY 2017 to SY 2019?

Study Measures

To address evaluation questions 1 through 3 and 5 through 9, data were compiled from student enrollment files, report card files, and official AP and IB test score files for students in Grades 9, 10, 11, and 12. Data to address question 4 (school target and school progress) were compiled from the EOS portal, which summarizes student and school-level information for each of the schools that participated in the program.

Four types of variables were used in this study:

I. Demographic and background information.

a. Indicator of attending an EOS school by Cohort from 2016–2017 to 2018–2019
b. Grade level from 2016–2017 to 2018–2019
c. Race/ethnicity
d. Gender
e. Receipt of special services from 2016–2017 to 2018–2019: students who had previously received or were currently receiving special services, such as the Free and Reduced-price Meals System (FARMS) services, English for Speakers of Other Languages (ESOL), or those who had Limited English Proficiency (LEP)

II. AP/IB course information, enrollment, credit earned, exams taken and scores earned

a. Record of students who had not taken any AP/IB courses as of the first-year implementation of the EOS program (computed from course records from 2014–2015 through 2018–2019)
b. Record of students taking an AP/IB course for the first time the following years after the EOS program started (computed from course records of 2017–2018 and 2018–2019)
c. Records of any student enrolling in an AP/IB course (computed from course records of 2017–2018 and 2018–2019)
d. AP/IB outcomes and exam records of 2017–2018 and 2018–2019 (AP/IB credits enrolled, AP/IB course grades, number of AP/IB tests taken, and AP/IB tests scores).
e. List of AP/IB courses offered in all MCPS high schools (extracted from the end-of-year report cards from 2016–2017 to 2018–2019)

III. Overall academic and other indicators of academic standing.

a. Unweighted grade point average. The grade point average (GPA) is the average number of grade points earned per course in Grades 9 through 12, including grade points earned for successful completion of specific high school level courses taken while in middle school (MCPS, 2018).
b. Weighted high school grade point average from 2016–2017 to 2018–2019. The weighted grade point average (WGPA) is a recalculation of the GPA, substituting weighted grade points for regular grade points earned in courses designated as honors or advanced level (MCPS, 2011).
c. Four-year cohort graduation rates from 2016–2017 to 2018–2019.
d. Average daily attendance from 2016–2017 to 2018–2019.
e. Record of students with one or more suspension from 2016–2017 to 2018–2019 (computed from suspension records of the same school years).
f. Record of students who enrolled in a Career and Technology Education (CTE) course from 2016–2017 to 2018–2019 (computed from special programs data provided by Office of Technology and Innovation (OTI)).
g. Record of students in a dual enrollment program from 2016–2017 to 2018–2019 from institutional databases.

IV. Data from the EOS portal

a. *School-level target*. The school-level target was defined as the percentage of students of a certain race/ethnicity needed to achieve equity in the school in a particular year, which was determined by the highest percentage of students of another race/ethnicity taking at least one AP/IB course. For example, in most of the cases, the percentage of White or Asian students not receiving FARMS services who take AP/IB set the target for their peers of other races/ethnicities. Since these percentages can be different every year, the targets can also change every year.
b. *School-level progress*. School-level progress in AP/IB participation was represented by the percentage of students of certain characteristics that the school achieved enrollment in AP/IB in a particular year.

Analytical Samples

- For questions 1, 2, and 5, the sample consisted of Grade 11 and 12 students identified as not previously taking AP/IB courses.
- For question 3, the sample included underrepresented students in EOS schools (Cohort 1 and 2) and their comparison schools (Cohort 2 and 3, and Cohort 3, respectively).
- For question 4, the sample included schools participating in the EOS program (Cohort 1 and 2).
- For question 6, the sample included all students in EOS schools (Cohort 1 and 2).
- For question 7, the sample included all students in EOS schools (Cohort 1 and 2) and in their comparison schools (Cohort 3).
- For question 8, the unit of analysis was the school; the sample included all 25 MCPS schools in MCPS.

Data Analysis Procedures

Different procedures were used to address the evaluation questions, including descriptive statistics (counts, percentages, means, and standard deviations), tests of significance (one-way ANOVA, Chi-square, and Chi-square goodness-of-fit tests), and advanced analyses (analysis of covariance and logistic regression). More details about the procedures conducted are organized by the evaluation question.

The analytical procedures varied by question—with three different analytical procedures applied overall: 1) descriptive analyses, 2) logistic regression or chi square tests for rates of taking or passing AP/IB courses, and 3) analyses of covariance (ANCOVA) on behavioral and academic outcomes such as interval level outcomes number of courses taken, grades earned on AP exams, weighted GPA, attendance and suspension rates. More details about the procedures conducted are organized by the evaluation question.

Evaluation Question 1. The sample for Question 1 was all students in Grades 10 and 11 in Cohorts 1, 2, and 3. The analyses used descriptive statistics to identify and summarize the characteristics of Grade 10 and 11 students who had not taken any AP/IB courses before their school started implementing EOS (2016 for Cohort 1; 2017 for Cohort 2, and 2018 for Cohort 3).

Evaluation Question 2. The analytical sample for Question 2 was the Grade 10 and 11 students without prior AP/AB experience. The analyses used descriptive statistics to summarize the proportions of students who took their first AP courses in Grade 11 or 12. Then, Chi Square tests were used to compare the proportion of students in EOS schools who took their first AP/IB course after their school implemented EOS with the proportion of first-time course-takers in schools without EOS. Further, logistic regression analysis was used to explore factors associated with enrolling in AP/IB courses; factors in the analyses included enrollment in EOS school, demographic characteristics, and prior academic performance. Analyses were conducted separately for Cohorts 1 and 2.

Evaluation Question 3. The analytical sample for Question 3 was all underrepresented students in Cohort 1 and 2 schools—students receiving FARMS services, Hispanic/Latino and Black or African American students. First, descriptive statistics (counts, percentages, means, and standard deviations) were used to compute the percentage of underrepresented students who enrolled in AP/IB courses. Then, Chi Square tests were conducted to compare rates of enrolling in AP/IB among underrepresented students in Grade 10 and 11 from EOS schools and their peers from comparison schools. Because the student's enrollment in AP/IB courses can be related to a variety of factors, logistic regression analysis was used to explore other potential influences associated with enrolling in AP/IB courses; factors in the analyses included enrollment in EOS school, gender, grade, and prior academic performance. Odds ratios (OR) were reported to indicate which factors were associated with increased probability of enrolling in AP/IB courses.

Evaluation Question 4. Three steps were used to address question 4.

1. School-level descriptive statistics were extracted from the EOS portal. These data comprised measures of: 1) annual targets for each student group and 2) actual participation in AP/IB from 2016 to 2020. The goal of Question 4 was to examine the percentage of students who enrolled in an AP/IB course for the first time in a given school and how close a school was to attaining its annual within-school equity target.
2. The difference between the target and actual enrolment, or equity gap, was computed for each student group for each of the four Cohort 1 schools and six Cohort 2 schools. For each school the analyses for were completed separately by the following student groups to examine whether the attainment of within-school equity varied by student characteristics: FARMS, Hispanic/Latino, Non-FARMS Hispanic/Latino, FARMS Black or African American, and Non-FARMS Black or African American.
3. The third step involved computing summary statistics on improvements toward school-level equity in AP/IB participation in 2020 relative to 2017 by comparing the equity gap in 2017 to 2020.

Evaluation Question 5. The goal of Question 5 was to assess if there were any differences in the performance of first time AP/IB course takers on the number of credits earned, course grades, and AP exam performance between students in EOS and those in non-EOS schools. Since students were not randomly assigned to cohorts, ANCOVA was used to statistically control for background variables and preexisting differences among individual students. Student characteristics controlled in the analyses were: previous GPA, receiving FARMS services, receiving ESOL services, and race/ethnicity other than Asian or White. In addition, Chi-square tests were conducted to examine if there were any significant differences in percentage of students passing an AP/IB course with a C grade or higher between students in EOS and students in non-EOS comparison schools.

Evaluation Question 6. Descriptive statistics (means, standard deviations, and percentages) were calculated to show the overall AP/IB performance of students in EOS schools in the year following their school implementing the EOS program. Descriptive statistics are reported for all students and by focus group.

Evaluation Question 7. Descriptive statistics (counts, percentages, means, and standard deviations) were used to examine the academic and behavioral outcomes of students in EOS schools and their peers in schools without EOS. Summary information is presented for all students, by grade level, and by focus group. Differences between outcomes in these two groups of schools (schools implementing EOS and schools not implementing EOS) were tested via one-way ANOVA or chi-square tests (when appropriate).

Evaluation Question 8: To address Question 8, data on all AP/IB courses offered in each of the MCPS high schools from 2016 to 2019 were compiled from student report cards and MCPS reports (Liu, 2020). Summary statistics for the total number of AP and IB courses available in each school from 2016 to 2019 were computed separately by year. Further, trends in the mean number of courses, controlling for school size (number of students), were examined for each cohort of schools. Lastly, the net change in the number of courses offered by schools within each cohort from 2016 to 2019 was examined. Additionally, school level demographic information of students in each school (based on SY 2019–2020 September 30, 2019 official count) were reported to provide a demographic profile of each school.

Delimitations, Strengths, and Limitations

Delimitations. Delimitations are factors that can restrict the questions a researcher can address or answer, as well as the inferences that can be drawn from the findings.

MCPS has 25 high schools that were not evenly distributed across cohorts. The number of schools affects the types of analyses conducted when using only school-level information. For question 4 and part of question 8 (four-year cohort graduation rates only), data were only available at the school level (n <= 14). Therefore, this evaluation was not able to test significant differences of the schools' progress toward equity in AP/IB participation over time nor the differences of four-year cohort graduation rates between EOS and comparison groups of students. In addition, the number of schools per cohort, for use in the trend analyses of courses by cohort in question 8, was not large enough for the authors to complete the proposed additional analyses.

Based on the study design, a comparison group for Cohort 3 could not be created in a way that was consistent with the comparison groups for Cohorts 1 and 2. In this study, comparison schools comprised the schools that implemented EOS in subsequent years, but were not part of the EOS program in a specific year of analysis. There was no indication that the remaining seven schools, not implementing EOS by 2019–2020, would be part of the EOS program in the future. Further, overall outcomes for Cohort 3 (Question 7) could not be reported because data for the 2019–2020 school year, when EOS was in place in Cohort 3 schools, was incomplete or not available.

Strengths. This study has many strengths. A cohort analysis approach was used to compare cohort of schools on a variety of measures allowing the researchers to examine patterns between cohorts of schools and over a three-year period. This approach takes into account the developmental shifts that take place from year to year. For instance, some questions in this study (1, 3, 4, and 8) reported information for several years, and some questions required the use of past student records to identify individuals with and with no AP/IB experience.

A variety of MCPS records provided many usable student level data to draw from which facilitated the: 1) use of advanced statistical procedures (where applicable) since samples were large, and 2) analysis of the data by student groups. The ability to link and compile a variety of student level data and to disaggregate data by student groups enabled the researchers to analyze commonalities and differences among AP/IB course takers to determine which students' outcomes are more strongly influenced by having the EOS program in a school. In addition, the use of demographic and previous academic data allowed researchers to conduct advanced statistical analyses that controlled for background differences of student groups, yielding a more reliable and valid comparison.

Finally, the study explored other factors that may help explain why students may be missing from AP/IB courses—by examining the extent to which underrepresented students were also participating in the other available options of dual enrollment and CTE, which are likely to compete for time on a student's schedule with AP/IB courses.

Limitations. In addition to the above analyses, a survey and school-level questionnaire were planned to elicit information on the experiences of school-based staff regarding: how schools made decisions, successful aspects and challenges to implementing efforts to increase access and success of underrepresented students in AP/IB courses among schools participating in the EOS program and schools not implementing EOS. However, these data collection activities were suspended due to the school building closures caused by the COVID-19 pandemic. As such, this study does not report on which aspects of the EOS program the schools consider the most effective for increasing enrollment and boosting success of underrepresented students in AP/IB courses.

Findings

The findings of this report are organized by evaluation question.

Question 1: What were the characteristics of Grade 10 and 11 students who had not taken any AP/IB courses for each Cohort?

Overall, more than one-half of the Grade 10 and 11 students in Cohorts 1 (2016–2017) and 2 (2017–2018) schools (53% and 57%, respectively) did not have any AP/IB experience when the EOS program started (see Table 1).

Grade-level. When data were disaggregated by grade-level, about two thirds of Grade 10 students had no AP/IB experience among Cohorts 1 (61%) and 2 (68%) schools compared to about one half of Grade 10 peers in Cohort 3 schools (51%). For Grade 11 students, 42 percent of students in Cohort 1 and 2 had no AP/IB experience compared with only 29 percent of Grade 11 students in Cohort 3 schools who had no AP/IB experience (Table 1).

Gender. More than one half of the male students in Cohorts 1 and 2 schools (59% and 65%, respectively) did not have any AP/IB experience, compared to 46 percent and 49 percent of the female students in the same schools. For Cohort 3 schools, the percentage of male and female students with no AP/IB experience was lower than Cohorts 1 and 2 schools; however, this percentage was still higher among male than female students.

Race/ethnicity. Looking across the three cohorts of schools, the percentage of students who did not have any AP/IB experience was higher among Hispanic/Latino and Black or African Americans students compared to their peers of other races/ethnicities. For instance, more than 62 percent of Grade 10 and 11 Hispanic/Latino students and more than 52 percent of Grade 10 and 11 Black or African American students had not taken any AP/IB courses by the year when the EOS program started in their schools. Conversely, across the three cohorts, the majority of the Asian and White students had AP/IB experience before the start of EOS in their school. Therefore, only one third of Asian students (34%) and 41 percent of White students did not have any AP/IB experience (Table 1).

Special Services Receipt. From 2016 to 2019, only about one third of students who were receiving FARMS services had AP/IB experience by the time the EOS program started in their school; 62 percent or more of students receiving FARMS had not taken an AP/IB course (see Table 1). In addition, 83 percent or more of Grade 10 and 11 students receiving ESOL instruction had not taken any AP/IB course when the EOS program started in their school.

Focus Groups. When previous AP/IB experience was examined by focus group, the two focus groups with the largest percentage of students not having AP/IB experience were Hispanic/Latino students receiving FARMS and Black or African American students receiving FARMS, regardless of the cohort. For Grade 10 and 11 students, more than two thirds of Hispanic/Latino students receiving FARMS services and more than 60 percent of Black or African American receiving FARMS services did not have any AP/IB experience. In contrast, only about one third of Grade 10 and 11 Cohort 1 (31%) and 2 (35%) and one fifth of Cohort 3 (20%) students in the monitoring group had not taken any AP/IB course.

Table 1

Demographic Characteristics of All Grade 10 and 11 Students and Those with no Previous AP/IB Classes During First Year of Implementation by EOS Cohorts

	Cohort 1 EOS Schools 2016–2017			Cohort 2 EOS Schools 2017–2018			Cohort 3 EOS Schools 2018–2019		
	Grades 10 & 11 - All Students	Grades 10 & 11 - No previous AP/IB classes		Grades 10 & 11 - All Students	Grades 10 & 11 - No previous AP/IB classes		Grades 10 & 11 - All Students	Grades 10 & 11 - No previous AP/IB classes	
	N	n	%	N	n	%	N	n	%
All Students	3,856	2,035	52.8	5,901	3,340	56.6	8,691	3,516	40.5
Grade									
10	2,104	1,289	61.3	3,346	2,268	67.8	4,640	2,360	50.9
11	1,752	746	42.6	2,555	1,072	42.0	4,051	1,156	28.5
Gender									
Female	1,722	784	45.5	2,948	1,434	48.6	4,255	1,445	34.0
Male	2,134	1,251	58.6	2,953	1,906	64.5	4,436	2,071	46.7
Race/Ethnicity									
Asian	573	145	25.3	539	181	33.6	1,233	262	21.2
Black or African American	1,109	644	58.1	1,728	1,019	59.0	2,011	1,038	51.6
White	710	276	38.9	777	319	41.1	2,496	566	22.7
Hispanic/Latino	1,305	892	68.3	2,650	1,730	65.3	2,567	1,559	61.7
Two or More Races	155	76	49.0	200	84	42.0	369	85	23.0
Services Received, Current									
FARMS	1,457	958	65.8	2,552	1,651	64.7	2,347	1,448	61.7
ESOL	390	348	89.2	1,222	1,015	83.1	992	902	91.9
Focus groups									
Non-FARMS Asian/White/All Other Student Groups	1,197	370	30.9	1,267	445	35.1	3,748	768	20.5
Non-FARMS Black or African American	610	326	53.4	891	486	54.5	1,202	552	45.9
Non-FARMS Hispanic/Latino	592	381	64.4	1,191	758	63.6	1,144	748	53.7
FARMS Asian/White/All Other Student Groups	244	129	52.9	256	146	57.0	365	151	41.4
FARMS Black or African American	499	318	63.7	837	533	63.7	809	486	60.1
FARMS Hispanic/Latino	714	511	71.6	1,459	972	66.6	1,173	811	69.1

Note. American Indian and Pacific Islander Groups are not reported separately by race/ethnicity because numbers are smaller than 5%, but they are included in total and other categories.

Question 2: What percentage of Grade 10 and 11 students in Cohort 1 and 2 schools who had not taken any AP/IP course enrolled in an AP/IP course in the following year relative to peer schools without EOS? Was enrollment related to student demographic or academic characteristics?

Among Grade 10 and 11 students who did not have any prior AP/IB experience, 40 percent of the Cohort 1 students and 35 percent of the Cohort 2 students enrolled in an AP/IB course in the year following the introduction of EOS at their school (Table 2). In both cohorts of EOS schools, the percentage of students who enrolled in AP/IB courses the following year was significantly (p<.001) higher than the percentage of students *enrolling in the comparison schools.*

Table 2

Number and Percent of Grade 10 and 11 Students with no Previous AP/IB Courses who Enrolled in at Least one AP/IB Course by Cohort

	EOS Schools			Comparison Schools (Non-EOS Schools)		
	Grade 10 & 11 - No previous AP/IB Classes	Enrolled in AP/IB in Following Year		Grade 10 & 11 - No Previous AP/IB Classes	Enrolled in AP/IB in Following year	
	N	n	%	N	n	%
Cohort 1, year 1	2,035	804	**39.5**	7,224	2,205	**30.5**
Cohort 2, year 1	3,340	1,159	**34.7**	3,776	1,152	**30.5**

Note. Comparison schools for Cohort 1 in year 1 include schools in cohorts 2 and 3. Comparison schools for cohort 2 in year 1 include schools in cohort 3. **Bold** represents statistically significant differences between the proportion of students who enrolled in AP/IB courses in EOS schools relative to comparison schools. See Appendix (Table A-1) for details of the Chi-square test.

Factors associated with enrolling in AP/IB courses in Cohort 1 schools. Results of the regression analyses (right side of Table 3) show that students in Cohort 1 schools were significantly (p<.001) more likely to enroll in AP/IB the year after EOS started relative to their peers in comparison schools. Further, the effect was stronger when demographic and previous academic characteristics were controlled in the analysis (OR=1.65). The relationship between first-time AP/IB enrollment and other factors is also shown in Table 3. Students who were not White or Asian, students receiving FARMS, or students with a high weighted GPA were significantly (p<.05) more likely to enroll in an AP/IB course for the first time relative to their peers who were White or Asian, students not receiving FARMS, or who had a low weighted GPA. Conversely, male students or students receiving ESOL instruction were significantly (p<.001) less likely to enroll in an AP/IB course for the first time relative to their female or non-ESOL peers (Table 3).

Table 2

Number and Percentage of Cohort 1 Students Enrolled in AP/IB Courses Relative to Peers in Comparison Schools as well as Odds Ratios for Factors Associated with Students with no Previous AP/IB Experience Enrolling in an AP/IB Course

	Descriptive Statistics by Group				Logistic Regression Results			
	EOS Cohort 1 (N = 2,035)		Comparison (N = 7,224)		***No Controls***			
	Enrolled in AP/IB in 2018						95% Conf. Intervals	
	n	%	*n*	%	β (SE)	Odds Ratio	Lower	Upper
Group (Coh.1 vs Comp.)	804	39.5	2,205	30.5	.19*** (.06)	1.21	1.10	1.34
					With Controls			
Student characteristic (categorical variables)	*n*	%	*n*	%	β (SE)	Odds Ratio	Lower	Upper
Group (Coh.1 vs Comp.)	804	39.5	2,205	30.5	.50*** (.06)	1.65	1.47	1.85
Male	462	36.9	1,088	26.6	-.15*** (.05)	.86	.78	.95
Not White or Asian	605	37.5	1,619	28.7	.31*** (.06)	1.37	1.21	1.55
FARMS	350	36.5	928	28.4	.14** (.05)	1.15	1.04	1.28
ESOL	42	12.1	258	18.8	-.86*** (.07)	.42	.36	.49
Grade 10	498	38.6	1,529	31.9	-.03 (.05)	.97	.88	1.07
Student characteristic (continuous variable)	Mean	SD	Mean	SD	β (SE)	Odds Ratio	Lower	Upper
Weighted GPA 2017	2.71	0.83	2.73	0.87	1.27*** (.04)	3.55	3.30	3.82

Note. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. SD = Standard deviation. SE = Standard error. Cohorts 2 and 3 schools are the comparison group for the descriptive statistics and are the reference group in logistic regression analysis. Interpretation of findings for ESOL should be made with caution because the number of cases is small.

Factors associated with enrolling in AP/IB courses in Cohort 2 schools. Overall, the students in Cohort 2 schools were significantly ($p<.001$) more likely to enroll in AP/IB the year after EOS started relative to their peers in comparison schools (Table 4). The effect of attending a Cohort 2 school was also evident and stronger when controlling for student demographic characteristics and GPA, indicating that attending an EOS school was strongly associated with increased enrollment in AP/IB for students in Cohort 2 schools. In examining the relationship between first-time AP/IB enrollment and other factors, Grade 10 students who were not White or Asian or students with a high weighted GPA were significantly ($p<.05$) more likely to enroll in an AP/IB course for the first time relative to their Grade 11 peers who were White or Asian or who had a low weighted GPA. Conversely, male students or students receiving ESOL instruction were significantly ($p<.001$) less likely to enroll in an AP/IB course for the first time relative to their female or non-ESOL peers (Table 4).

Table 3

Number and Percentage of Cohort 2 Students Enrolled in AP/IB Courses Relative to Peers in Comparison Schools as well as Odds Ratios for Factors Associated with Students with no Previous AP/IB Experience Enrolling in an AP/IB Course the Following Year

	Descriptive Statistics by Group				Logistic Regression Results			
	EOS Cohort 2 (N = 3,340)		Comparison (N = 3,776)		***No Controls***			
	Enrolled in AP/IB in 2019						95% Conf. Intervals	
Comparisons	*n*	%	*n*	%	β (SE)	Odds Ratio	Lower	Upper
Group (Coh.2 vs. Comp.)	1,159	34.7	1,152	30.5	.19*** (.05)	1.21	1.10	1.34
With Controls					***With Controls***			
Student characteristic (categorical variables)	*n*	%	*n*	%	β (SE)	Odds Ratio	Lower	Upper
Group (Coh.2 vs. Comp.)	1,159	34.7	1,152	30.5	.29*** (.06)	1.34	1.19	1.50
Male	558	29.3	596	27.2	-.21*** (.06)	.81	.73	.91
Not White or Asian	945	33.3	813	28.4	.33*** (.08)	1.39	1.20	1.62
FARMS	553	33.5	438	27.3	.12 (.06)	1.12	.99	1.27
ESOL	191	18.8	152	15.2	-1.07*** (.07)	.34	.30	.40
Grade 10	839	37.0	786	31.9	.14* (.06)	1.15	1.02	1.30
Student characteristic (continuous variable)	Mean	SD	Mean	SD	β (SE)	Odds Ratio	Lower	Upper
Weighted GPA 2018	3.31	0.7	2.84	0.9	1.31*** (.04)	3.69	3.39	4.02

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. SD = Standard deviation. SE = Standard error. Cohort 3 schools are the comparison group for the descriptive statistics and are the reference group in logistic regression analysis

Question 3: What is the trend in AP/IB enrollment among all Grade 10 and 11 underrepresented students in Cohorts 1 and 2? How does it compare with the trend in the enrollment of all underrepresented students in non-yet EOS schools? Was enrollment related to student demographic or academic characteristics?

Three year trend in AP/IB enrollment for Cohort 1 schools. The percentage of underrepresented students in Cohort 1 schools who enrolled in an AP/IB course when the EOS program began in 2017 was significantly (p<.000) lower than the percentage of underrepresented students in comparison schools (49% and 55%, respectively), as shown in Table 5. However, when the program started enrolling students in AP/IB courses the following year, 2018, the percentage of underrepresented students enrolling increased by 7 percentage points in Cohort 1 school (56%), whereas in comparison schools, this percentage decreased by 4 percentage points (51%), reflecting a statistically significant difference between Cohort 1 schools and comparison schools (p<.001). Similarly, the percentage of underrepresented students enrolled in AP/IB courses in Cohort 1 schools in 2019 (54%) was significantly (p<.01) higher than the percentage enrolled in comparison schools (51%).

Table 4

Number and Percent of Underrepresented Students in Cohort 1 Schools who Enrolled in AP/IB from 2017 to 2019, Relative to Peers in Comparison Schools

	All	AP/IB Enrolled in 2017 (EOS began)		All	AP/IB Enrolled in 2018 (1st year enrolling in AP/IB)		All	AP/IB Enrolled in 2019 (2nd year enrolling in AP/IB)	
	N	N	%	N	n	%	N	n	%
Cohort 1 Underrepresented	2,572	1,264	**49.1**	2,780	1,558	**56.0**	2,876	1,561	**54.3**
Comparison schools [a] (not-yet EOS) Underrepresented	4,827	2,647	**54.8**	5,000[a]	2,562	**51.2**	5,178[a]	2,653	**51.2**

[a] Comparison schools for each year are Cohort 3 schools. **Bold** represents statistically significant difference between the percentages of underrepresented students in Cohort 1 schools relative to the percentage of underrepresented students in comparison schools in AP/IB enrollment. See Appendix (Table A-2) for details of the Chi-square test.

Changes in AP/IB enrollment for Cohort 2 schools. Overall, the percentage of underrepresented students in EOS Cohort 2 schools who enrolled in AP/IB increased from 47 percent in 2018 to 51 percent in 2019, when the program started enrolling students in AP/IB. The percentage of underrepresented students in comparison schools without EOS only increased less than one percentage point from 2018 to 2019 (Table 6). The percentage of underrepresented students in Cohort 2 schools who enrolled in an AP/IB course in 2018, when EOS began in Cohort 2, was significantly (p<.001) lower than the percentage of underrepresented students in comparison schools who enrolled in 2018 (47% and 51%, respectively). However, in the following year, the percentage of underrepresented students in Cohort 2 schools who enrolled in AP/IB increased to 51 percent, bringing it to comparable levels with the comparison schools

(Table 6). The difference in the percentage of AP/IB enrollment among underrepresented students in Cohort 2 and comparison schools was not significantly different in 2019.

Table 5

Number and Percent of Underrepresented Students in Cohort 2 who Enrolled in AP/IB in 2018 and 2019 Relative to Peers in Comparison Schools

	All	AP/IB Enrolled in 2018 (EOS began)		All	AP/IB Enrolled in 2019 (1st year enrolling in AP/IB)	
Sample	N	n	%	N	n	%
Cohort 2 Underrepresented	4,386	2,047	**46.7**	4,801	2,460	51.2
Comparison schools (not yet EOS) Underrepresented	5,000	2,562	**51.2**	5,178	2,679	51.7

Note. Comparison schools include Cohort 3 schools. **Bold** represents a statistically significant difference in the percentage of underrepresented students in Cohort 2 schools who enrolled in AP/IB courses relative to peers in comparison schools. See Appendix (Table A-2) for details of the Chi-square test.

Factors associated with taking AP/IB among underrepresented students in Cohort 1. The results showed a significant relationship between being in a Cohort 1 EOS school and AP/IB enrollment among Grades 10 and 11 underrepresented students (OR=1.32; $p<.001$), indicating that being in an EOS school increased the odds of underrepresented students taking an AP/IB course. Further, when the analyses controlled for gender, grade, and previous weighted GPA, the relationship was stronger: analysis yielded a significant relationship between EOS and AP/IB enrollment among underrepresented students with a higher odd ratio (OR=1.48; $p<.001$). Further analysis showed that underrepresented students who were male or in Grade 10 were significantly ($p<.001$) less likely to enroll in AP/IB than their peers who were female or in Grade 11. Not surprisingly, underrepresented students with a high weighted GPA were significantly ($p<.001$) more likely to enroll in AP/IB than their peers with lower weighted GPA (Table 7).

Table 6

Number and Percentage of Underrepresented Cohort 1 Students Enrolled in AP/IB Courses Relative to Peers in Comparison Schools as well as Odds Ratios for Factors Associated with Grade 10 and 11 Underrepresented Students Enrolling in an AP/IB Course

	Descriptive Statistics by Group				Logistic Regression Results			
	EOS Cohort 1 (N = 2,780)		Comparison (N = 9,386)		***Unadjusted***			
	Enrolled in AP/IB in 2018				β		95% Conf. Intervals	
	n	%	*n*	%	(SE)	Odds Ratio	Lower	Upper
Group (Coh.1 vs Comp.)	1,558	56.0	4,609	49.1	.28*** (.04)	1.32	1.21	1.44
					With Controls			
Student characteristic (categorical variables)	*n*	%	*n*	%	β (SE)	Odds Ratio	Lower	Upper
Group (Coh.1 vs Comp.)	804	39.5	2,205	30.5	.39*** (.05)	1.48	1.33	1.65
Male	809	51.0	1,955	41.6	-.12** (.05)	.89	.81	.97
Grade 10	776	50.7	2,265	43.2	-.48*** (.05)	.62	.57	68
Student characteristic (continuous variable)	Mean	SD	Mean	SD	β (SE)	Odds Ratio	Lower	Upper
Weighted GPA 2017	2.73	0.73	2.73	0.76	1.78*** (.03)	5.96	5.57	6.34

Note. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. SD = Standard deviation. SE = Standard error. . Cohorts 2 and 3 schools are the comparison group for the descriptive statistics and are the reference group in logistic regression analysis.

Factors associated with taking AP/IB among underrepresented students in Cohort 2. The results showed no significant relationship between being in a Cohort 2 EOS school and AP/IB enrollment among underrepresented students in Grades 10 and 11 when student demographic characteristics and previous GPA were not controlled. However, when controlling for gender, grade, and weighted GPA, the analysis yielded a significant relationship between EOS and AP/IB enrollment among underrepresented students (OR=1.16; $p<.01$). In addition, the analysis showed that underrepresented students who were male or in Grade 10 were significantly ($p<.001$) less likely to enroll in AP/IB than their peers who were female or in Grade 11. Not surprisingly, underrepresented students with a high weighted GPA were significantly ($p<.001$) more likely to enroll in AP/IB than their peers with lower weighted GPA (Table 8).

Table 7

Number and Percentage of Underrepresented Cohort 2 Students Enrolled in AP/IB Courses Relative to Peers in Comparison Schools as well as Odds Ratios for Factors Associated with Grade 10 and 11 Underrepresented Students Enrolling in an AP/IB Course

	Descriptive Statistics by Group				Logistic Regression Results			
	EOS Cohort 2 (N = 4,801)		Comparison (N = 5,178)		***Unadjusted***			
	Enrolled in AP/IB in 2019						95% Conf. Intervals	
Student characteristic (categorical variables)	*n*	%	*n*	%	β (SE)	Odds Ratio	Lower	Upper
In EOS School	2,460	51.2	2,679	51.7	-.02 (.04)	.98	.91	1.06
					With Controls			
Student characteristic (categorical variables)	*n*	%	*n*	%	β (SE)	Odds Ratio	Lower	Upper
In EOS School	2,460	51.2	2,679	51.7	.15** (.05)	1.16	1.05	1.28
Male	1,047	43.1	1,181	44.5	-.19*** (.05)	.83	.75	.91
Grade 10	1,342	48.1	1,382	47.9	-.33*** (.05)	.72	.65	.79
Student characteristic (continuous variable)	Mean	SD	Mean	SD	β (SE)	Odds Ratio	Lower	Upper
Weighted GPA in 2018	3.57	0.69	3.70	0.65	1.75*** (.04)	5.78	5.37	6.22

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. SD = Standard deviation. SE = Standard error. Cohorts 3 schools are the comparison group for the descriptive statistics and are the reference group in logistic regression analysis.

Question 4a: To what extent did Cohort 1 schools attain their specified within-school level target of "students needed to achieve equity" in SY 2018, 2019, and 2020 relative to SY 2017? Did the attainment of student group targets vary across student groups or student characteristics?

The progress or lack of progress toward within school equitable participation in AP/IB for each Cohort 1 school is shown in Table 9, represented by the difference between the equity gaps in 2017 and in 2020 for each student group in each school. Equity gaps are represented by the difference between the percentages of students with certain characteristics needed to achieve equity in AP/IB participation (target) and the percentage of students with the same characteristics that the school actually enrolled in AP/IB for the first time (progress). Positive values represent improvements toward equity in AP/IB participation, whereas negative values represent lack of improvements.

All four Cohort 1 schools made progress toward equity in participation in AP/IB courses among Black or African American students receiving FARMS. Among Cohort 1 schools, Springbrook and Wheaton high schools made progress toward equity in AP/IB participation (reduced gaps) for most of the student groups in 2020 relative to 2017. Springbrook HS improved equity in AP/IB participation across all the focus groups, and Wheaton HS improved equity among all groups except the Hispanic/Latino students receiving

FARMS services. Mixed results were observed in Col. Zadok Magruder and Northwest high schools in 2020 relative to 2017. Both schools showed improvements toward equity in AP/IB participation among students who receive FARMS services; however, the equity gap widened among Hispanic/Latino and Black or African American students not receiving FARMS services (Table 9).

Table 9

Change Toward Within-School Equity in AP/IB Participation in Cohort 1 Schools

Cohort 1 Schools	Hisp./Lat. Non-FARMS	Hisp./Lat. FARMS	Black or Afr. Am. Non-FARMS	Black or Afr. Am. FARMS
Magruder HS	-9	+2	-9	+3
Northwest HS	-5	+7	0	+8
Springbrook HS	+2	+20	+8	+13
Wheaton HS	+41	-2	+18	+15

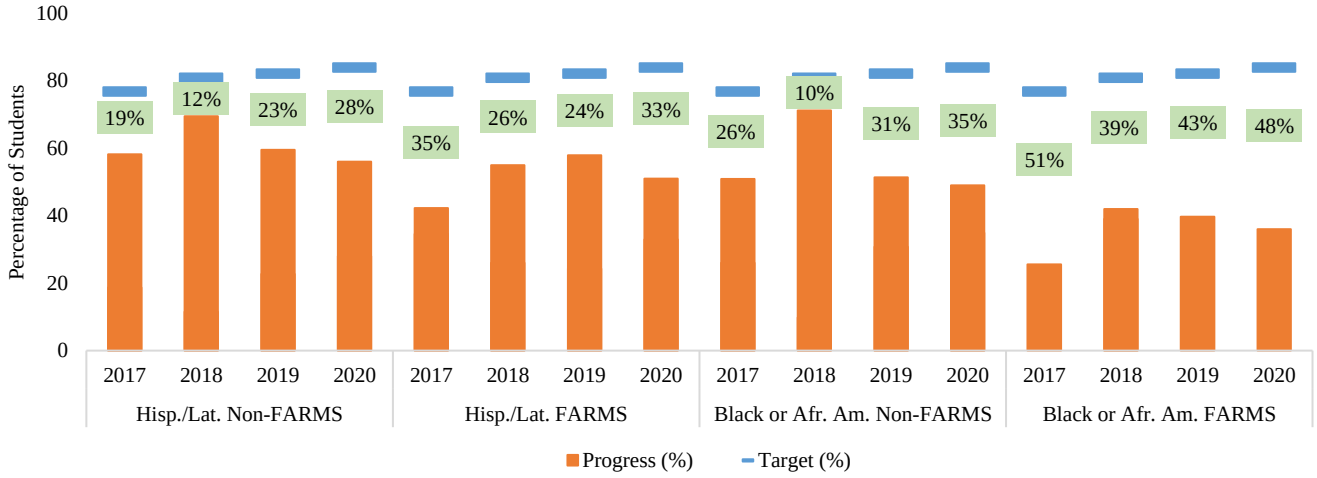
Note. Changes toward equity are percentage point values, calculated by the difference between the equity gap in 2017 and the equity gap in 2020 for a particular student group. Positive values represent improvements toward equity in AP/IB participation, whereas negative values represent no improvements.

Enrollment, Targets, and Equity Gaps in Cohort 1 Schools. Figures 4–7 show the actual enrollment, target enrollment, and equity gap in each Cohort 1 school across four years among students in the following focus groups: Non-FARMS Hispanic/Latino, FARMS Hispanic/Latino, Non-FARMS Black or African American, and FARMS Black or African American. Within-school rates for participation in AP/IB courses varied each year depending on AP/IB enrollment of students in each group. Annual targets also varied, because they were established based on the student groups with highest enrollment. Each school reestablished its targets for each student group at the beginning of each year. The goal was to 1) increase participation overall, while 2) working toward comparable AP/IB participation rates for all students, regardless of their race/ethnicity or FARMS status.

Magruder HS. Even though the within-school targets increased from 2017 to 2020, Col. Zadok Magruder HS made progress toward equity in AP/IB participation among students receiving FARMS services. Higher participation in AP/IB courses in 2020, relative to 2017, resulted in the reduction in equity gaps for Hispanic/Latino (35% to 33%) and Black or African American (51% to 48%) students receiving FARMS services. At the same time, the data showed no improvement from 2017 to 2020 in the enrollment in AP/IB courses among Hispanic/Latino students and Black or African American students not receiving FARMS services relative to the set targets (Figure 4).

Figure 4

Actual Performance, Target Performance, and Equity Gap By Student Groups in Magruder HS

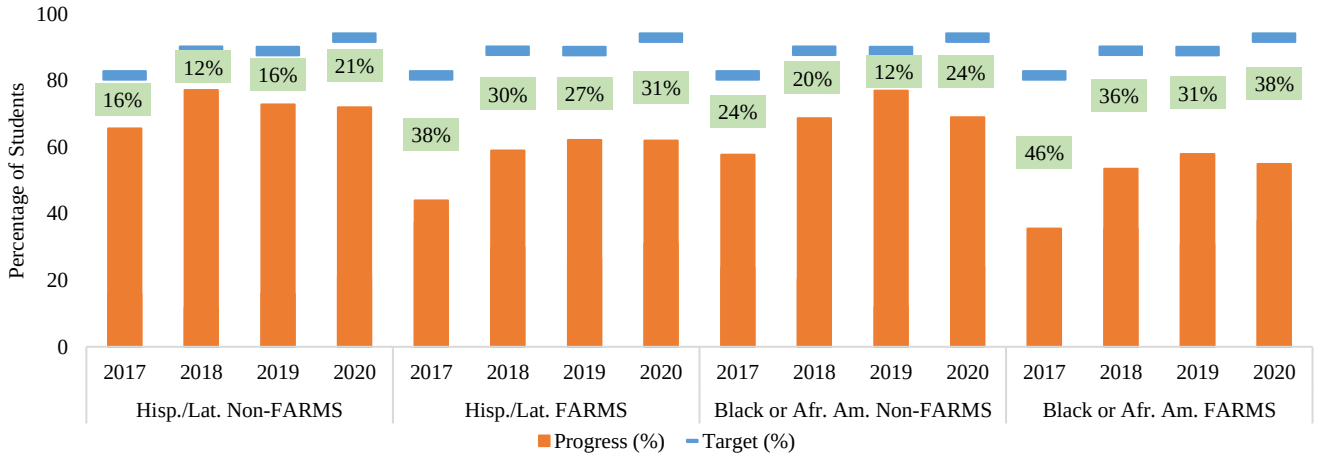


Note. Percentage in green box represents the equity gap (difference between target and actual AP/IB participation).

Northwest HS. Participation in AP/IB courses in Northwest HS increased in 2020, relative to 2017, across all Hispanic/Latino and Black or African American students, with a corresponding decrease in the within-school equity gaps among those students receiving FARMS services. The decrease in equity gaps in 2020, relative to 2017, corresponded to 7 percentage points for Hispanic/Latino students receiving FARMS services (38% vs. 31%) and 8 percentage points for Black or African American students receiving FARMS services (46% vs. 38%). However, no progress toward equity in AP/IB participation was observed among Hispanic/Latino and Black or African American students not receiving FARMS services (16% vs. 21%, and 24% vs. 24%, respectively) (Figure 5).

Figure 5

Actual Performance, Target Performance, and Equity Gap by Student Groups in Northwest HS

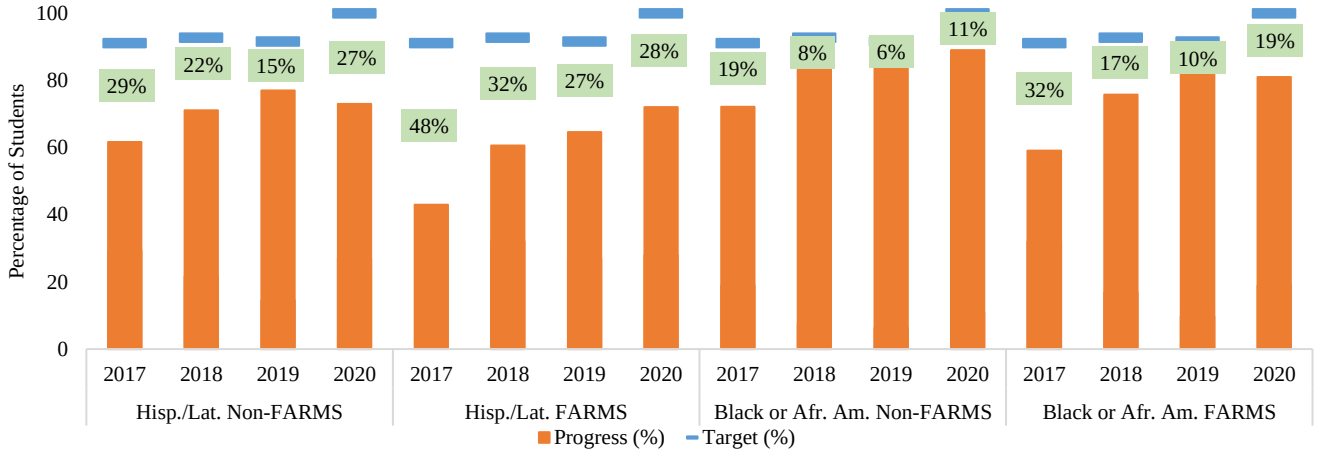


Note. Percentage in green box represents the equity gap (difference between target and actual AP/IB participation).

Springbrook HS. Springbrook HS made progress toward equity in AP/IB participation across all student groups even though the school had higher targets in 2020 than in 2017. The two student groups with the largest increases in AP/IB participation, resulting in the reduction in equity gaps, comprise Hispanic/Latino (48% vs. 28%) and Black or African American (32% vs. 19%) students receiving FARMS services (Figure 6).

Figure 6

Actual Performance, Target Performance, and Equity Gap By Student Groups in Springbrook HS.

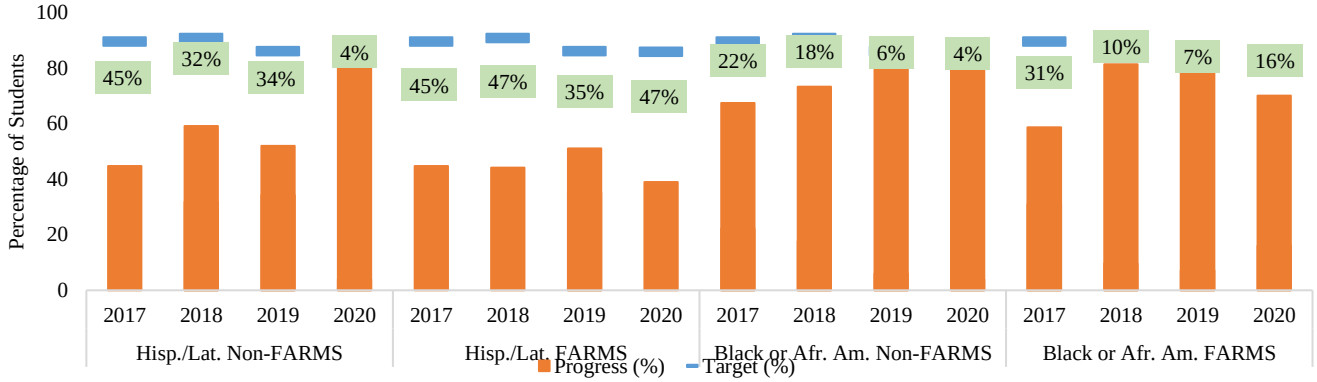


Note. Percentage in green box represents the equity gap (difference between target and actual AP/IB participation).

Wheaton HS. Wheaton HS made progress toward equity in AP/IB participation from 2017 to 2020 across most student groups. Notable improvements toward equity were observed among Hispanic/Latino and Black or African American students not receiving FARMS services, where targets were almost met in 2020 relative to 2017 (45% vs. 4%, and 22% vs. 4%, respectively). However, no progress toward equity in AP/IB participation was observed for Hispanic/Latino students receiving FARMS services, with an equity gap of 45 percent in 2017 and 47% in 2020, mainly explained by the decrease in AP/IB participation in 2020 (Figure 7).

Figure 7.

Actual Performance, Target Performance, and Equity Gap By Student Groups in Wheaton HS.



Note. Percentage in green box represents the equity gap (difference between target and actual AP/IB participation).

Question 4b: To what extent did cohort 2 schools attain their specified school level target of "students needed to achieve equity" in SY 2019 and 2020 relative to SY 2018? Did the attainment of within-school targets vary by student characteristics?

The progress or lack of progress toward equitable participation in AP/IB for Cohort 2 schools is shown in Table 10, represented by the difference between the equity gaps in 2018 and in 2020 for each student group in each school. Positive values represent improvements toward equity in AP/IB participation, whereas negative values represent lack of improvements.

Among the six Cohort 2 schools, only James Hubert Blake HS showed improvements toward equity in AP/IB participation across all student groups in 2020 relative to 2018, especially among Hispanic/Latino students receiving FARMS services and Black or African American students who do not receive FARMS services. In Clarksburg HS, progress toward equity in AP/IB participation was observed only among Black or African American students receiving FARMS services. In Northwood HS, there was no change in proportions participating in AP/IB participation in 2020 and 2018 among Hispanic/Latino students who do not receive FARMS services; however, the gaps increased for the other groups (Table 10).

No progress toward equity in AP/IB participation was observed for the remaining four schools in Cohort 2. As shown in Table 10, the large negative values associated to John F. Kennedy HS can be attributed to a combination of a higher within-school target and lower AP/IB participation in 2020. In Gaithersburg HS, increased equity gaps in AP/IB participation were associated with a decrease in AP/IB participation in 2020. In Watkins Mill HS, a higher within-school target in 2020 explained the increase in equity gaps in 2020, even though the school reported a high AP/IB participation among some student groups in recent years.

Table 8
Changes Toward Equity in AP/IB Participation in Cohort 2 Schools

Cohort 2 Schools	Hisp./Lat. Non-FARMS	Hisp./Lat. FARMS	Black or Afr. Am. Non-FARMS	Black or Afr. Am. FARMS
James Hubert Blake HS	+1	+10	+11	+2
Clarksburg HS	-22	-13	-6	+6
John F. Kennedy HS	-23	-24	-25	-33
Gaithersburg HS	-11	-2	-3	-2
Northwood HS	0	-13	-10	-9
Watkins Mill HS	-16	-3	-14	-4

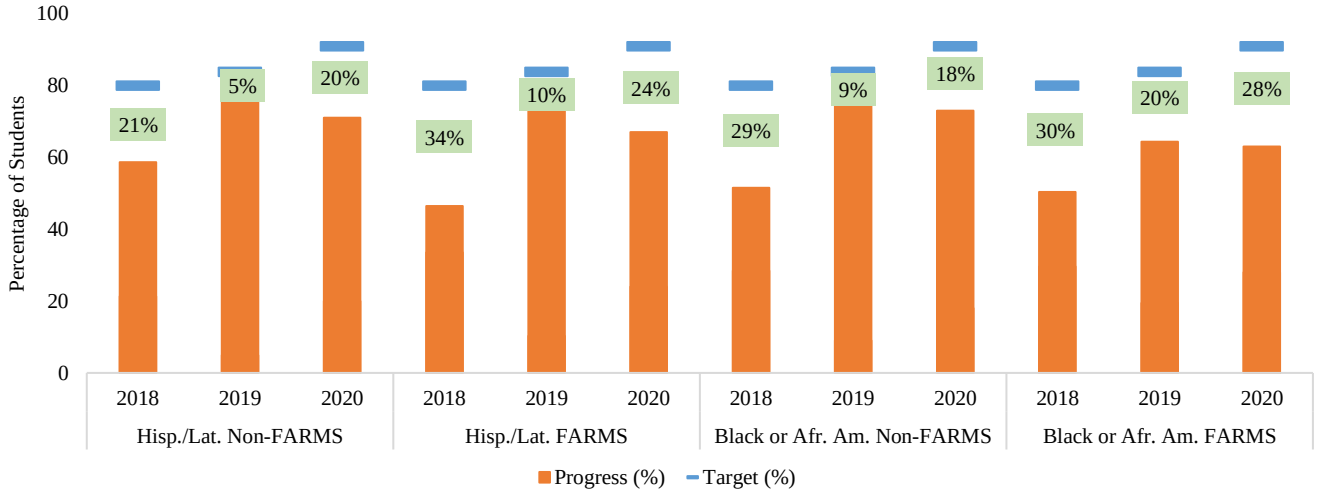
Note. Changes toward equity are percentage point values, calculated by the difference between the equity gap in 2018 and the equity gap in 2020 for a particular group. Positive values represent improvements toward equity in AP/IB participation, whereas negative values represent lack of improvements.

Enrollment, Targets, and Equity Gaps in Cohort 2 Schools. Figures 8–13 show the actual enrollment, target enrollment, and equity gap by student focus groups in each Cohort 2 school in 2018, 2019, and 2020.

James Hubert Blake HS. James Hubert Blake HS made progress toward equity in AP/IB participation across all student groups, as indicated by an increased AP/IB participation in recent years, even though the school had higher targets from 2018 to 2020 (Figure 8). The highest progress toward equity in AP/IB participation in 2020, relative to 2018, was observed for Black or African American students not receiving FARMS services (29% vs. 18%) and Hispanic/Latino students receiving FARMS services (34% vs. 24%).

Figure 8

Actual Performance, Target Performance, and Equity Gap By Student Groups in James Hubert Blake HS

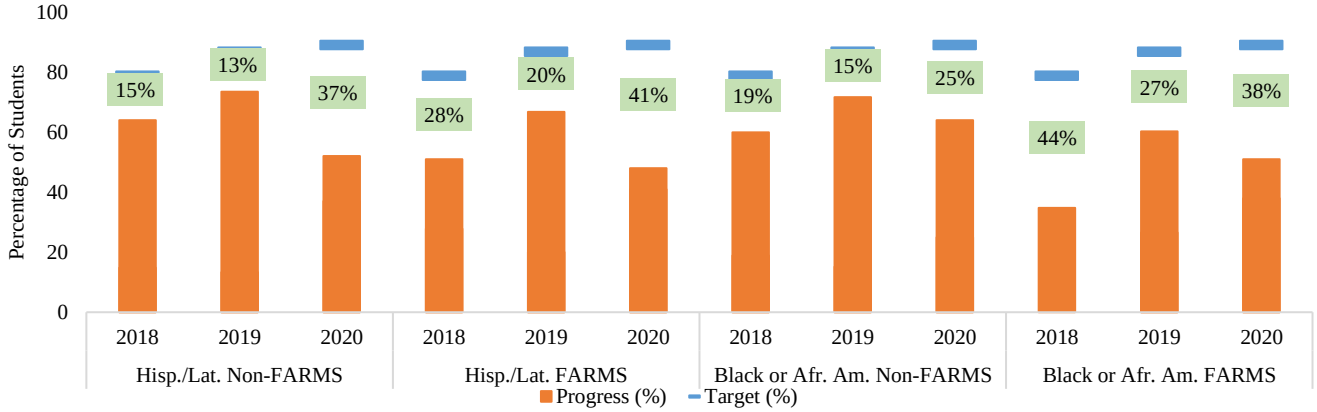


Note. The percentage in the green box represents the equity gap (the difference between target and actual AP/IB participation).

Clarksburg HS. Clarksburg HS increased the AP/IB participation of Black or African American students in 2020, relative to 2018. However, progress toward equity in AP/IB participation was only observed for Black or African American students receiving FARMS services (44% vs. 38%). In the case of Black or African American students not receiving FARMS services, the increase in AP/IB participation was not large enough to surpass the increase in the target. The school experienced a decrease in the AP/IB participation of Hispanic/Latino students in 2020 relative to 2018, which resulted in wider equity gaps (Figure 9).

Figure 9

Actual Performance, Target Performance, and Equity Gap By Student Groups in Clarksburg HS

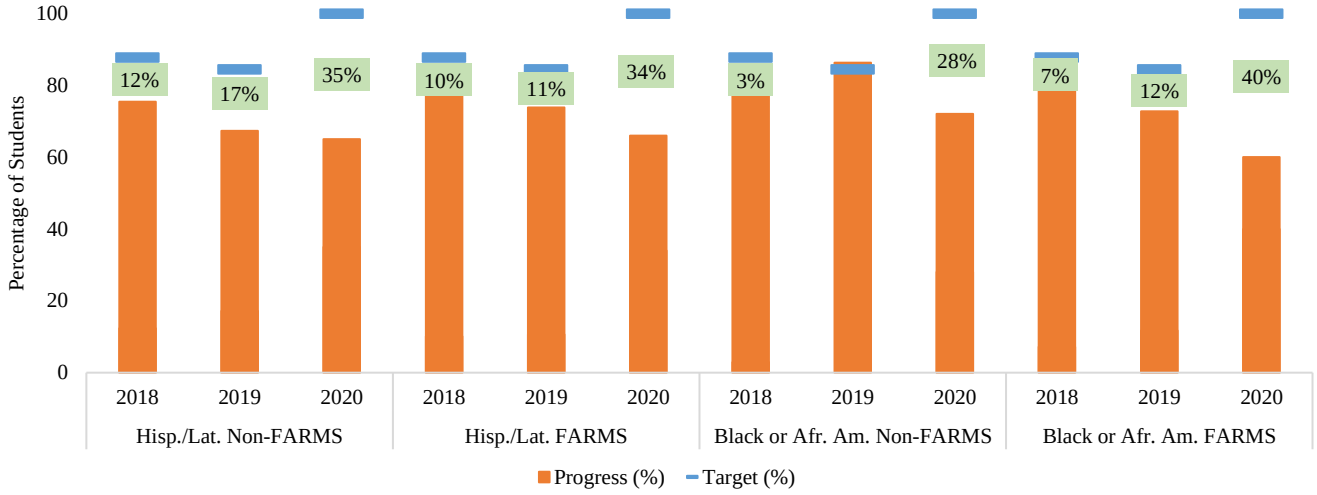


Note. The percentage in the green box represents the equity gap (the difference between target and actual AP/IB participation).

John F. Kennedy, HS. In 2020, the target was set at 100 percent for all student groups because 100 percent of students with two or more races receiving FARMS services enrolled in at least one AP/IB course. The fact of having the school target at 100 percent in 2020 and a decrease in AP/IB participation in the same year explains why equity gaps notably increased for all student groups in 2020 relative to 2018 (Figure 10).

Figure 10

Actual Performance, Target Performance, and Equity Gap By Student Groups in John F. Kennedy HS

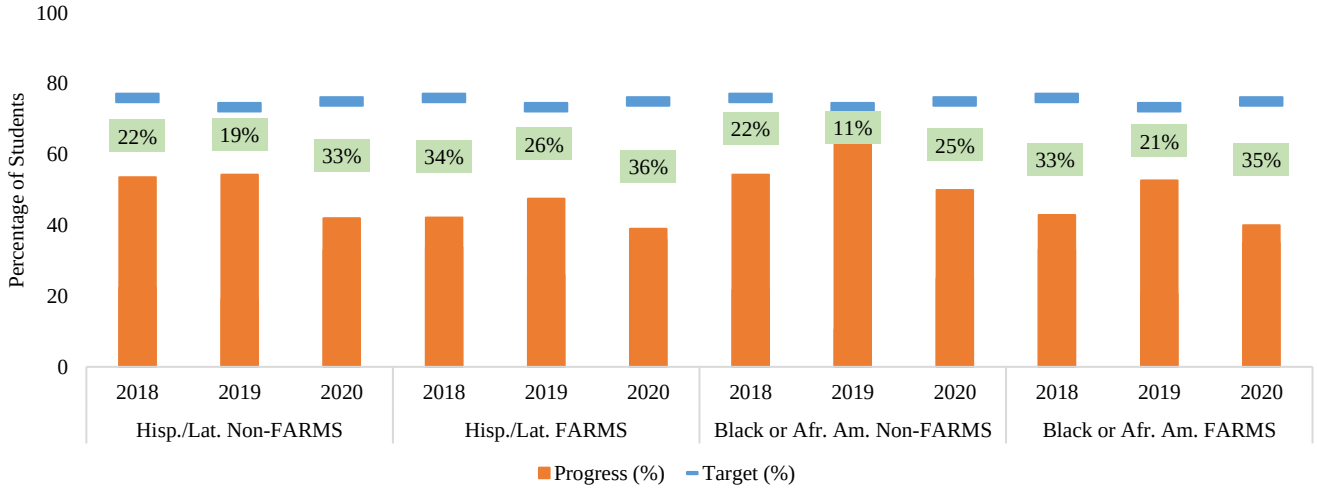


Note. The percentage in the green box represents the equity gap (the difference between target and actual AP/IB participation).

Gaithersburg HS. In Gaithersburg HS, progress toward equity in AP/IB participation was observed from 2018 to 2019 across all student groups. However, equity gaps widened in 2020, even exceeding the 2018 levels, for all the groups due to the decrease in AP/IB participation. The highest equity gap in 2020 relative to 2018 was observed for Hispanic/Latino students not receiving FARMS services (22% vs. 33%) (-11 percentage points). The other groups widened their gaps by 2 or 3 percentage points only (Figure 11).

Figure 11

Actual Performance, Target Performance, and Equity Gap By Student Groups in Gaithersburg HS

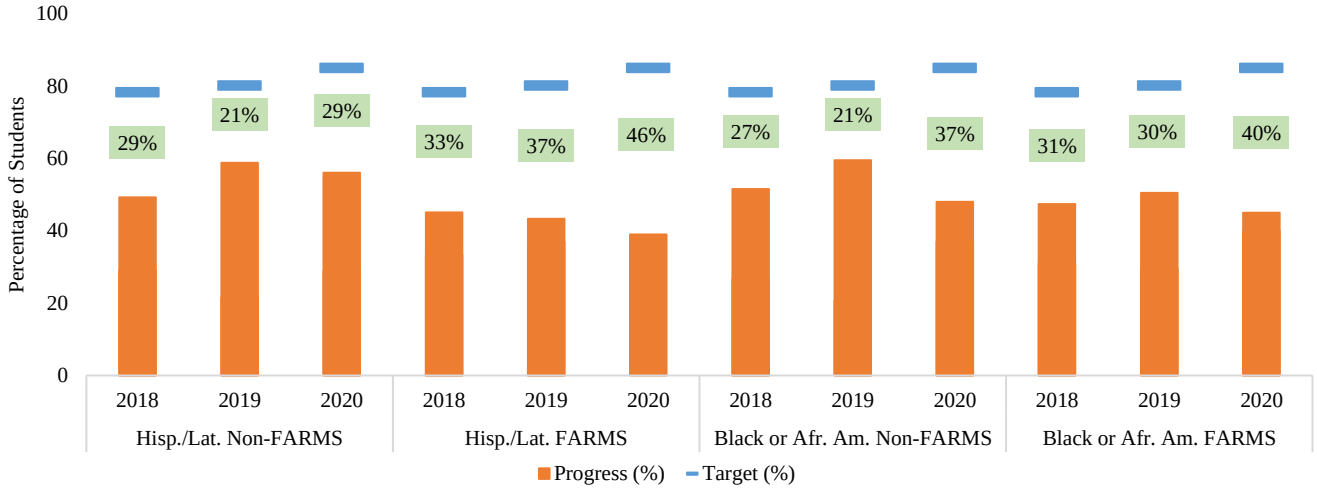


Note. The percentage in the green box represents the equity gap (the difference between target and actual AP/IB participation).

Northwood HS. Similarly, Northwood HS experienced a decrease in AP/IB participation in 2020 for almost all of the student groups examined, which resulted in a lack of progress toward equity in AP/IB participation in 2020 relative to 2018. However, the school maintained the same level of equity in AP/IB participation among Hispanic/Latino students not receiving FARMS services in 2020 by increasing their AP/IB participation (Figure 12).

Figure 12

Actual Performance, Target Performance, and Equity Gap By Student Groups in Northwood HS

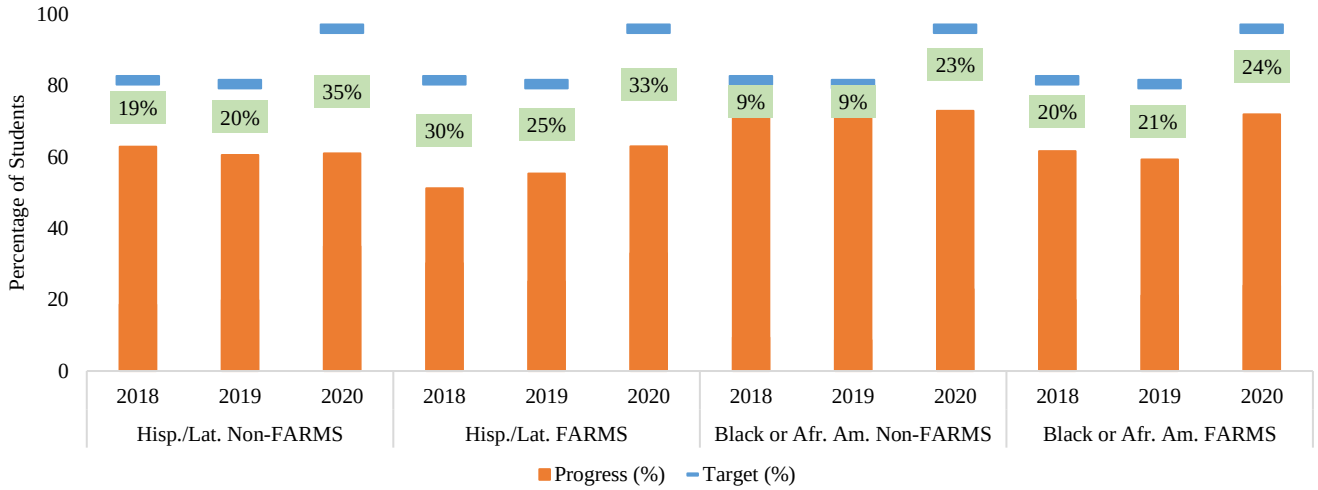


Note. Percentage in green box represents the equity gap (difference between target and actual AP/IB participation).

Watkins Mill HS. Watkins Mill HS reported wider equity gaps in 2020 relative to 2018, mainly due to higher targets set for 2020 (96%), not due to a decrease in AP/IB participation. The school in 2020 has approximately maintained the same level of participation in AP/IB courses as in 2018 among Hispanic/Latino and Black or African American students not receiving FARMS services, and increased participation among their peers receiving FARMS services during the same period (Figure 13).

Figure 13

Actual Performance, Target Performance, and Equity Gap By Student Groups in Watkins Mill HS



Note. Percentage in green box represents the equity gap (difference between target and actual AP/IB participation).

Question 5: Among students in Cohort 1 and 2 who previously had not taken any AP/IB courses, what were the course taking and performance outcomes? How do these outcomes vary by student characteristics?

AP/IB Course credits. Among students who enrolled in at least one AP/IB course, the range of course credits taken by EOS (Cohorts 1 and 2) and non-EOS students was similar, from a minimum of 0.5 to a maximum of seven credits. However, students in Cohort 1 schools, on average, took fewer AP/IB credits than students in schools without EOS (1.60 compared with 1.68, $p<.05$). Students in Cohort 2 schools took a similar average number of credits to their peers in non-EOS schools (1.59 compared with 1.61).

Course grades earned in AP/IB courses. The average AP/IB course grades, illustrated with the mean, were lower for Cohort 1 students compared with students in schools without EOS (2.15 vs. 2.39, $p<.001$). Average course grades were not significantly different between students in Cohort 2 schools and their peers in non-EOS comparison schools.

The average AP/IB course grades were statistically significantly lower for students in Cohort 1 schools compared with students in schools without EOS among three non-FARMS focus groups: the monitoring group (Non-FARMS Asian/White/All Other Student Groups); Non-FARMS Black or African American students; and Non-FARMS Hispanic/Latino students. For Cohort 2 schools, no statistically significant differences in the average AP/IB course grades between students in EOS and non-EOS schools were observed within the focus groups.

Percent Earning a C or Above in AP/IB courses. In all groups in both Cohort 1 and Cohort 2, more than 75 percent of the students earned a C or above in one or more AP/IB courses (Figures 14 and 15). The overall percentage of students in Cohort 1 who earned a C or above was 84.8 percent, which was not statistically different from the percentage of students in schools that had yet implemented EOS (87.2%). Comparisons within each of the MCPS focus groups also yielded no statistically significant differences between EOS Cohort 1 students and the comparison group. The percentage of Cohort 2 EOS students who

earned a C or higher in a least one AP/IB course (Figure 15) was very similar to that of students in the schools not yet implementing EOS. For the whole group of Cohort 2 students and all but one of the MCPS focus groups, the difference was smaller than one percentage point; none of the comparisons (whole group and within focus groups) yielded statistically significant differences (Appendix, Table A–5).

Table 9

Number of AP/IB Course Credits and Average AP/IB Course Grades for Students who had not Taken any AP/IB Courses Prior to EOS, by EOS and Comparison Schools

	Students taking 1 or more AP/IB courses				Number of credits taken by course-takers [1/]				Average AP/IB Course Grades (4=A, 3=B, 2=C, 1=D, 0=E) [2/]			
	2018		2019		2018		2019		2018		2019	
	Coh. 1 EOS	Not EOS	Coh. 2 EOS	Not EOS	Coh. 1 EOS	Not EOS	Coh. 2 EOS	Not EOS	Coh. 1 EOS	Not EOS	Coh. 2 EOS	Not EOS
	N	N	N	N	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
All	797	2,197	1,112	1,119	**1.60 (.91)**	**1.68 (1.07)**	1.59 (0.96)	1.61 (0.98)	**2.15 (1.04)**	**2.39 (1.09)**	2.37 (1.09)	2.42 (1.03)
Focus Groups												
Non-FARMS Asian/White/ All Other Student Groups	182	532	187	316	1.73 (.96)	1.74 (.97)	1.71 (1.00)	1.85 (1.08)	**2.39 (.98)**	**2.69 (.98)**	2.61 (1.07)	2.63 (1.03)
Non-FARMS Black or African American	136	371	194	186	1.76 (.99)	1.67 (1.01)	1.53 (.83)	1.51 (.89)	**2.11 (.99)**	**2.31 (.99)**	2.34 (1.03)	2.31 (1.00)
Non-FARMS Hispanic/ Latino	133	368	209	197	1.54 (.89)	1.70 (1.11)	1.65 (1.02)	1.68 (1.08)	**1.99 (1.08)**	**2.17 (1.04)**	2.26 (1.06)	2.44 (.92)
FARMS Asian/White/ All Other Student Groups	129	274	56	63	1.53 (.77)	1.76 (1.25)	1.94 (1.23)	1.67 (1.00)	1.94 (1.04)	2.34 (1.04)	2.6 (1.05)	2.54 (1.05)
FARMS Black or African American	168	533	166	151	1.40 (.80)	1.53 (1.04)	1.47 (.92)	1.44 (.79)	2.18 (1.09)	2.29 (1.18)	2.06 (1.04)	2.25 (1.07)
FARMS Hispanic /Latino	49	119	300	206	1.76 (1.15)	1.87 (1.16)	1.50 (.93)	1.37 (.80)	2.30 (1.02)	2.50 (1.04)	2.43 (1.17)	2.26 (1.08)

Note. "Coh. 1 EOS" refers to students in Cohort 1 schools in 2017 and "Coh. 2 EOS" to students in Cohort 2 schools in 2018. "Not EOS" depends on the cohort analyzed. For Cohort 1, "Not EOS" includes future Cohort 2 and 3 schools, whereas for Cohort 2, it includes future Cohort 3 schools. Outcomes about AP/IB courses are for the year after EOS started the program (2018 for Cohort 1 and 2019 for Cohort 2). **Bold** represents significant differences of means of at least $p < .05$. Differences were tested via ANCOVA, covarying previous GPA, FARMS, ESOL, and not White or Asian race in whole group analyses. For focus group analyses, only previous GPA was covaried.

[1/] Adjusted means and adjusted means differences (for significant results only) are presented in Appendix (Table A–3) for Cohort 1.

[2/] Adjusted means and adjusted means differences (for significant results only) are presented in Appendix (Table A–4) for Cohort 2.

Figure 14

Percentage of Students Passing an AB/IB Course With C or Higher: Cohort 1 Schools And Comparison Schools

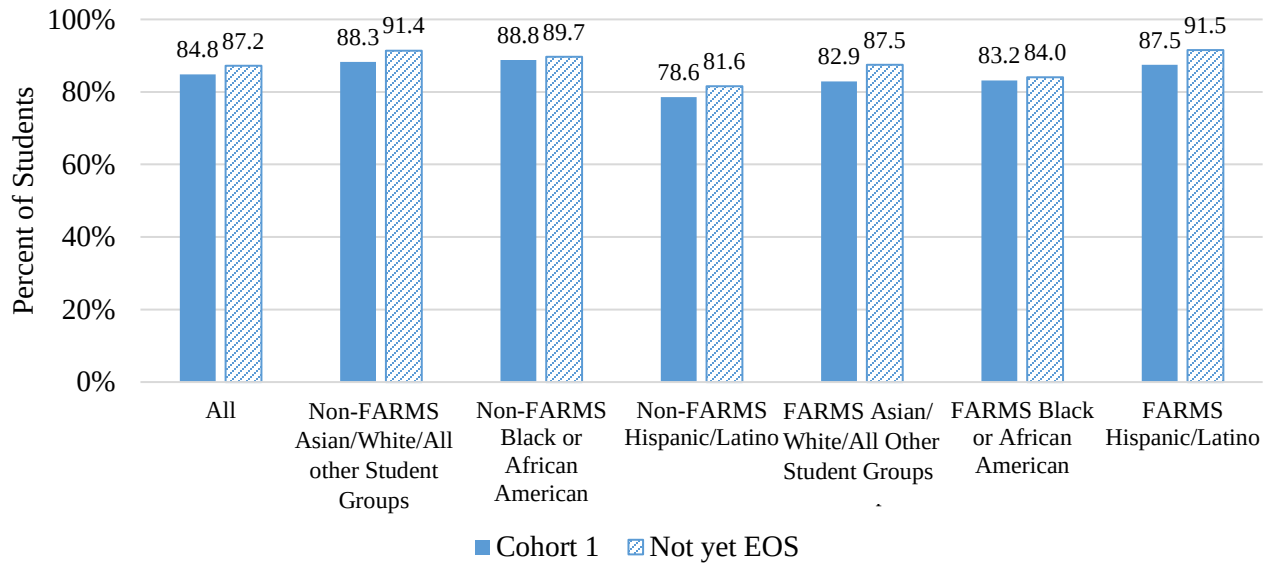
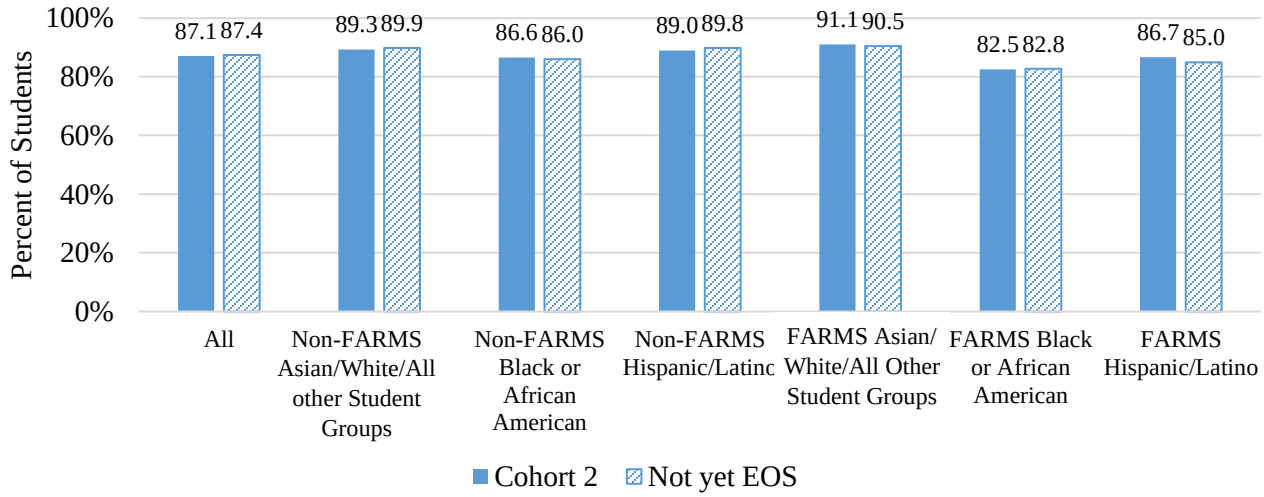


Figure 15

Percentage of Students Passing an AB/IB Course With C or Higher: Cohort 2 Schools and Comparison Schools



Number AP/IB exams taken. Cohort 1 students averaged a higher number of exams taken than students in schools without EOS (1.62 vs. 1.50, $p<.001$) (Table 12). Analyses within the MCPS focus groups showed significantly higher numbers of exams taken by EOS Cohort 1 students compared with students in non-EOS schools in three of the five focus groups (Table 12). Among Cohort 2 students who took at least one AP/IB exam, the number of exams taken by students in EOS schools was comparable to the number taken in non-EOS schools. In the monitoring group, however, students in the non-EOS schools took significantly more exams than students in EOS Cohort 2 schools (Table 12).

Percentage of AP/IB exams with college-ready scores. The percentage of exams meeting a college-ready score (3 or higher on AP; 4 or higher on IB) ranged from 0 percent to 100 percent for both EOS and not-yet EOS students. However, the average percentage of exams taken that earned a college-ready score was 25 percent for Cohort 1 students overall and 41 percent for the comparison group of students in non-EOS schools, a statistically significant difference ($p<.001$) in favor of the comparison group (Table 12).

Table 10

Number of AP/IB Exams Taken and Exams with College-Ready Scores for Students who had not Taken any AP/IB Courses Prior to EOS, by EOS and Comparison Schools

	Students taking 1 or more AP/IB tests				Number of AP/IB exams taken by test-takers [1/]				Percentage of exams with college-ready scores [2/]			
	2018		2019		2018		2019		2018		2019	
Student characteristics	Coh. 1 EOS	Not EOS	Coh. 2 EOS	Not EOS	Coh. 1 EOS	Not EOS	Coh. 2 EOS	Not EOS	Coh. 1 EOS	Not EOS	Coh. 2 EOS	Not EOS
	N	N	N	N	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
All	585	1,320	491	684	**1.62 (.87)**	**1.50 (.83)**	1.57 (.85)	1.64 (.90)	**24.9 (39.8)**	**41.3 (44.8)**	37.9 (44.3)	41.8 (44.4)
Focus Groups												
Non-FARMS Asian/White/All Other Student Groups	137	382	102	222	**1.80 (.93)**	**1.68 (.82)**	**1.63 (1.01)**	**1.83 (1.03)**	**29.7 (40.7)**	**46.1 (45.7)**	44.0 (46.4)	46.6 (43.9)
Non-FARMS Black or African Amer.	106	212	86	107	**1.69 (.91)**	**1.49 (.75)**	1.57 (.83)	1.55 (.70)	**12.4 (29.9)**	**34.2 (43.5)**	23.4 (38.7)	32.4 (43.2)
Non-FARMS Hispanic/Latino	94	212	82	121	1.62 (.79)	1.52 (.87)	1.57 (.86)	1.60 (.84)	**31.4 (32.7)**	**42.4 (44.0)**	40.0 (43.8)	43.7 (44.6)
FARMS Asian/White/All Other Student Groups	89	134	25	35	**1.49 (.69)**	**1.35 (.93)**	1.76 (.83)	1.94 (1.41)	**6.3 (22.6)**	**26.4 (40.3)**	44.0 (48.8)	34.8 (42.7)
FARMS Black or African Amer.	120	305	64	81	**1.45 (.80)**	**1.27 (.75)**	1.53 (.71)	1.43 (.63)	42.0 (45.9)	46.7 (45.8)	18.0 (33.0)	28.4 (42.7)
FARMS Hispanic/Latino	39	75	132	118	1.54 (1.12)	1.69 (.88)	1.51 (.79)	1.47 (.76)	14.4 (34.7)	36.5 (43.2)	49.9 (45.1)	50.4 (45.0)

Note. "Coh. 1 EOS" refers to students in Cohort 1 schools in 2017 and "Coh. 2 EOS" to students in Cohort 2 schools in 2018. "Not EOS" depends on the cohort analyzed. For cohort 1, "Not EOS" includes future cohorts 2 and 3 schools, whereas for cohort 2, it includes only future cohort 3 schools. Outcomes about AP/IB tests are for the year after EOS started the program (2018 and 2019). **Bold** represents significant differences of means of at least p <. 05. Differences were tested via ANCOVA, covarying previous GPA, FARMS, ESOL, and not White or Asian race student in whole group analyses. For focus group analyses, only previous GPA was covaried.

[1/] Adjusted means and adjusted means differences (for significant results only) are presented in Appendix (Table A–6) for Cohort 1 and Appendix (Table A–7) for Cohort 2.

[2/] Adjusted means and adjusted means differences (for significant results only) are presented in Appendix (Table A–8) for Cohort 1.

Among Cohort 1 students, three of the five focus groups also had statistically significantly lower average percentages of AP/IB exams with college-ready scores in 2018 than did students in the comparison group (Table 12). For Cohort 2 EOS students, the average percentage of exams taken earning college-level scores was not statistically significantly different from that of their peers in the comparison group, for all students, or for each of the MCPS focus groups (Table 12).

Question 6: What was the overall level of performance in AP/IB courses for students in Cohort 1 and 2 schools in the year following the implementation of EOS? Did it vary by student characteristics?

To examine the overall AP/IB experience among students in Cohort 1 schools and Cohort 2 schools, the performance in AP/IB courses and on AP/IB exams administered by College Board was assessed for all students in the two cohorts (Tables 13 and 14). The average number of course credits taken and average course grade earned during the year following EOS implementation are shown in Table 13 for students who took at least one AP/IB course, for all students as well as for students in MCPS focus groups, for Cohort 1 and Cohort 2.

Average number of AP/IB credits. On average, students in both cohorts took 2 AP/IB credits the year following implementation of EOS in their schools. The number of AP/IB credits earned by Cohort 1 and Cohort 2 students in 2018 and 2019, respectively, ranged from 0.5 to 7.0. Among student groups in Cohort 1 schools, the highest average of AP/IB credits were noted for FARMS Hispanic/Latino students (mean of 2.20 credits) and the monitoring group (mean of 2.19 credits). Among Cohort 2 students, the highest average AP/IB credits were observed for students in the monitoring group (mean of 2.15 credits) and FARMS White/Asian/all other student groups (mean of 2.14 credits) (Table 13).

Average AP/IB course grade. For all students who took at least one AP/IB course, the average course grade among Cohort 1 students was 2.88 and among Cohort 2 students was 2.83; average grades ranged from 0 (fail) to 4 (A) among Cohort 1 and Cohort 2 students. The highest performance on AP/IB courses, reflecting a B plus, was among the students in the monitoring group for both, Cohort 1 (mean=3.22) and Cohort 2 (mean=3.23). Other groups earning grades approximating a B were the FARMS Hispanic/Latino group in Cohort 1 (2.96) and the FARMS Asian/White/All other student groups in Cohort 2 (3.03) (Table 13).

Table 13

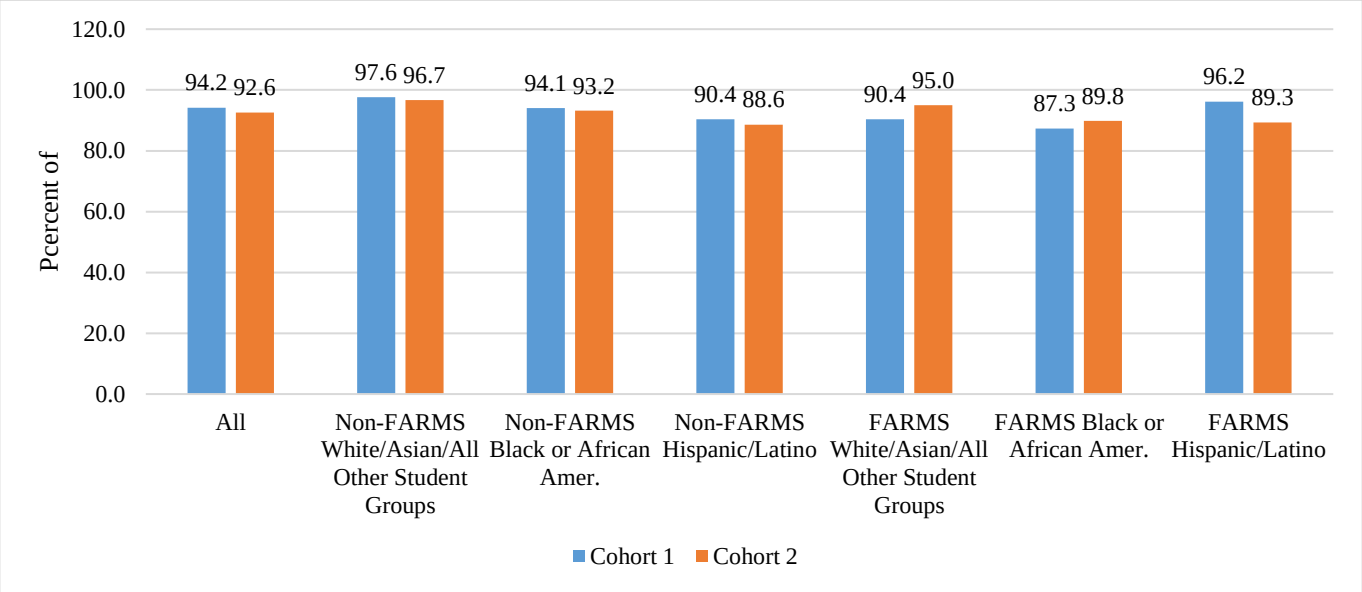
Number of AP/IB Course Credits and Average Grades for all Students in Cohorts 1 and 2 in the Year Following the Implementation of EOS

	Number of Students taking 1 or more AP/IB courses		Average AP/IB credits enrolled by course-takers		Average course grade (4=A, 3=B, 2=C, 1=D, 0=E)	
	Coh. 1 EOS	Coh. 2 EOS	Coh. 1 EOS	Coh. 2 EOS	Coh. 1 EOS	Coh. 2 EOS
Student characteristics	N	N	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
All	4,074	5,090	2.04 (1.38)	2.00 (1.31)	2.88 (1.00)	2.83 (1.05)
Focus Groups						
Non-FARMS Asian/White/All Other Student Groups	1,789	1,659	2.19 (1.44)	2.15 (1.35)	3.22 (.83)	3.23 (.88)
Non-FARMS Black or African American	628	826	2.15 (1.45)	1.96 (1.28)	2.68 (.98)	2.79 (.97)
Non-FARMS Hispanic/Latino	487	840	1.80 (1.19)	1.93 (1.28)	2.53 (1.06)	2.54 (1.10)
FARMS Asian/White/All Other Student Groups	417	240	1.90 (1.30)	2.14 (1.40)	2.51 (1.03)	3.03 (.96)
FARMS Black or African American	489	589	1.65 (1.11)	1.92 (1.29)	2.46 (1.10)	2.63 (1.07)
FARMS Hispanic/Latino	264	936	2.20 (1.51)	1.82 (1.23)	2.96 (.97)	2.49 (1.12)

Note. Outcomes for AP/IB courses are for the year after EOS started the program (2018 for cohort 1 and 2019 for cohort 2).

Corroborating the performance levels observed in Table 13, Figure 16 depicts the percentage of students who earned a C or better in one or more AP/IB courses. A very high percentage of students in both Cohort 1 and Cohort 2 earned a C or better in at least one AP/IB course (94% and 93%, respectively). At the student group level, the highest performance was observed among students in the monitoring group (98%) and among Hispanic/Latino students receiving FARMS (96%) in Cohort 1, and the monitoring group (97%) and Asian/White/All other student groups receiving FARMS (95%) in Cohort 2 schools. At least 87 percent of each student group in both cohorts earned a C or better in at least one AP/IB course (Figure 16).

Figure 16
Percentage of Students Passing an AP/IB Course with C or Higher: Cohort 1 and Cohort 2 Schools



Average number of AP/IB exams taken. The average number of AP/IB tests taken by Cohort 1 students was 2.05 (with a range of 1 to 7) and the number of tests taken by students in Cohort 2 schools was 1.86 (with a range of 1 to 9); fewer students on average took at least one AP/IB exam than enrolled in at least one AP/IB course in Cohort 2 schools. The highest number of exams taken was recorded for the FARMS Hispanic/Latino group (M=2.19) and the monitoring group (M= 2.17) in Cohort 1. In Cohort 2 schools, the highest number of tests taken was among students in the monitoring group (M=1.95).

Percent of exams with college-ready scores. Of the AP/IB exams taken by students in Cohort 1 and Cohort 2 schools, about half earned a college-level score (3 or higher on an AP test, and 4 or higher on an IB test). Among MCPS focus groups, the monitoring group in each cohort had the highest percent of college-ready scores (60% for Cohort 1 and 63% for Cohort 2). In addition, 50 percent of tests taken by students in the FARMS Asian/White/All other student groups in Cohort 2 earned a college-ready score. At least 40 percent of AP/IB exams taken by the FARMS Hispanic/Latino group (44%) and non-FARMS Hispanic/Latino (41%) in Cohort 1, and FARMS Hispanic/Latino (40%) and non-FARMS Hispanic/Latino (44%) in Cohort 2 schools earned college ready scores.

Table 11

Number of AP/IB Exams Taken and Exams with College-ready Scores for All Students in Cohort 1 and 2 Schools in the Year Following the Implementation of EOS

	Number of Students taking 1 or more AP/IB tests		Average number of AP/IB exams taken by test-takers		Mean Percent with college-ready scores	
	Coh. 1 EOS	Coh. 2 EOS	Coh. 1 EOS	Coh. 2 EOS	Coh. 1 EOS	Coh. 2 EOS
	N	N	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
All	3,564	3,329	2.05 (1.36)	1.86 (1.19)	47.5 (45.0)	50.1 (45.3)
Focus Groups						
Non-FARMS White/Asian/ All Other Student Groups	1,673	1,347	2.17 (1.43)	1.95 (1.25)	59.7 (44.2)	62.9 (43.9)
Non-FARMS Black or African American	537	516	2.09 (1.34)	1.78 (1.11)	37.0 (42.4)	39.4 (44.3)
Non-FARMS Hispanic/Latino	393	452	1.86 (1.16)	1.85 (1.15)	41.3 (43.8)	44.1 (44.9)
FARMS All White/Asian/ Other Student Groups	340	180	1.87 (1.30)	1.87 (1.25)	24.3 (38.1)	49.9 (45.1)
FARMS Black or African American	382	329	1.72 (1.13)	1.84 (1.18)	38.0 (43.7)	38.3 (43.8)
FARMS Hispanic/Latino	239	505	2.19 (1.47)	1.74 (1.13)	44.0 (45.1)	39.8 (43.1)

Note. Outcomes for AP/IB tests are for the year after EOS started the program (2018 for Cohort 1 and 2019 for Cohort 2). College-ready scores for AP tests represent scores of 3 or higher and, for IB tests, scores of 4 or higher.

Question 7: How do the academic and behavioral outcomes of students (i.e. weighted GPA, 4-year cohort graduation rates, attendance, suspensions, taking courses in the Career and Technology Education (CTE) program or through dual enrollment options) in EOS schools compare with those of their peers in schools not yet implementing EOS?

The comparison group for both Cohort 1 and Cohort 2 analyses is Cohort 3. This allowed the same group of schools to serve as the comparison for all three years of the Cohort 1 analyses, given that EOS was not recruiting students in Cohort 3 during those years.

Weighted GPA. Overall, the average weighted GPA for students in Cohort 1 and comparison schools increased from 2017 to 2019, and significant differences in the average weighted GPA scores for all students were found in favor of comparison schools in each of these three years. Within Cohort 1 schools (which started EOS in 2017 and aimed at enrolling more students in AP/IB courses in the following years), the average weighted GPA in 2018 and 2019 was higher than in 2017, when EOS was introduced.

However, the same was true for comparison schools—weighted GPA was higher in 2018 and 2019 than in 2017—thus maintaining a significant difference between EOS and comparison in each of these three years (Table 15).

Similarly, in Cohort 1 and comparison schools, students at each grade level, especially Grades 11 and 12, earned a higher average weighted GPA in 2018 and 2019 relative to 2017. Significant differences in the average weighted GPA were observed in favor of comparison schools for all the grades during the three years of analysis (Table 15).

Further analysis showed that the average weighted GPA for Cohort 1 and comparison schools varied by focus group and year of analysis. Looking across focus groups, the average weighted GPA for students in Cohort 1 and comparison schools increased from 2017 to 2019 for all the focus groups, except for Non-FARMS Hispanic/Latino students. For example, in each of the three years, the average weighted GPA for two focus groups (Monitoring Group and Non-FARMS Hispanic/Latino) was significantly higher for students in comparison schools than for their peers in Cohort 1 schools. For Non-FARMS Black or African American students, significant differences in favor of Cohort 1 schools were found in 2017. Finally, no significant differences in the average weighted GPA were found between students in the three FARMS groups and non-FARMS Black or African American in Cohort 1 schools and their counterparts in comparison schools, for the two years after EOS was implemented (Table 15).

Table 15

Average Weighted GPA from 2017 to 2019 for Students in Cohort 1 and Comparison Schools

	2017		2018		2019	
	Coh. 1 EOS (N=7,968)	Comp. (N=17,183)	Coh. 1 EOS (N=8,273)	Comp. (N=17,565)	Coh. 1 EOS (N=8,483)	Comp. (N=17,831)
Student characteristics	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
All	**3.19 (.99)**	**3.34 (.99)**	**3.26 (1.02)**	**3.43 (.98)**	**3.29 (1.05)**	**3.46 (1.00)**
Grades						
9	**3.08 (1.16)**	**3.28 (1.08)**	**3.10 (1.18)**	**3.33 (1.09)**	**3.08 (1.22)**	**3.32 (1.13)**
10	**3.20 (.99)**	**3.29 (1.00)**	**3.26 (1.02)**	**3.45 (.99)**	**3.31 (1.04)**	**3.43 (1.01)**
11	**3.32 (.88)**	**3.47 (.89)**	**3.44 (.88)**	**3.53 (.88)**	**3.47 (.91)**	**3.66 (.87)**
12	**3.19 (.90)**	**3.33 (.96)**	**3.29 (.88)**	**3.44 (.90)**	**3.40 (.87)**	**3.47 (.89)**
Focus Groups						
Non-FARMS Asian/White/All Other Student Groups (monitoring group)	**3.80 (.75)**	**3.87 (.76)**	**3.86 (.77)**	**3.95 (.74)**	**3.90 (.78)**	**3.98 (.74)**
Non-FARMS Black or African American	**3.16 (.93)**	**3.09 (.91)**	3.23 (.94)	3.25 (.87)	3.32 (.92)	3.26 (.93)
Non-FARMS Hispanic/Latino	**2.88 (.98)**	**2.98 (1.00)**	**2.93 (1.03)**	**3.02 (1.04)**	**2.91 (1.07)**	**3.04 (1.04)**
FARMS Asian/White/All Other Student Groups	**3.20 (1.05)**	**3.37 (.92)**	3.41 (1.02)	3.51 (.91)	3.46 (1.03)	3.52 (.96)
FARMS Black or African American	2.85 (.95)	2.87 (.97)	2.95 (.99)	2.99 (.98)	3.00 (1.03)	3.04 (.99)
FARMS Hispanic/Latino	2.75 (.91)	2.72 (.90)	2.80 (.98)	2.83 (.89)	2.83 (1.02)	2.84 (.94)

Note. Comparison schools for 2017, 2018, and 2019 are Cohort 3 schools. **Bold** represents significant differences of means of at least p <. 05 between schools in Cohort 1 and comparison. Differences were tested via one-way ANOVA for the whole analysis, by grade, and focus group. Differences over time were not tested. See Appendix (Table A-9) for details of the one-way ANOVA test.

The average weighted GPA for all students in Cohort 2 and comparison schools increased from 2018 to 2019. When looking across grade level, Grade 11 and 12 students in both Cohort 2 and comparison schools performed better and earned a higher average weighted GPA in 2019 relative to 2018; however, a statistically significantly higher average weighted GPA was observed in favor of Grades 9, 10, 11, and 12 students in comparison schools (Table 16).

When looking at focus groups, most focus groups in Cohort 2 and comparison schools (except for FARMS Hispanic/Latino) attained a higher average weighted GPA in 2019 than 2018. Significant differences in weighted GPA were observed for three focus groups in favor of students in comparison schools (Monitoring

Group, Non-FARMS Hispanic/Latino, and FARMS Black or African American) during both years. One group, FARMS All Other Student Groups, reported a significant difference in favor of students in comparison schools in 2018 but improvement in the EOS group resulted in no significant difference in 2019, after EOS was implemented. (Table 16).

Table 16

Average Weighted GPA for 2018 and 2019 for Students in Cohort 2 and Comparison Schools

	2018		2019	
	Coh. 2 EOS (N=12,092)	Comparison (N=17,565)	Coh. 2 EOS (N=12,468)	Comparison (N=17,831)
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
All	**3.15 (1.02)**	**3.43 (.98)**	**3.18 (1.04)**	**3.46 (1.00)**
Grades				
9	**3.00 (1.17)**	**3.33 (1.09)**	**2.98 (1.18)**	**3.32 (1.13)**
10	**3.15 (1.01)**	**3.45 (.99)**	**3.17 (1.05)**	**3.43 (1.02)**
11	**3.29 (.89)**	**3.53 (.88)**	**3.42 (.88)**	**3.66 (.87)**
12	**3.18 (.91)**	**3.44 (.90)**	**3.23 (.90)**	**3.47 (.89)**
Focus Groups				
Non-FARMS Asian/White/All Other Student Groups (monitoring group)	**3.79 (.80)**	**3.95 (.74)**	**3.84 (.81)**	**3.98 (.74)**
Non-FARMS Black or African American	3.21 (.93)	3.25 (.87)	3.27 (.95)	3.26 (.93)
Non-FARMS Hispanic/Latino	**2.85 (1.06)**	**3.02 (1.04)**	**2.90 (1.05)**	**3.04 (1.04)**
FARMS Asian/White/All Other Student Groups	**3.32 (.98)**	**3.51 (.91)**	3.46 (.93)	3.52 (.96)
FARMS Black or African American	**2.91 (1.01)**	**2.99 (.98)**	**2.96 (1.03)**	**3.04 (.99)**
FARMS Hispanic/Latino	2.88 (.95)	2.83 (.89)	2.85 (.99)	2.84 (.94)

Note. Comparison schools for 2018 and 2019 are Cohort 3 schools. **Bold** represents significant differences of means of at least p <. 05 between schools in cohort 2 and comparison. Differences were tested via one-way ANOVA for the whole analysis, by grade, and focus group. Differences over time were not tested. See Appendix (Table A-10) for details of the one-way ANOVA test.

Four-year-graduation rates. Four-year cohort graduation rates are reported at the school level, so statistical tests of differences in graduation rates were not appropriate because of the small number of schools in each cohort.

In general, there was minimal variation in the four-year cohort graduation rates from 2017 to 2019 (less than 0.6 percentage points) for schools in EOS Cohort 1 and comparison schools; however, comparison schools had higher rates in 2017 and maintained the edge over Cohort 1 schools for all the three years of analysis by at least 1.4 percentage points (Table 17).

In the analysis disaggregated by students' characteristics, certain racial/ethnic groups reported a change in their graduation rates of more than one percentage point in 2019 relative to 2017. For instance, graduation rates of Hispanic/Latino and White students in Cohort 1 schools decreased by at least 1.2 percentage points in 2019 relative to 2017, whereas the graduation rates of students in two or more race groups increased by 1.7 percentage points (from 94.3% to 96%) during the same period.

In the examination of graduation rates between Cohort 1 and comparison schools, the differences in graduation rates varied depending on the race/ethnicity and the year examined. However, the graduation rates of Asian students in EOS schools were consistently higher than the rates in comparison schools for the period 2017–2019.

When data were disaggregated by services, both groups of schools (Cohort 1 and comparison) reported an increase in their graduation rates in 2019 relative to 2017, among students receiving ESOL services (increase in at least 1.6 percentage points). However, graduation rates of students receiving ESOL services were consistently higher in comparison schools than in Cohort 1 schools from 2017 to 2019 (Table 17).

Table 17

Average Four-year Cohort Graduation Rates from 2017 to 2019: Cohort 1 Schools and Comparison Schools

	2017		2018		2019	
	Coh. 1 EOS (N=4)	Comparison (N=8)	Coh. 1 EOS (N=4)	Comparison (N=8)	Coh. 1 EOS (N=4)	Comparison (N=8)
	Mean	Mean	Mean	Mean	Mean	Mean
All	87.4	89.3	86.0	88.3	87.3	88.7
Race/Ethnicity						
Asian	98.4	96.6	96.8	95.7	98.0	96.0
Black or African American	90.4	88.4	93.0	91.8	89.7	91.7
Hispanic/Latino	79.7	82.2	77.2	76.6	78.5	79.6
White	96.1	94.2	89.3	94.0	93.1	94.7
Two or More Races	94.3	92.4	90.1	93.6	96.0	91.2
Service Receipt						
FARMS	84.2	83.5	85.0	83.2	84.3	86.4
Limited English Proficiency (LEP)	52.1	53.4	42.0	52.7	53.7	59.6

Note. Comparison schools for 2017, 2018, and 2019 are Cohort 3 schools. Mean graduation rates for Cohort 1 schools (N=4) and for comparison schools (N=8) were computed using school-level rates calculated for district reports to MSDE.

Overall, the four-year cohort graduation rates remained at the same level (83.4%) in Cohort 2 schools between 2018 and 2019, whereas it increased less than one percentage point (from 88.3% to 88.7%) in comparison schools during the same period. In addition, for the two years examined, graduation rates in comparison schools were higher than the rates in Cohort 2 schools by at least 4.9 percentage points (Table 18).

Similar to the previous analysis, the four-year cohort graduation rates of students in four of the five race/ethnicity student groups reported a change of more than one percentage point from 2018 to 2019. Graduation rates of Hispanic/Latino and multiracial students in Cohort 2 schools decreased in at least 1.4 percentage points from 2018 to 2019, whereas the graduation rates of Black or African American and White students in Cohort 2 schools increased by at least 3.2 percentage points during the same period.

In the examination of graduation rates between of Cohort 2 and comparison schools, differences in the graduation rates also varied based on the student's race/ethnicity and the year examined. However, except for Hispanic/Latino students, graduation rates were higher in comparison schools than in Cohort 2 schools for both years of analysis, regardless of the race/ethnicity of the student (Table 18).

When examining graduation rates by special services receipt, a drop in graduation rates from 2018 to 2019 was observed for in Cohort 2 schools among students receiving FARMS or ESOL services. Conversely, an increase in graduation rates was observed among the students receiving FARMS and ESOL services in comparison schools from 2018 to 2019.

The differences in the graduation rates between Cohort 2 schools and comparison schools varied depending on the year. Graduation rates of students receiving FARMS or ESOL services were higher in Cohort 2 schools than in comparison schools in 2018, but the situation was reversed in 2019 with graduation rates being higher in comparison schools than in Cohort 2 (Table 18).

Table 18

Average Four-year Cohort Graduation Rates Across Two Years: Cohort 2 Schools and Comparison Schools

	2018		2019	
	Coh. 2 EOS (N=6)	Comparison (N=8)	Coh. 2 EOS (N=6)	Comparison (N=8)
	Mean	Mean	Mean	Mean
All	83.4	88.3	83.4	88.7
Race/Ethnicity				
Asian	95.5	95.7	94.8	96.0
Black or African American	87.5	91.8	90.7	91.7
Hispanic/Latino	77.6	76.6	75.1	79.6
White	87.0	94.0	91.1	94.7
Two or More Races	91.2	93.6	89.8	91.2
Service Receipt				
FARMS	83.7	83.2	83.5	86.4
Limited English Proficiency (LEP)	58.8	52.7	57.7	59.5

Note. Comparison schools for 2018 and 2019 are Cohort 3 schools. Mean graduation rates for Cohort 2 schools (N=6) and for comparison schools (N=8) were computed using school-level rates calculated for district reports to MSDE.

Average Daily Attendance. The average daily attendance of all students in Cohort 1 and comparison schools decreased from 2017 to 2019, and significant differences were found in favor of comparison schools in these three years. Within Cohort 1 schools, the average daily attendance decreased from 91.2 percnet in 2017 to 90.1 percent in 2019. Similarly, within Cohort 2 schools, the average daily attendance also decreased from 91.8 percent in 2017 to 91.0 percent in 2019 (Table 19).

In the analysis of attendance by grade, the average daily attendance was lower in 2019 relative to 2017 for all the grades examined, and attendance rates reported to be higher among students in comparison schools than in Cohort 1 schools. However, significant differences in attendance between Cohort 1 and comparison schools were observed for all grades in 2018, but for some grades in 2017 and 2019 (Table 19).

When looking at focus groups, average daily attendance was lower in 2019 relative to 2017 for the following four focus groups: Monitoring Group, Non-FARMS Hispanic/Latino, FARMS All Other Student Groups, and FARMS Hispanic/Latino. For the other two focus groups (Non-FARMS and FARMS Black or African American), increasing or decreasing attendance rates from 2017 to 2019 varied depending on the school type (EOS or comparison). Moreover, differences in attendance patterns between Cohort 1 and comparison schools varied by focus group and year of analysis. For example, Cohort 1 students in the Monitoring Group registered significantly lower attendance rates than their peers in comparison schools in 2018. Similarly, Cohort 1 Black or African American (FARMS and Non-FARMS) students had significantly lower attendance rates than their peers in comparison schools in 2018 and 2019. In contrast, Cohort 1 FARMS and Non-FARMS Hispanic/Latino students (in 2017 and 2018, respectively) had significantly higher attendance rates than their counterparts in comparison schools (Table 19).

Table 19

Average Daily Attendance Across Three Years: Cohort 1 Schools and Comparison Schools

	2017		2018		2019	
	Coh. 1 EOS (N=7,968)	Comparison (N=17,183)	Coh. 1 EOS (N=8,273)	Comparison (N=17,501)	Coh. 1 EOS (N=8,195)	Comparison (N=17,163)
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
All	**91.2 (12.5)**	**91.8 (11.5)**	**90.1 (13.9)**	**91.4 (11.6)**	**90.1 (14.1)**	**91.0 (13.1)**
Grades						
9	91.9 (13.3)	92.3 (13.0)	**90.9 (15.3)**	**92.8 (11.8)**	**90.8 (15.1)**	**92.2 (13.6)**
10	**91.4 (13.5)**	**92.2 (11.6)**	**90.3 (14.9)**	**91.9 (11.8)**	90.6 (15.2)	91.2 (13.9)
11	92.2 (11.2)	92.6 (9.7)	**91.0 (12.7)**	**91.8 (10.9)**	**90.6 (12.9)**	**92.1 (11.2)**
12	**89.1 (10.7)**	**90.1 (10.7)**	**87.9 (11.7)**	**88.9 (11.5)**	88.1 (12.2)	88.1 (12.9)
Focus Groups						
Non-FARMS Asian/White/All Other Student Groups (monitoring group)	93.5 (8.9)	93.5 (8.6)	**92.7 (10.7)**	**93.1 (8.6)**	92.9 (10.0)	93.2 (9.3)
Non-FARMS Black or African American	93.4 (10.3)	93.7 (10.1)	**92.5 (11.2)**	**94.0 (8.4)**	**93.0 (11.3)**	**93.7 (9.7)**
Non-FARMS Hispanic/Latino	87.6 (16.9)	89.1 (14.4)	**88.6 (17.5)**	**87.9 (15.5)**	86.2 (18.2)	86.3 (18.6)
FARMS Asian/White/All Other Student Groups	90.6 (13.6)	91.9 (11.9)	90.8 (12.9)	91.1 (13.0)	89.7 (15.9)	91.0 (13.4)
FARMS Black or African American	90.0 (12.9)	91.8 (12.3)	**90.1 (14.4)**	**91.6 (12.1)**	**90.1 (14.3)**	**91.4 (12.1)**
FARMS Hispanic/Latino	**89.4 (13.0)**	**88.4 (14.2)**	87.2 (15.5)	87.8 (14.2)	87.4 (15.2)	86.7 (16.0)

Note. Comparison schools for 2017, 2018, and 2019 are Cohort 3 schools. **Bold** represents significant differences of means of at least p <. 05 between schools in cohort 2 and comparison. Differences were tested via one-way ANOVA for the whole analysis, by grade, and focus group. See Appendix (Table A-11) for details of the one-way ANOVA test.

The attendance rates for all students in Cohort 2 and comparison schools decreased from 2018 to 2019; nevertheless, students in Cohort 2 schools registered significantly lower attendance rates than their peers in comparison schools for both years of analysis (Table 20). When looking at grades, students in all grades, except for Grade 11, also reported lower attendance patterns from 2018 to 2019, and significantly lower attendance rates were also observed among Cohort 2 students relative to their peers in comparison schools for all the grades examined (Table 20).

In the analysis by focus groups, all Black or African American and Hispanic/Latino students, those receiving FARMS and those not receiving FARMS, in Cohort 2 and comparison schools, reported lower attendance rates in 2019 relative to 2018. Moreover, attendance rates in Cohort 2 schools were lower than comparison schools for all the focus groups examined. Significant differences in favor of comparison schools were found for some focus groups: 1) in all focus groups except for the Monitoring Group in the 2018 analysis, and 2) in all focus groups except for FARMS All Other Student Groups in the 2019 analysis (Table 20).

Table 20

Average Daily Attendance Across Two Years: Cohort 2 Schools and Comparison Schools

	2018		2019	
	Coh. 2 EOS (N=12,092)	Comparison (N=17,565)	Coh. 2 EOS (N=12,468)	Comparison (N=17,831)
	Mean % (SD)	Mean % (SD)	Mean % (SD)	Mean % (SD)
All	**88.7 (15.0)**	**91.4 (11.6)**	**88.0 (15.9)**	**91.0 (13.1)**
Grades				
9	**89.5 (16.3)**	**92.8 (11.8)**	**89.0 (16.9)**	**92.2 (13.6)**
10	**89.2 (15.6)**	**91.9 (11.8)**	**88.0 (16.8)**	**91.2 (13.9)**
11	**89.5 (13.5)**	**91.8 (10.9)**	**89.3 (14.9)**	**92.1 (11.2)**
12	**86.5 (13.7)**	**88.9 (11.5)**	**85.2 (14.0)**	**88.1 (12.9)**
Focus Groups				
Non-FARMS Asian/White/All Other Student Groups (monitoring group)	93.0 (9.7)	93.1 (8.6)	**92.4 (10.6)**	**93.2 (9.3)**
Non-FARMS Black or African American	**92.3 (11.1)**	**94.0 (8.4)**	**92.0 (11.6)**	**93.7 (9.7)**
Non-FARMS Hispanic/Latino	**83.9 (19.5)**	**87.9 (15.5)**	**82.8 (21.0)**	**86.3 (18.6)**
FARMS Asian/White/All Other Student Groups	**89.5 (14.4)**	**91.1 (13.0)**	90.8 (11.5)	91.0 (13.4)
FARMS Black or African American	**89.1 (15.2)**	**91.6 (12.1)**	**89.0 (14.5)**	**91.4 (12.1)**
FARMS Hispanic/Latino	**86.3 (15.5)**	**87.8 (14.2)**	**84.9 (17.0)**	**86.7 (16.0)**

Note. Comparison schools for 2018 and 2019 are Cohort 3 schools. **Bold** represents significant differences of means of at least p <. 05 between schools in cohort 2 and comparison. Differences were tested via one-way ANOVA for the whole analysis, by grade, and focus group. See Appendix (Table A–12) for details of the one-way ANOVA test.

Suspension rates. Overall, the percentage of students with at least one suspension ranged between 2.0 to 3.6 depending on the year and group of schools. The percentage of students with one or more suspensions in Cohort 1 schools decreased from 3.6 percent in 2017 (before EOS implementation) to 2.8 percent in 2019, whereas the percentage of students suspended in comparison schools increased from 2.0 percent in 2017 to 2.2 percent in 2019. However, despite this decrease in suspensions in Cohort 1 schools from 2017 to 2019, suspensions rates in Cohort 1 schools were still significantly higher than those in comparison schools for all the three years examined when all students were compared (Table 21).

A similar pattern was observed in the analysis by grade. All grades in Cohort 1 schools reported a lower percentage of students suspended in 2019 relative to 2017, whereas almost all grades (9, 10, and 11) in comparison schools reported an increase in suspensions during the same period. In addition, significant differences in the percentage of students with suspensions between Cohort 1 and comparison schools varied depending on the grade and year. For example, in 2017, suspension rates in Cohort 1 schools were significantly higher than in comparison schools for all the grades. However, in 2018, suspension rates in Cohort 1 schools were significantly higher than in comparison schools only for Grades 9 and 12. In 2019, suspension rates in Cohort 1 schools were significantly higher than in comparison school only for Grade 12; for Grades 9, 10, and 11, the suspension rates for Cohort 1 were not statistically significantly different from the suspension rates of students in the comparison schools (Table 21).

In the analysis by focus group, suspension rates from 2017 to 2019 showed different patterns depending on the focus group and type of school (EOS or comparison) analyzed. In general, suspension rates across all focus groups in Cohort 1 schools were lower in 2019 relative to 2017 (except for Non-FARMS Hispanic/Latino students that remained at 2.4 percent in 2019). However, in the case of comparison schools, suspension rates in four focus groups were higher in 2019 relative to 2017; it remained the same (1.0%) among students in the Monitoring Group, and decreased to 1.8 percent among Non-FARMS Hispanic/Latino students. Moreover, suspension rates in Cohort 1 schools were significantly higher than in comparison schools in four focus groups in 2017, when the EOS program was introduced. However, these differences were significant for only one focus group in subsequent years (among students in the Monitoring Group in 2018 and among FARMS Hispanic/Latino students in 2019) (Table 21).

Table 21

Percentage of Students with One or More Suspensions Across Three Years: Cohort 1 Schools and Comparison Schools

	2017		2018		2019	
	Coh. 1 EOS	Comparison	Coh. 1 EOS	Comparison	Coh. 1 EOS	Comparison
	% (N)	% (N)	% (N)	% (N)	% (N)	% (N)
All	**3.6 (7,968)**	**2.0 (17,183)**	**2.9 (8,305)**	**2.3 (17,565)**	**2.8 (8,502)**	**2.2 (17,831)**
Grades						
9	**4.8 (2,419)**	**2.7 (5,064)**	**3.9 (2,447)**	**2.5 (4,990)**	3.6 (2,493)	2.9 (5,056)
10	**4.0 (2,104)**	**1.9 (4,354)**	3.1 (2,191)	2.9 (4,647)	3.0 (2,2304)	2.7 (4,640)
11	**2.6 (1,752)**	**1.6 (3,849)**	2.1 (1,821)	1.7 (3,903)	2.0 (1,854)	1.7 (4,051)
12	**2.5 (1,693)**	**1.6 (3,916)**	**2.2 (1,846)**	**1.8 (4,025)**	**2.2 (1,925)**	**1.4 (4,084)**
Focus Groups						
Non-FARMS Asian/White/All Other Student Groups (monitoring group)	1.0 (2,421)	1.0 (7,247)	**1.2 (2,540)**	**0.7 (7,399)**	0.9 (2,611)	1.0 (7,533)
Non-FARMS Black or African American	**4.7 (1,154)**	**1.9 (2,297)**	4.0 (1,159)	3.7 (2,376)	3.1 (1,195)	3.0 (2,409)
Non-FARMS Hispanic/Latino	2.4 (1,202)	2.0 (2,378)	2.3 (1,313)	2.0 (2,540)	2.4 (1,477)	1.8 (2,829)
FARMS Asian/White/All Other Student Groups	**4.1 (468)**	**1.2 (818)**	2.1 (473)	1.4 (806)	1.8 (453)	1.8 (780)
FARMS Black or African American	**8.7 (1,018)**	**5.4 (1,628)**	6.7 (1,020)	6.2 (1,671)	6.1 (994)	6.3 (1,712)
FARMS Hispanic/Latino	**4.2 (1,705)**	**2.8 (2,815)**	3.2 (1,800)	3.2 (2,773)	**4.0 (1,772)**	**2.8 (2,558)**

Note. Comparison schools for 2017, 2018, and 2019 are Cohort 3 schools. **Bold** represents significant differences in percentages of at least p <. 05 between schools in Cohort 1 and comparison. Differences were tested via Chi-square for all students, by grade, and focus group. See Appendix (Table A-13) for details of the Chi-square test.

The percentage of students suspended in Cohort 2 schools stayed at the same level (3.5%) from 2018 to 2019, whereas the percentage of students suspended in comparison schools decreased slightly from 2.3 percent in 2018 to 2.2 percent in 2019 (Table 22). Students in Cohort 2 schools also had significantly higher suspension rates than those in comparison schools for both years of analysis. In the analysis by grade, suspension rates for Cohort 2 schools were higher in 2019 relative to 2018 for Grades 9 and 10 only, whereas for comparison schools, the rate was higher in 2019 relative to 2018 for Grade 9 only. Cohort 2 schools, for all the grades examined, reported higher percentage of students suspended than comparison schools; these differences were significant for Grades 9, 10, 11 in 2018, and for Grades 9 and 10 in 2019.

In the analysis by focus group, changes in the percent of students suspended in 2019, relative to 2018, varied depending on the focus group examined. Three focus groups in Cohort 2 and comparison schools had lower suspension rates in 2019 relative to 2018, while the rest of the focus groups experienced higher suspension rates in the same period. Moreover, suspension rates for almost all of the focus groups were higher in Cohort 2 schools than in comparison schools; these differences were statistically significant for the following student groups: 1) Monitoring Group and Non-FARMS Hispanic/Latino in 2018, and 2) Hispanic/Latino (FARMS and Non-FARMS) in 2019 (Table 22).

Table 22

Percent of Students with One or More Suspensions Across Two Years: Cohort 2 Schools and Comparison Schools

	2018		2019	
	Coh. 2 EOS	Comparison	Coh. 2 EOS	Comparison
Student characteristics	% (N)	% (N)	% (N)	% (N)
All	**3.5 (12,092)**	**2.3 (17,565)**	**3.5 (12,468)**	**2.2 (17,831)**
Grades				
9	**4.1 (3,552)**	**2.5 (4,990)**	**5.0 (3,783)**	**2.9 (5,056)**
10	**3.9 (3,346)**	**2.9 (4,647)**	**4.1 (3,205)**	**2.7 (4,640)**
11	**3.4 (2,555)**	**1.7 (3,903)**	2.3 (2,733)	1.7 (4,051)
12	2.2 (2,639)	1.8 (4,025)	2.0 (2,747)	1.4 (4,084)
Focus Groups				
Non-FARMS Asian/White/All Other Student Groups	**1.2 (2,651)**	**0.7 (7,399)**	1.5 (2,688)	1.0 (7,533)
Non-FARMS Black or African American	4.2 (1,845)	3.7 (2,376)	3.7 (1,868)	3.0 (2,409)
Non-FARMS Hispanic/Latino	**3.0 (2,330)**	**2.0 (2,540)**	**2.8 (2,373)**	**1.8 (2,829)**
FARMS Asian/White/All Other Student Groups	2.2 (540)	1.4 (806)	1.8 (551)	1.9 (780)
FARMS Black or African American	7.4 (1,684)	6.2 (1,671)	7.6 (1,745)	6.3 (1,722)
FARMS Hispanic/Latino	3.5 (3,042)	3.2 (2,773)	**3.8 (3,243)**	**2.8 (2,558)**

Note. Comparison schools for 2018 and 2019 are Cohort 3 schools. **Bold** represents significant differences in percentages of at least p <. 05 between schools in Cohort 2 and comparison. Differences were tested via Chi-square for all students, by grade, and focus group. See Appendix (Table A-14) for details of the Chi-square test.

Participation in Career and Technology Education (CTE) Courses. Overall, more than one half of students in Cohort 1 and comparison schools, except for 2019, took at least one CTE course. The percentage of students taking at least one CTE course in Cohort 1 schools increased from 62.8 percent in 2017 to 67.5 percent in 2018, but decreased to 60.9 percent in 2019. In the case of comparison schools, the percentage of students taking one or more CTE courses decreased during the period 2017–2019 (from 52.4% to 47.7%). When percentages of students taking CTE courses were tested between Cohort 1 and comparison schools, Cohort 1 schools had significantly higher percentages of students taking CTE for the three years of analysis (Table 23).

Similar patterns were observed for Grade 9, 10, and 11 students in Cohort 1 schools (increasing the year following the program but decreasing in the second year), and for Grade 9 and 12 students in comparison schools (decreasing trend). Moreover, similar to the analysis for all students, the percentage of Grade 9, 10, 11 and 12 students taking at least one CTE course was significantly higher in Cohort 1 schools than in comparison schools (Table 23).

Within each focus group of students in Cohort 1 schools, more than one-half of students took at least one CTE course in 2017, 2018, and 2019. In comparison schools, about a third of Hispanic/Latino students receiving FARMS and less than one-half of Non-FARMS Hispanic/Latino students and Black or African American students receiving FARMS took at least one CTE course during that period. In addition, the percentage of students taking one or more CTE courses in Cohort 1 schools also increased in 2018 relative to 2017, but decreased the year following (2019) for all the focus groups analyzed. In the case of comparison schools, a decreasing trend was observed from 2017 to 2019 for all the focus groups, except for Asian/White/All Other Student Groups receiving FARMS and Black or African American students receiving FARMS. Consistent with the analyses for all students and by grade, significant differences in the percentage of students taking one or more CTE courses were also observed for all the focus groups, with a higher percentage of Cohort 1 students taking one or more CTE courses than students in comparison schools (Table 23).

Table 23

Percentage of Students with One or More CTE Courses Across Three Years: Cohort 1 and Comparison Schools

	2017		2018		2019	
	Coh. 1 EOS	Comp.	Coh. 1 EOS	Comp.	Coh. 1 EOS	Comp.
Student characteristics	% (N)	% (N)	% (N)	% (N)	% (N)	% (N)
All	**62.8 (7,762)**	**52.4 (16,639)**	**67.5 (8,305)**	**50.8 (17,565)**	**60.9 (8,502)**	**47.7 (17,831)**
Grades						
9	**36.3 (2,364)**	**20.5 (4,895)**	**51.4 (2,447)**	**20.1 (4,990)**	**32.5 (2,493)**	**10.7 (5,056)**
10	**62.2 (2,040)**	**52.3 (4,027)**	**62.3 (2,191)**	**52.1 (4,647)**	**57.8 (2,230)**	**53.2 (4,640)**
11	**79.3 (1,708)**	**71.6 (3,729)**	**79.4 (1,821)**	**65.9 (3,903)**	**77.0 (1,854)**	**66.8 (4,051)**
12	**84.5 (1,650)**	**74.5 (3,808)**	**83.1 (1,846)**	**72.9 (4,025)**	**83.5 (1,925)**	**68.3 (4,084)**
Focus Groups						
Non-FARMS Asian/White/All Other Student Groups	**72.5 (2,360)**	**62.2 (7,021)**	**78.6 (2,540)**	**59.7 (7,399)**	**65.6 (2,611)**	**55.5 (7,533)**
Non-FARMS Black or African American	**68.4 (1,100)**	**55.4 (2,176)**	**70.3 (1,159)**	**54.8 (2,376)**	**62.3 (1,195)**	**50.5 (2,409)**
Non-FARMS Hispanic/Latino	**57.0 (1,129)**	**45.3 (2,219)**	**58.3 (1,313)**	**40.4 (2,540)**	**53.0 (1,477)**	**39.2 (2,829)**
FARMS Asian/White/All Other Student Groups	**61.9 (465)**	**50.5 (812)**	**72.7 (473)**	**54.1 (806)**	**64.0 (453)**	**49.6 (780)**
FARMS Black or African American	**60.3 (1,007)**	**47.1 (1,611)**	**67.3 (1,020)**	**48.1 (1,671)**	**64.5 (994)**	**45.9 (1,722)**
FARMS Hispanic/Latino	**51.6 (1,701)**	**34.8 (2,800)**	**55.3 (1,800)**	**34.1 (2,773)**	**54.3 (1,772)**	**32.1 (2,558)**

Note. Comparison schools for 2017, 2018, and 2019 are Cohort 3 schools. **Bold** represents significant differences in percentages of at least p <. 05 between schools in Cohort 1 and comparison. Differences were tested via Chi-square for all students, by grade, and focus group. See Appendix (Table A–15) for details of the Chi-square test.

Overall, about one-half of students in Cohort 2 and comparison schools took at least one CTE course, depending on year and student group (Table 24). The percentage of students taking at least one CTE course in Cohort 2 and comparison schools were lower in 2019 relative to 2018; however, higher percentages of students in comparison schools took at least one CTE course for both years of analysis.

In the analysis by grade, the majority of Grade 11 and 12 took at least one CTE course, and lower percentages of students taking one or more CTE courses in 2019 relative to 2018 were reported for Grade 9, 11, and 12 in Cohort 2 schools, and for Grade 9 and 12 in comparison schools. Nevertheless, differences between Cohort 2 and comparison schools for each of the grades depended on the year

examined. For instance, in 2019, higher percentages of Grade 10 and 11 students in comparison schools took CTE courses than their peers in EOS schools. Conversely, higher percentages of students in EOS schools took CTE courses in Grade 9 for both years of analysis, and in Grade 12 students in 2019 (Table 24).

Table 24

Percent of Students Taking at Least one CTE Course Across Two Years: Cohort 2 Schools and Comparison Schools

	2018		2019	
	Coh. 2 EOS	Comparison	Coh. 2 EOS	Comparison
Student characteristics	% (N)	% (N)	% (N)	% (N)
All	**48.9 (12,092)**	**50.8 (17,565)**	**46.0 (12,468)**	**47.7 (17,831)**
Grades				
9	**21.9 (3,552)**	**20.1 (4,990)**	**15.1 (3,783)**	**10.7 (5,056)**
10	**45.2 (3,346)**	**52.1 (4,647)**	**48.8 (3,205)**	**53.2 (4,640)**
11	64.5 (2,555)	65.9 (3,903)	**60.3 (2,733)**	**66.8 (4,051)**
12	74.7 (2,639)	72.9 (4,025)	**70.9 (2,747)**	**68.3 (4,084)**
Focus Groups				
Non-FARMS Asian/White/All Other Student Groups	61.6 (2,651)	59.7 (7,399)	56.4 (2,688)	55.5 (7,533)
Non-FARMS Black or African American	52.6 (1,845)	54.8 (2,376)	49.5 (1,868)	50.5 (2,409)
Non-FARMS Hispanic/Latino	42.1 (2,330)	40.4 (2,540)	**41.9 (2,373)**	**39.2 (2,829)**
FARMS Asian/White/All Other Student Groups	58.0 (540)	54.1 (806)	51.5 (551)	49.6 (780)
FARMS Black or African American	49.2 (1,684)	48.1 (1,671)	46.4 (1,745)	45.9 (1,722)
FARMS Hispanic/Latino	**38.9 (3,042)**	**34.1 (2,773)**	**37.2 (3,243)**	**32.1 (2,558)**

Note. Not-yet EOS in 2018 corresponds to cohort 3 schools in 2019. **Bold** represents significant differences of at least p <. 05 between schools in cohort 2 and comparison. Differences were tested via Chi-square for all students, by grade, and focus group. See Appendix (Table A-16) for details of the Chi-square test.

The percentage of Cohort 2 students who took at least one CTE course varied by focus group. For instance, one half or more of students in the monitoring group and Non-FARMS Black or African American students in Cohort 2 and comparison schools took at least one CTE course in 2018 and 2019. Conversely, less than one-half of students in the other focus groups in Cohort 2 or comparison schools took CTE courses during the same period. Additionally, the percentage of students taking CTE courses decreased from 2018 to 2019, for both groups of schools (Cohort 2 and comparison). When comparing EOS Cohort 2 and comparison

schools, the former had a higher percentage of students taking CTE courses than the latter in almost all of the focus groups examined. However, these differences were only significant in two focus groups: 1) Hispanic/Latino students receiving FARMS (in 2018 and 2019), and 2) Non-FARMS Hispanic/Latino (in 2019 only), in favor of students in schools implementing EOS (Table 24).

Dual Enrollment. Among Cohort 1 students, the lowest percentages of students taking one or more college courses was observed in 2019, but percentages of students in dual enrollment courses changed less than half of one percentage point for both EOS Cohort 1 and comparison schools. The percentage of students participating in dual enrollment in Cohort 1 schools was higher than in comparison schools for all the three years examined (Table 25).

Almost all students taking college courses were in Grades 11 and 12. Cohort 1 schools reported a significantly higher percentage of students in dual enrollment courses than did comparison schools for each of the three years (Table 25).

The analysis by focus groups revealed that during each year examined, the percentage of Cohort 1 monitoring group students in dual enrollment courses was larger than the percentage of their peers in the comparison schools. Participation in dual enrollment courses for students in the focus groups did not change much over the three years for Cohort 1 students and for students in comparison schools (Table 25).

Table 25

Percent of Students Taking One or More College Courses Across Three Years: Cohort 1 Schools and Comparison Schools

	2017		2018		2019	
	Coh. 1 EOS	Comp.	Coh. 1 EOS	Comp.	Coh. 1 EOS	Comp.
Student characteristics	% (N)	% (N)	% (N)	% (N)	% (N)	% (N)
All	**1.4 (7,759)**	**0.8 (16,626)**	**1.6 (8,305)**	**0.9 (17,565)**	**1.2 (8,499)**	**0.7 (17,816)**
Grades						
9	n < 5 (2,362)	n < 5 (4,891)	1.2 (2,447)	n < 5 (4,990)	n < 5 (2,493)	n < 5 (5,056)
10	n < 5 (2,040)	n < 5 (4,201)	n < 5 (2,191)	n < 5 (4,647)	n < 5 (2,230)	n < 5 (4,640)
11	**1.8 (1,707)**	**0.4 (3,727)**	**1.2 (1,821)**	**0.4 (3,903)**	**1.6 (1,854)**	**0.6 (4,050)**
12	**4.8 (1,650)**	**3.0 (3,807)**	**4.6 (1,846)**	**3.5 (4,025)**	**3.4 (1,922)**	**2.4 (4,070)**
Focus Groups						
Non-FARMS Asian/White/All Other Student Groups (monitoring group)	**2.4 (2,359)**	**1.1 (7,016)**	**2.7 (2,540)**	**1.3 (7,399)**	**2.5 (2,610)**	**0.8 (7,528)**
Non-FARMS Black or African American	0.9 (1,100)	0.8 (2,174)	**1.6 (1,159)**	**0.5 (2,376)**	1.1 (1,195)	1.1 (2,407)
Non-FARMS Hispanic/Latino	1.2 (1,127)	0.8 (2,215)	**1.5 (1,313)**	**0.6 (2,540)**	**0.9 (1,476)**	**0.3 (2,826)**
FARMS Asian/White/All Other Student Groups	1.5 (465)	0.9 (812)	1.5 (473)	1.2 (806)	n < 5 (453)	1.5 (780)
FARMS Black or African American	1.2 (1,007)	n < 5 (1,610)	0.7 (1,020)	0.5 (1,671)	0.9 (994)	0.5 (1,722)
FARMS Hispanic/Latino	**0.8 (1,701)**	**0.3 (2,799)**	0.8 (1,800)	0.4 (2,773)	n < 5 (1,771)	n < 5 (2,554)

Note. Comparison schools for 2017, 2018, and 2019 are Cohort 3 schools. Differences between Cohort 1 and comparison schools were not tested when either group < 5. **Bold** represents significant differences of percentages of students DE of at least p <. 05 between schools in cohort 1 and comparison. Differences were tested via Chi-square for all students, by grade, and focus group. See Appendix (Table A-17) for details of the Chi-square test.

Across 2018 and 2019, the percentage of students participating in dual enrollment in Cohort 2 schools was higher than in comparison schools (Table 26). The difference was observed in Grades 11 and 12, and for students in each of the focus groups in 2018; in 2019 significant differences were found for students in Grades 11 and 12, and in the monitoring group and Hispanic/Latino students not receiving FARMS.

Table 26

Percent of Students Taking One or More College Courses Across Two Years: Cohort 2 Schools and Comparison Schools

	2018		2019	
	Coh. 2 EOS	Comparison	Coh. 2 EOS	Comparison
Student characteristics	% (N)	% (N)	% (N)	% (N)
All	**1.9 (12,092)**	**0.9 (17,565)**	**1.2 (12,461)**	**0.7 (17,816)**
Grades				
9	n < 5 (3,552)	n < 5 (4,990)	n < 5 (3,783)	n < 5 (5,056)
10	0.7 (3,346)	n < 5 (4,647)	n < 5 (3,205)	n < 5 (4,640)
11	**1.1 (2,555)**	**0.4 (3,903)**	**1.4 (2,732)**	**0.6 (4,050)**
12	**6.7 (2,639)**	**3.5 (4,025)**	**4.0 (2,741)**	**2.4 (4,070)**
Focus Groups				
Non-FARMS Asian/White/All Other Student Groups (monitoring group)	**3.1 (2,651)**	**1.3 (7,399)**	**2.5 (2,685)**	**0.8 (7,528)**
Non-FARMS Black or African American	**2.3 (1,845)**	**0.5 (2,376)**	1.2 (1,867)	1.1 (2,407)
Non-FARMS Hispanic/Latino	**1.2 (2,330)**	**0.6 (2,540)**	**0.9 (2,371)**	**0.3 (2,826)**
FARMS Asian/White/All Other Student Groups	**3.0 (540)**	**1.2 (806)**	2.0 (551)	1.5 (780)
FARMS Black or African American	**1.2 (1,684)**	**0.5 (1,671)**	0.9 (1,743)	0.5 (1,722)
FARMS Hispanic/Latino	**1.4 (3,042)**	**0.4 (2,773)**	0.3 (3,243)	n < 5 (2,554)

Note. Not-yet EOS in 2018 corresponds to cohort 3 schools in 2019. Differences between Cohort 2 and comparison schools were not tested when either group < 5. **Bold** represents significant differences of percentages of students DE of at least p <. 05 between schools in cohort 2 and comparison. Differences were tested via Chi-square for all students, by grade, and focus group. See Appendix (Table A-18) for details of the Chi-square test.

Question 8: What is the status of AP/IB course offerings in EOS and Non-EOS schools from SY 2017 to SY 2019?

Nearly all the high schools (23 of 25) offered 24 or more total AP and IB courses each year (Liu, 2020). Richard Montgomery, Bethesda-Chevy Chase, Springbrook, Albert Einstein, John F. Kennedy, Rockville, and Seneca Valley had 40 or more AP/IB courses during this period. Paint Branch and Northwood offered the lowest number of AP courses over the three years (Table 27; Appendix, Table A–19).

There is no discernable pattern in the net change in number of course offerings based on Cohort (Table 27). The majority of schools added three or more AP/IB courses during the three years. The highest increases in AP/IB courses were observed for Albert Einstein (16), John F. Kennedy (10), and Bethesda-Chevy Chase

(8). These data demonstrate that schools with IB programs offered the highest combined total AP/IB courses. Cohort 3 had the highest percentage of its schools with IB programs and the highest number of courses across all years.

The trend in the number of AP/IB course offerings by EOS cohort. Because the size of the sample of schools in each Cohort was less than 10, advanced analyses were not conducted to assess whether the differences in the number of courses offered were statistically significant across cohorts.

Overall, there is an upward trend in the mean number of AP/IB courses from 2017 to 2020 for schools within Cohorts 1, 2, and 3, regardless of the starting point (Figure 17). Within each Cohort, the number of courses offered grew by an average of three to four courses. On average, schools in Cohort 3 (began implementation of EOS in 2018–2019) offered an average of ten more courses than schools in Cohorts 1 and 2, and Cohort 4 (the Never EOS cohort) offered an average of four more AP/IB courses than the schools in Cohorts 1 and 2 in 2017, 2018, and 2019.

Table 27

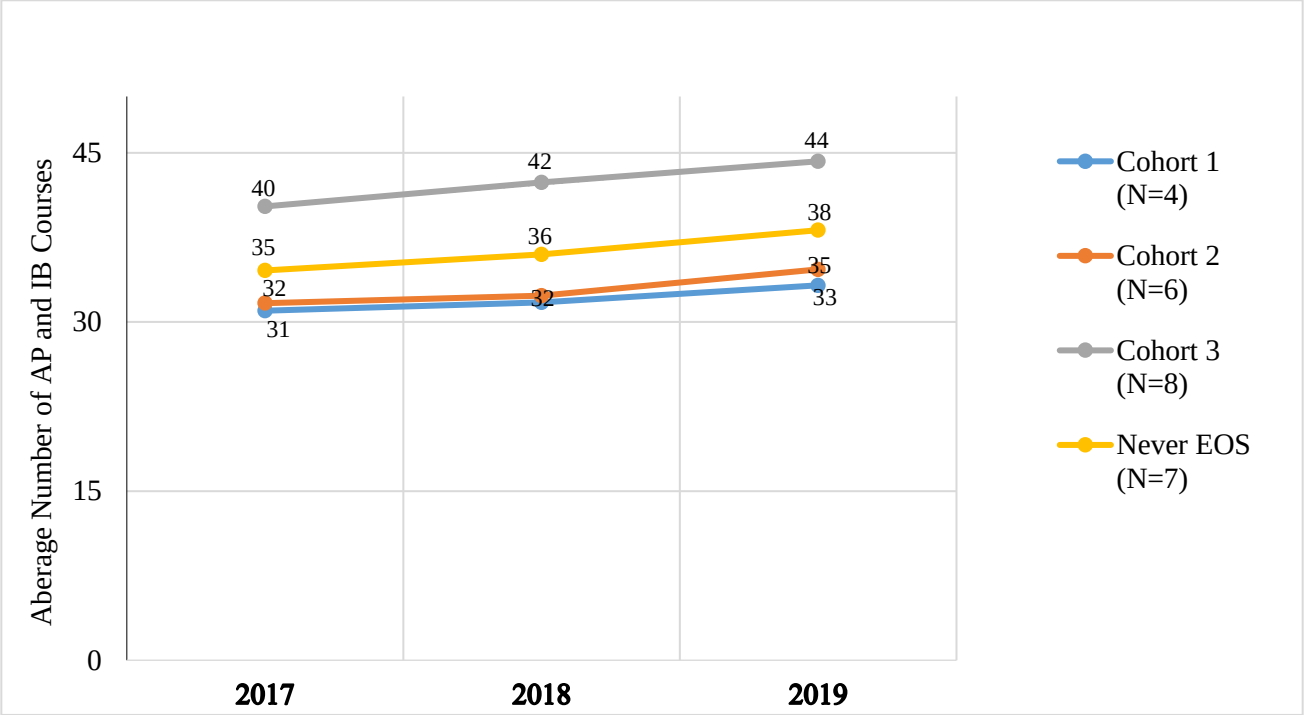
Total Number of AP/IB Courses and Net Change in Courses from 2017 to 2019, by School

	School Characteristics					Total AP/IB Courses /year			Change in AP/IB Courses 2017 to 2019
High School	Cohort	Size[a]	Total black and Hispanic	% FARMS	% Students in Focus Groups[b]	2017	2018	2019	
Col. Zadok Magruder	1	1609	33.00	58.0	63.0	24	25	28	4
Northwest [DE]	1	2586	22.08	48.0	52.0	26	26	28	2
Springbrook[IB]	1	1735	48.01	79.0	85.0	54	55	54	0
Wheaton	1	2077	46.94	77.0	82.0	20	21	23	3
John F. Kennedy [IB]	2	1781	50.53	86.0	90.0	46	48	56	10
Gaithersburg	2	2352	43.62	77.0	81.0	25	27	29	4
Northwood [DE]	2	1732	49.65	78.0	81.0	21	21	23	2
James Hubert Blake	2	1717	35.99	70.0	73.0	29	28	30	1
Clarksburg	2	2338	26.99	57.0	61.0	28	28	29	1
Watkins Mill [IB]	2	1615	49.97	82.0	86.0	41	42	41	0
Albert Einstein [IB]	3	1746	36.31	67.0	70.0	48	55	64	16
Montgomery Blair	3	3196	33.32	59.0	61.0	28	31	34	6
Rockville [IB]	3	1450	24.14	55.0	59.0	46	45	50	4
Walter Johnson	3	2587	7.42	28.0	31.0	36	38	40	4
Richard Montgomery [IB]	3	2483	19.98	41.0	47.0	68	72	71	3
Quince Orchard	3	2100	21.57	45.0	49.0	33	35	34	1
Paint Branch	3	2005	35.51	81.0	85.0	19	20	19	0
Seneca Valley [IB]	3	1181	37.93	72.0	76.0	44	43	42	-2
Bethesda-Chevy Chase [IB]	4	2124	10.17	32.0	33.0	60	64	68	8
Damascus	4	1311	15.79	36.0	40.0	26	30	31	5
Poolesville	4	1185	7.34	14.0	17.0	28	31	33	5
Walt Whitman	4	2098	1.81	13.0	14.0	35	36	37	2
Thomas S. Wootton	4	2107	5.17	17.0	19.0	33	33	35	2
Winston Churchill	4	2227	3.68	17.0	19.0	32	32	34	2
Sherwood	4	1973	15.71	36.0	38.0	28	26	29	1

Source. Liu, S. 2020. [IB] = IB school. [DE] = DE school, part of the Montgomery College Middle College (MC2) program, a dual enrollment program that prepares students to earn a High School Diploma and college credits towards an Associate's degree. *Note.* The schools are organized by Cohort. Within each Cohort, schools are sorted in descending order by the net change in courses from 2017 to 2019. Schools in Cohort 4 did not implement EOS.

[a] School size is based on September 30, 2019, official enrollment data. [b] Percent of students in the five MCPS focus groups (excluding students in the Monitoring Group-Asian/White/All other student groups not receiving FARMS services).

Figure 17
Comparative Plots of Average Number of AP/IB Courses From 2017 to 2019, by Cohort



Conclusion and Discussion

The study analyzed and compared student and school-level data of schools partnering with EOS and those not implementing the initiative by examining: AP/IB course offerings, percentage of all and underrepresented students AP/IB courses and their level of success, progress toward within-school equity in AP/IB participation, and overall evidence of academic success and student engagement. One of the goals of the partnership with EOS was to expand access and support to AP/IB courses for students of color and students impacted by poverty, who are traditionally underrepresented in these rigorous classes. MCPS envisioned that the participating schools would 1) reduce roadblocks that impede equitable access, such as GPA cut-offs, recommendations, parent/guardian signatures, stringent prerequisites, AP/IB contract, or registration fees, and 2) increase advocacy for students without any AP/IB course experience by Grade 10, and work toward increasing feelings of belonging for students of all backgrounds. These changes would, in turn, lead to greater numbers of students—especially students who have been traditionally underrepresented in advanced courses—enrolling in AP/IB courses in Grade 11 and 12 and passing the AP/IB exams.

This study found that about one-half of Grade 10 and 11 students in schools implementing EOS had not taken any AP/IB courses when the program was introduced in their schools. The percentages of students without AP/IB experience were much higher for Black or African American students, Hispanic/Latino students, and students receiving FARMS services and ESOL services. These findings corroborate other studies that indicate that participation in AP/IB courses has been increasing across the nation but that some groups —including Black or African American, Hispanic/Latino, and American Indian or Alaskan Native students— have continued to be underrepresented among the participants in AP courses (AP Central, 2020).

Also noticeable from the College Board data is that some groups —including Black or African American and American Indian or Alaskan Native students—have continued to be underrepresented among the participants in AP courses and those passing the tests.

When AP/IB enrollment was examined relative to the schools partnering with EOS, this study found that the number and percentage of Grade 11 and 12 students who had not taken an AP/IB course and who later took an AP/IB course were higher in EOS schools than in comparison schools for all students and for underrepresented students.

Cohort 1 schools also made more progress toward achieving within-school equity in participation in AP/IB for all students as well as for most student groups in their schools from 2016 to 2020. However, none of the schools participating in EOS had fully closed race and income gaps in AP/IB as of SY 2019–2020. While this study revealed evidence of progress toward within school equity among Cohort 1 schools, data on requests for AP/IB courses were not readily available for EOS and non-EOS schools, such that researchers could not examine if all the students who requested courses were enrolled. While many studies have shown that schools that offer more AP/IB courses are more likely to be the more affluent and less diverse schools, each school provided at least 25 different AP courses, suggesting that availability of courses is not the critical barrier to inequitable access to AP/IB courses in MCPS. Some schools also offered both AP and IB courses; therefore, the students had more options.

Surprisingly, this study found that the majority of Grades 11 and 12 (>85%) students of all backgrounds, without prior AP/IB experience, who took an AP/IB course earned a C or above in their AP/IB course, both in schools implementing EOS and comparison schools. In contrast, only a quarter of the students without previous AP/IB experience from EOS schools, and less than one-half of peers in non-EOS schools earned a college-ready score in the same courses. However, students in Cohort 1 schools took a significantly higher number of AP/IB tests on average than students in comparison schools, suggesting there may have been a different level of "push" to take the exams among different schools.

With regard to AP/IB exams, students in EOS schools took more AP/IB tests, whereas comparison schools outperformed EOS schools on the number of exams earning college-ready scores.

The program's goal of higher performance for all groups has not yet been accomplished for some of the measures analyzed in this report. Only about one-third of Hispanic/Latino and less than one-half of the Black or African American students earned college-ready scores on AP/IB exams, irrespective of whether their school was partnering with EOS or not. These findings on the performance of underrepresented students are consistent with other research across the country: Black, Latino, and Native American students and students from low-income households are less likely to take AP/IB exams or earn college-ready scores than their White, Asian, and more-affluent peers (Finn & Scanlan, 2019; GAO, 2018; Patrick, Socol, & Morgan, 2020). On the other hand, the findings in this study are inconsistent with those reported by districts implementing EOS that observed that increased participation by traditionally underrepresented groups students of all backgrounds were performing at comparable levels (Belcher, 2017).

Nationally, enrolment in DE is reportedly becoming more popular and often preferred over AP courses (Datapoint, 2019; Xu, Fink, & Solanski, 2019; Fink, Jenkins, & Yanagiura, 2017). This study examined participation in DE since it is an option for advanced coursework that may compete with AP/IB enrollment. Higher percentages of students in EOS schools were enrolled in DE courses in both Cohorts 1 and 2. An examination of participation in CTE courses, which offer another alternative for high school students, revealed that in Cohort 1 but not in Cohort 2, higher percentages of students in EOS schools enrolled in

CTE courses. Different DE and CTE programs at each school may account for these differences, but there was no evidence that students were missing in AP/IB courses because they were taking DE or CTE courses. Notably, the DE option may be available to all Grades 11 and 12 students, but unlike AP classes, students must meet specified criteria and have the ability to meet associated costs (MSDE, 2020a). In addition, the number of students taking DE may be underestimated, because the data at hand reflected mostly students who took DE courses at Montgomery College, which is free to the students in participating schools.

One of the goals of EOS and across MCPS is to create and sustain a productive learning environment for all students and to maintain a culture of rigor, belonging, and success for students of all backgrounds. To that regard, this study revealed patterns of lower reported incidences of suspension, and overall higher weighted GPA in students attending EOS Cohort 1 schools in the years following program implementation; no corresponding changes were observed for Cohort 2 schools. Though not directly attributable to EOS per se or taking AP/IB courses, these changes in Cohort 1 schools may reflect the focus of EOS on increasing equity and creating a sense of belonging for students of all backgrounds.

Lastly, this study did not examine the efforts each of the participating schools instituted to decrease any roadblocks that could impede equitable access (e.g., GPA cut-offs, recommendations, parent signatures, stringent prerequisites, AP/IB contract, registration fee). Therefore, the findings do not explain the most effective strategies for ensuring access and success in AP/IB for students of all backgrounds or the systems that schools have in place to sustain and improve upon their positive results in future years. Regardless, these findings point to the continued need for concerted efforts to increase the success of underrepresented students in AP/IB courses through means that guarantee positive outcomes.

Recommendations

The following recommendations, drawn primarily from the findings in this report and the goals of the EOS-MCPS partnership, focus primarily on actions within the control of intended users—schools and Office of Teaching, Learning, and Schools-Curriculum and Instructional Programs (OTLS-CIP). The researchers envision that the recommendations will elicit information to complement the findings from this report regarding the factors that have bearing on students' enrollment and success in AP/IB courses.

- Explore factors associated with progress toward, as well as barriers to, increasing participation and success in AP/IB courses by traditionally underrepresented students.
  - Examine patterns of course requests and course taking to determine if all students interested in taking AP/IB courses receive the opportunity to do so.
  - Gather and share information on experiences of students in AP/IB courses, especially any challenges students in each school face concerning enrolling or accessing in AP/IB courses.
  - Document activities and supports that individual EOS schools have instituted to support students without previous AP/IB experience in their AP/IB classes.
  - Examine whether scheduling of CTE or dual enrollment courses has any influence in the participation of underrepresented students in AP/IB.
- Examine whether the timing or sequencing of AP/IB courses is associated with rates of participation and success in AP/IB.
- Examine reasons for the discrepancy of students earning a C or above in course grades and not earning a college-ready scores in the AP exams.
- Institute a system or portal for schools to share best practices on increasing enrollment and success of underrepresented students in AP/IB and other options for rigorous courses.
- Systematize the documentation of students completing dual enrollment courses or participating in CTE pathway and establish a central location for these data.

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Appendix

Table A-1

Relationship between Enrolling in AP/IB for the First Time and Type of School (EOS Cohort 1 or 2, and Comparison Schools)

	Chi Square Test Statistic	p-value
Cohort 1, year 1	58.4	0.000
Cohort 1, year 1, underrepresented	49.1	0.000
Cohort 2, year 1	27.8	0.000
Cohort 2, year 1, underrepresented	31.9	0.000

Table A-2

Relationship between Underrepresented Students Enrolling in AP/IB and Type of School (EOS Cohort 1 or 2, and Comparison Schools)

	Chi Square Test Statistic	p-value
Cohort 1 Schools		
AP/IB Enrolled in 2017 (EOS began)	21.82	0.000
AP/IB Enrolled in 2018 (year 1)	16.55	0.000
AP/IB Enrolled in 2019 (year 2)	6.85	0.009
Cohort 2 Schools		
AP/IB Enrolled in 2018 (EOS began)	36.0	0.000
AP/IB Enrolled in 2019 (year 1)	0.41	0.520

Table A-3

Adjusted Means of the Number of AP/IB Credits Taken in Cohort 1 and Comparison Schools

	Means of the Number of AP/IB Credits Taken						EOS School vs. Not-yet EOS	
	Cohort 1 Schools			Not-yet EOS Schools				
	n	Original Mean (SD)	Adjusted Mean	*n*	Original Mean (SD)	Adjusted Mean	Adjusted Mean Difference	St. Error
All	797	1.60 (.91)	1.60	2,197	1.68 (1.07)	1.68	-0.08*	0.03

Note. * p < 0.05, ** p < 0.01, *** p < 0.001. SD = Standard deviation.

Table A-4

Adjusted Means AP/IB Course Grades Earned in Cohort 1 and Comparison Schools

	Means of AP/IB Course Grades Earned						EOS School vs. Not-yet EOS	
	Cohort 1 Schools			Not-yet EOS Schools				
	n	Original Mean (SD)	Adjusted Mean	*n*	Original Mean (SD)	Adjusted Mean	Adjusted Mean Difference	St. Error
All	797	2.15 (1.04)	2.22	2,197	2.39 (1.09)	2.36	-0.14***	0.03
Non-FARMS All Other Student Groups	182	2.39 (.98)	2.41	532	2.69 (.98)	2.68	-0.27***	0.04
Non-FARMS Black or African American	136	2.11 (.99)	2.11	371	2.31 (.99)	2.31	-0.20*	0.05
Non-FARMS Hispanic/Latino	133	1.99 (1.08)	1.97	368	2.17 (1.04)	2.18	-0.21*	0.06

Note. * p < 0.05, ** p < 0.01, *** p < 0.001. SD = Standard deviation.

Table A-5

Relationship Between Percent of Students Passing with a C or Above and Type of School (EOS Cohort 1 or 2, and Comparison Schools)

	Cohort 1 vs. Not-yet EOS		Cohort 2 vs. Not-yet EOS	
	Chi Square Test Statistic	p-value	Chi Square Test Statistic	p-value
All Students	0.6	0.43	0.0	0.85
Focus Groups				
Non-FARMS All Other Student Groups	1.1	0.30	0.0	0.96
Non-FARMS Black or African American	0.1	0.79	0.0	0.84
Non-FARMS Hispanic/Latino	0.0	0.84	0.0	0.93
FARMS All Other Student Groups	0.0	0.93	0.0	0.83
FARMS Black or African American	0.1	0.70	0.1	0.93
FARMS Hispanic/Latino	0.8	0.37	1.0	0.32

Table A-6

Adjusted Means of the Number of AP/IB Tests Taken in Cohort 1 and Comparison Schools

	Means of the Number of AP/IB Tests Taken						EOS School vs. Not-yet EOS	
	Cohort 1 Schools			Not-yet EOS Schools				
	n	Original Mean (SD)	Adjusted Mean	*n*	Original Mean (SD)	Adjusted Mean	Adjusted Mean Difference	St. Error
All	585	1.62 (.87)	1.65	1,320	1.50 (.83)	1.48	0.17***	0.03
Non-FARMS All Other Student Groups	137	1.80 (.93)	1.84	382	1.68 (.82)	1.67	0.17*	0.05
Non-FARMS Black or African American	106	1.69 (.91)	1.72	212	1.49 (.75)	1.48	0.24**	0.06
FARMS All Other Student Groups	89	1.49 (.69)	1.58	134	1.35 (.93)	1.30	0.28*	0.08
FARMS Black or African American	120	1.45 (.80)	1.49	305	1.27 (.75)	1.26	0.23**	0.05

Note. * p < 0.05, ** p < 0.01, *** p < 0.001. SD = Standard deviation.

Table A-7

Adjusted Means of the Number of AP/IB Tests Taken in Cohort 2 and Comparison Schools

	Means of the Number of AP/IB Tests Taken						EOS School vs. Not-yet EOS	
	Cohort 2 Schools			Not-yet EOS Schools				
	n	Original Mean (SD)	Adjusted Mean	*n*	Original Mean (SD)	Adjusted Mean	Adjusted Mean Difference	St. Error
Non-FARMS All Other Student Groups	102	1.63 (1.01)	1.60	222	1.83 (1.03)	1.85	-0.24*	0.12

Note. * p < 0.05, ** p < 0.01, *** p < 0.001. SD = Standard deviation.

Table A-8

Adjusted Means of the Percentage of Tests with College-Ready Scores in Cohort 1 and Comparison Schools

	Mean Percentage of AP/IB Tests with College-Ready Scores						EOS School vs. Not-yet EOS	
	Cohort 1 Schools			Not-yet EOS Schools				
	n	Original Mean (SD)	Adjusted Mean	*n*	Original Mean (SD)	Adjusted Mean	Adjusted Mean Difference	St. Error
All	585	24.9 (39.8)	27.8	1,320	41.3 (44.8)	39.9	-12.1***	1.80
Non-FARMS All Other Student Groups	137	29.7 (40.7)	31.6	382	46.1 (45.7)	45.5	-13.9**	3.70
Non-FARMS Black or African American	106	12.4 (29.9)	13.5	212	34.2 (43.5)	33.6	-20.1***	3.90
Non-FARMS Hispanic/Latino	94	31.4 (32.7)	32.2	212	42.4 (44.0)	42.5	-10.3*	4.40
FARMS All Other Student Groups	89	6.3 (22.6)	9.6	134	26.4 (40.3)	24.0	-14.4**	3.70

Note. * p < 0.05, ** p < 0.01, *** p < 0.001. SD = Standard deviation.

Table A-9

Relationship Between Weighted GPA and Type of School (EOS Cohort 1 and Comparison Schools)

	2017		2018		2019	
	F Statistic	p value	F Statistic	p value	F Statistic	p value
All students	121.66	.000	171.50	.000	149.43	.000
Grades						
9	53.08	.000	68.19	.000	72.89	.000
10	11.62	.001	57.64	.000	18.02	.000
11	34.40	.000	14.06	.000	62.15	.000
12	27.85	.000	33.00	.000	9.35	.002
Focus Groups						
Non-FARMS All Other Student Groups	14.94	.000	25.38	.000	22.12	.000
Non-FARMS Black or African American	4.85	.028	0.28	.596	3.54	.060
Non-FARMS Hispanic/Latino	7.41	.007	6.90	.009	13.89	.000
FARMS All Other Student Groups	9.05	.003	3.38	.066	1.02	.313
FARMS Black or African American	.52	.472	.94	.332	1.02	.313
FARMS Hispanic/Latino	1.04	.308	1.23	.267	.12	.732

Table A-10

Relationship Between Weighted GPA and Type of School (EOS Cohort 2 and Comparison Schools)

	2018		2019	
	F Statistic	p-value	F Statistic	p-value
All Students	587.9	0.00	568.1	0.00
Grades				
9	171.9	0.00	188.9	0.00
10	176.8	0.00	120.8	0.00
11	110.2	0.00	128.9	0.00
12	126.5	0.00	124.1	0.00
Focus Groups				
Non-FARMS All Other Student Groups	87.3	0.00	74.4	0.00
Non-FARMS Black or African American	2.4	0.12	0.2	0.67
Non-FARMS Hispanic/Latino	31.9	0.00	22.8	0.00
FARMS All Other Student Groups	13.2	0.00	1.0	0.31
FARMS Black or African American	5.0	0.03	5.8	0.02
FARMS Hispanic/Latino	3.7	0.06	0.1	0.72

Table A-11

Relationship Between Average Percent Daily Attendance and Type of School (EOS Cohort 1 and Comparison Schools)

	2017		2018		2019	
	F Statistic	p value	F Statistic	p value	F Statistic	p value
All students	13.62	.000	64.40	.000	23.05	.000
Grades						
9	1.54	.215	34.21	.000	16.07	.000
10	4.65	.031	24.48	.000	2.15	.145
11	2.76	.097	5.29	.021	21.13	.000
12	9.99	.002	8.75	.003	0.03	.866
Focus Groups						
Non-FARMS All Other Student Groups	0.01	.932	5.13	.024	2.11	.147
Non-FARMS Black or African American	0.62	.433	19.91	.000	3.90	.048
Non-FARMS Hispanic/Latino	7.45	.006	5.02	.025	0.05	.829
FARMS All Other Student Groups	3.26	.071	0.21	.645	2.24	.134
FARMS Black or African American	2.43	.119	7.97	.005	6.33	.012
FARMS Hispanic/Latino	6.56	.010	2.02	.155	2.49	.115

Table A-12

Relationship Between Average Percent Daily Attendance and Type of School (EOS Cohort 2 and Comparison Schools)

	2018		2019	
	F Statistic	p-value	F Statistic	p-value
All Students	287.5	0.00	307.9	0.00
Grades				
9	111.6	0.00	94.5	0.00
10	78.8	0.00	79.4	0.00
11	55.9	0.00	73.3	0.00
12	53.6	0.00	74.7	0.00
Focus Groups				
Non-FARMS All Other Student Groups	0.4	0.51	14.9	0.00
Non-FARMS Black or African American	30.2	0.00	26.4	0.00
Non-FARMS Hispanic/Latino	58.7	0.00	37.9	0.00
FARMS All Other Student Groups	4.6	0.03	0.03	0.86
FARMS Black or African American	26.5	0.00	27.4	0.00
FARMS Hispanic/Latino	16.6	0.00	16.6	0.00

Table A-13

Relationship Between Percent of Students Suspended and Type of School (EOS Cohort 1 and Comparison Schools)

	2017		2018		2019	
	Chi-square Statistic	p value	Chi-square Statistic	p value	Chi-square Statistic	p value
All students	57.98	.000	10.00	.002	7.24	.007
Grades						
9	22.07	.000	11.08	.001	2.58	.108
10	26.29	.000	0.30	.581	0.89	.347
11	5.90	.015	0.95	.331	0.51	.474
12	4.89	.027	1.11	.293	4.30	.038
Focus Groups						
Non-FARMS All Other Student Groups	0.01	.915	4.27	.039	0.32	.569
Non-FARMS Black or African American	21.28	.000	1.50	.698	0.01	.924
Non-FARMS Hispanic/Latino	0.57	.451	0.24	.628	1.97	.160
FARMS All Other Student Groups	10.90	.001	1.04	.309	0.04	.844
FARMS Black or African American	11.26	.001	2.69	.604	0.02	.888
FARMS Hispanic/Latino	6.15	.013	0.01	.927	4.26	.029

Table A-14

Relationship Between Percent of Students Suspended and Type of School (EOS Cohort 2 and Comparison Schools)

	2018		2019	
	Chi-square Statistic	p-value	Chi-square Statistic	p-value
All Students	40.3	0.00	46.4	0.00
Grades				
9	16.9	0.00	27.6	0.00
10	6.8	0.01	13.0	0.00
11	18.9	0.00	2.8	0.09
12	1.6	0.21	3.1	0.08
Focus Groups				
Non-FARMS All Other Student Groups	4.9	0.03	2.8	0.09
Non-FARMS Black or African American	0.6	0.44	1.7	0.20
Non-FARMS Hispanic/Latino	4.9	0.03	6.1	0.01
FARMS All Other Student Groups	1.4	0.23	0.0	0.89
FARMS Black or African American	1.9	0.17	2.2	0.13
FARMS Hispanic/Latino	0.4	0.51	4.2	0.04

Table A-15

Relationship Between Percent of Students Taking CTE Courses and Type of School (EOS Cohort 1 and Comparison Schools)

	2017		2018		2019	
	Chi-square Statistic	p value	Chi-square Statistic	p value	Chi-square Statistic	p value
All students	233.25	.000	632.62	.000	370.54	.000
Grades						
9	206.59	.000	759.51	.000	540.88	.000
10	53.86	.000	62.41	.000	12.45	.000
11	36.09	.000	108.31	.000	62.76	.000
12	66.38	.000	72.78	.000	154.83	.000
Focus Groups						
Non-FARMS All Other Student Groups	81.35	.000	296.27	.000	80.70	.000
Non-FARMS Black or African American	51.24	.000	78.12	.000	44.70	.000
Non-FARMS Hispanic/Latino	40.41	.000	110.61	.000	75.15	.000
FARMS All Other Student Groups	15.62	.000	44.50	.000	24.01	.000
FARMS Black or African American	43.04	.000	94.47	.000	87.56	.000
FARMS Hispanic/Latino	122.40	.000	200.82	.000	213.92	.000

Table A-16

Relationship Between Percent of Students Taking CTE Courses and Type of School (EOS Cohort 2 and Comparison Schools)

	2018		2019	
	Test Statistic	p-value	Test Statistic	p-value
All Students	10.9	0.00	8.7	0.00
Grades				
9	4.0	0.05	38.8	0.00
10	36.6	0.00	14.7	0.00
11	1.3	0.26	30.1	0.00
12	2.7	0.10	5.3	0.02
Focus Groups				
Non-FARMS All Other Student Groups	3.1	0.08	0.5	0.46
Non-FARMS Black or African American	2.0	0.16	0.4	0.53
Non-FARMS Hispanic/Latino	1.4	0.24	3.9	0.05
FARMS All Other Student Groups	2.0	0.16	0.5	0.49
FARMS Black or African American	0.4	0.52	0.1	0.78
FARMS Hispanic/Latino	14.7	0.00	16.5	0.00

Table A-17

Relationship Between Percent of Students Taking Dual Enrollment Courses and Type of School (EOS Cohort 1 and Comparison Schools)

	2017		2018		2019	
	Chi-square	p value	Chi-square	p value	Chi-square	p value
All students	22.75	.000	28.09	.000	18.86	.000
Grades						
9	*	---	*	---	*	---
10	*	---	*	---	*	---
11	29.58	.000	12.00	.001	15.77	.000
12	10.85	.001	4.17	.041	5.16	.023
Focus Groups						
Non-FARMS All Other Student Groups	19.96	.000	22.18	.000	41.88	.000
Non-FARMS Black or African American	0.14	.704	10.36	.001	0.00	.983
Non-FARMS Hispanic/Latino	1.25	.263	7.46	.006	7.24	.007
FARMS All Other Student Groups	*	---	*	---	*	---
FARMS Black or African American	*	---	*	---	1.40	2.36
FARMS Hispanic/Latino	*	---	2.30	.129	*	---

Table A-18
Relationship Between Percent of Students Taking Dual Enrollment Courses and Type of School (EOS Cohort 2 and Comparison Schools)

	2018		2019	
Characteristics	Chi-square	p value	Chi-square	p value
All students	58.11	.000	20.40	.000
Grades				
9	*	---	*	---
10	*	---	*	---
11	10.74	.001	12.40	.000
12	37.36	.000	13.68	.000
Focus Groups				
Non-FARMS All Other Student Groups	34.86	.000	45.96	.000
Non-FARMS Black or African American	24.15	.000	0.09	.763
Non-FARMS Hispanic/Latino	5.02	.025	7.23	.007
FARMS All Other Student Groups	5.06	.024	0.39	.530
FARMS Black or African American	5.09	.024	*	---
FARMS Hispanic/Latino	14.17	.000	*	---

Table A-19

Number of AP and IB Courses Offered from 2017 to 2019 by Schools

Table A1. Number of Advanced Placement and International Baccalaureate Courses Offered from 2016 to 2018 by High School

	Number of **AP** Courses Offered			Number of **IB** Courses Offered			Number of **AP/IB** Courses Offered		
High School	2016	2017	2018	2016	2017	2018	2016	2017	2018
MCPS	45	50	49	54	61	60	99	111	109
Bethesda-Chevy Chase	24	23	26	37	37	38	61	60	64
Montgomery Blair	28	28	31	0	0	0	28	28	31
James Hubert Blake	27	29	28	0	0	0	27	29	28
Winston Churchill	30	32	32	0	0	0	30	32	32
Clarksburg	23	28	28	0	0	0	23	28	28
Damascus	22	26	30	0	0	0	22	26	30
Albert Einstein	22	20	23	26	28	32	48	48	55
Gaithersburg	24	25	27	0	0	0	24	25	27
Walter Johnson	37	36	38	0	0	0	37	36	38
John F. Kennedy	13	14	11	26	32	37	39	46	48
Col. Zadok Magruder	24	24	25	0	0	0	24	24	25
Richard Montgomery	26	25	29	41	43	43	67	68	72
Northwest	26	26	26	0	0	0	26	26	26
Northwood	20	21	21	0	0	0	20	21	21
Paint Branch	19	19	20	0	0	0	19	19	20
Poolesville	27	28	31	0	0	0	27	28	31
Quince Orchard	30	33	35	0	0	0	30	33	35
Rockville	18	21	20	26	25	25	44	46	45
Seneca Valley	9	11	9	30	33	34	39	44	43
Sherwood	25	28	26	0	0	0	25	28	26
Springbrook	18	20	22	32	34	33	50	54	55
Watkins Mill	11	9	10	32	32	32	43	41	42
Wheaton	19	20	21	0	0	0	19	20	21
Walt Whitman	33	35	36	0	0	0	33	35	36
Thomas S. Wootton	33	33	33	0	0	0	33	33	33

Note. AP = Advanced Placement; IB = International Baccalaureate.

Source. MCPS (2020). https://www.montgomeryschoolsmd.org/departments/sharedaccountability/reports/2019/191219%20HS%20Princ_2019_AP_IB_Exams.dh.pdf