

Advanced Placement Participation, Staffing, and Staff Training in the District of Columbia Public Schools

A Publication of the National Center for Education Evaluation and Regional Assistance at IES



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April 2021

To expand participation in Advanced Placement (AP) courses, several District of Columbia Public Schools (DCPS) high schools have enacted a policy mandating that all students enroll in one or more AP courses. To promote quality instruction in AP courses, DCPS recommends regular teacher participation in the Advanced Placement Summer Institute (APSI) and is considering recommending that teachers' college major be factored into teacher assignments to AP courses. To better understand this policy and these recommendations, this study examined students' AP exam taking and passing rates in schools that mandate AP course enrollment and in schools that do not, teacher participation in the APSI, and the alignment of AP teachers' college major with the AP course they teach. Three of the four high schools that adopted a mandate on AP course enrollment during the study period had higher AP exam taking and passing rates after their mandate went into place. In three of the five schools that adopted a mandate before or during the study period, the passing rate (grade 10–12 students in the school who passed at least one AP exam as a percentage of all grade 10–12 students in the school) was below 20 percent in every year of the study period, and in a fourth it was below 50 percent in every year. Fewer than one-fifth of AP teachers participated in the APSI at least once every three years. Participation rates were higher in schools offering more AP courses, in schools with lower percentages of racial/ethnic minority students, among teachers whose college major aligned with the AP course they taught, and among more experienced teachers. Among AP teachers with a college major on record, about half had a college major aligned with each specific AP course they taught, and 70 percent had a college major aligned with the broad subject area of each AP course they taught.

Why this study?

Over the past decade the District of Columbia Public Schools (DCPS) has sought to expand participation in Advanced Placement (AP) courses in order to improve high school outcomes (attendance, achievement, and graduation) and longer-term outcomes (postsecondary enrollment and degree completion). The limited research on the effect of participation in AP courses suggests that offering a chance to enroll in an AP course can improve skills (Conger et al, 2019).

DCPS wants to better understand policies enacted and recommendations that are intended to support its goal of increasing the number of students taking and passing AP courses and exams, particularly (see box 1 for details):

- Policy 1: That students enroll in certain AP courses (a policy implemented in specific schools).
- Recommendation 1: That teachers participate in the Advanced Placement Summer Institute (APSI) at least once every three years (a recommendation from the DCPS Office of Advanced and Enriched Instruction in place since 2017).
- Recommendation 2: That AP courses are taught by a teacher whose college (undergraduate or graduate) major aligns with the course or its subject area (a recommendation under consideration by the DCPS Office of Advanced and Enriched Instruction).

DCPS wants to know whether requiring students to enroll in AP courses causes an increase in AP exam taking and passing, and as a first step toward that goal, DCPS wants to know whether mandating AP course enrollment is associated with increased AP exam taking and passing rates. If passing rates increase in

For more information, including technical methods, supporting analyses, and other analyses, access the report appendixes at <https://go.usa.gov/xstDa>.

proportion to course enrollment, it would suggest that other schools could mandate AP course enrollment to increase AP success, with the caveat that some students who are less prepared for AP courses might experience negative effects.¹ Findings on this question could also inform the decisions of other districts that are considering policies to increase AP participation.

Box 1. Policy and recommendations for expanding participation in Advanced Placement courses

Policy 1: School-level mandates for Advanced Placement (AP) course enrollment. In the 2010/11 school year one District of Columbia Public Schools (DCPS) high school began mandating that all students enroll in an AP course; since then four additional DCPS high schools have instituted such a policy (see table A3 in appendix A). Over the same time period DCPS also gradually increased the number of AP courses that schools must offer.

Every DCPS school that mandated AP course enrollment has a special curricular focus and requires students to apply for admission. Admissions requirements generally include a minimum grade point average and standardized test score, letters of recommendation, an essay, and an interview. Compared with other DCPS high schools, the schools that mandated AP course enrollment had fewer students from disadvantaged groups, such as students eligible for the national school lunch program, students receiving special education services, Black students, and students who transferred from another high school in the prior year (see table B1 in appendix B).

Recommendation 1: Teacher participation in the Advanced Placement Summer Institute (APSI). DCPS encourages AP teachers to participate in the APSI as a means of preparing them to deliver the course content and improve students' ability to master the material and pass the AP exam.

Beginning in summer 2017, DCPS began recommending that AP teachers participate in the APSI in a given summer if they were teaching the AP course for the first time in the subsequent school year, if they had not participated in the APSI for the course they teach within the previous three years, or if the course they teach had been significantly changed by the College Board. (No course has been significantly redesigned since the recommendation was enacted.) AP teachers who serve as exam readers during the summer are exempt from the APSI recommendation.

Recommendation 2: Alignment of AP teachers' college major with AP course taught or its subject area. DCPS does not formally recommend that AP teachers' college (undergraduate or graduate) major align with the AP course they teach or its subject area, nor does it have any other requirements for AP teachers. However, examining the extent to which alignment exists can inform considerations on implementing this recommendation.

In addition, DCPS wants to know the extent to which AP teachers participate in the APSI and whether the types of teachers who participate differ from the types who do not. That information could help DCPS better target communications encouraging AP teachers to participate and could lead to better understanding of the barriers to participation that teachers face. For example, if in some schools all AP teachers participate in the APSI and in others the participation rate is low, DCPS could focus its communication efforts on principals and teachers in the latter group of schools. Leaders in other districts seeking to better understand who participates in the APSI might also benefit from knowing participation patterns in DCPS. Although research on this topic is scarce, one study found that AP professional development activities are associated with improved AP exam performance in the following year (Laitusis, 2012).

Finally, DCPS wants to better understand whether staffing AP courses with teachers whose college major aligns with the course improves students' AP exam taking and passing rates. A first step toward examining whether to enact such a recommendation is to understand the share of AP teachers whose major aligns with the AP course

1. Students who are unprepared for an AP course might receive a low grade in it, which would lower their grade point average and could impinge on their college acceptance. Conger et al. (2019) found that enrolling in AP courses could reduce these students' confidence in the course topic and their desire to pursue the course in college. In that study randomly assigning eligible students to receive an offer to enroll in AP Biology or AP Chemistry led to suggestive evidence of improved student achievement in science but also decreased student confidence in completing college science courses.

they teach or its subject area. These findings might also be relevant to leaders in other urban districts with patterns of AP course staffing similar to those in DCPS. No studies have examined whether the effectiveness of AP teachers is related to the alignment of their college major with the subject area of the AP course they teach. A synthesis of 92 studies on effective teaching reported a positive association between the number of college courses completed in the subject area of the AP course they teach and teaching performance (Allen, 2003). Yet there appears to be a point at which additional college courses do not improve teaching performance, and it is unclear whether having a college major in the subject area of the AP course taught is necessary. This uncertainty suggests the value of additional research on the issue for DCPS and other districts.

Research questions

The study answers research questions related to the policy and two recommendations described above and in box 1.

Policy 1: School-level mandates for AP course enrollment

1. In schools that mandated AP course enrollment, what were students' AP exam taking and passing rates before and after the mandate?

Recommendation 1: Teacher participation in the APSI

2. What percentage of AP teachers participated in the APSI?
3. Did participation vary by school characteristics or teacher background characteristics?

Recommendation 2: Alignment of AP teachers' college major with AP course taught or its subject area

4. What percentage of AP teachers with a college major on record had a college major aligned with the AP course they taught or its subject area?
5. How did the percentage of AP teachers with an aligned college major vary over time?

See box 2 for definitions of key terms used in the report and box 3 for a summary of the data and methods used to address these questions as well as the limitations of the study.

Box 2. Key terms

Advanced Placement Summer Institute (APSI). A professional development session that the College Board sponsors for teachers of Advanced Placement (AP) courses. The 30-hour summer training is specific to each AP course and covers the course framework, exam, and classroom resources. For more information on the APSI, see <https://apcentral.collegeboard.org/learning-development/workshops-summer-institutes/about-summer-institutes>.

Application school. A public high school requiring an application for admission. In the District of Columbia Public Schools each application high school has its own admission requirements, which generally include a minimum grade point average and standardized test score, letters of recommendation, an essay, and an interview.

Major aligned with an AP course. A college (undergraduate or graduate) major that covers the same content as the specific AP course being taught. Course alignment is more narrowly defined than subject area alignment—for example, a biology major is

aligned with the AP Biology course but not with the AP Chemistry course. See table A4 in appendix A for the mapping of AP courses to college majors.

Major aligned with an the subject area of an AP course. A college (undergraduate or graduate) major that is within the same broad subject area as an AP course. AP courses fall into six subject areas: art, English, math, science, social studies, or world languages. Subject area alignment is more broadly defined than course alignment—for example, a biology major is aligned with the subject area of the AP Chemistry course because both are in the science subject area. See table A4 in appendix A for the mapping of the subject areas of AP courses to college majors.

Mandated AP course enrollment. The requirement that students enroll in an AP course in order to graduate. Some schools require students to enroll in a specific AP course, whereas others allow students to choose the AP course they enroll in. See table A3 in appendix A for individual school requirements.

Passing rate. Grade 10–12 students in the school who passed at least one AP exam as a percentage of all grade 10–12 students in the school.

Box 3. Data sources, sample, methods, and limitations

Data sources. The District of Columbia Public Schools (DCPS) provided student-level administrative data on student enrollment and demographics and Advanced Placement (AP) exam scores, teacher-level administrative data on teachers' background characteristics such as years of teaching experience and college (undergraduate and graduate) major, and AP course enrollment data linking AP students and AP teachers. The study also used data from rosters on teachers' attendance at the APSI, which were provided by DCPS.

Sample. The sample varied by policy/recommendation area as follows:

- Policy 1: School-level mandates for AP course enrollment: Students in grades 10–12 who attended a DCPS high school that offered AP courses in the 2011/12–2017/18 school years (55,910 student-year observations). Although students can begin taking AP exams in grade 9, it is much more common to take them in grades 10–12.
- Recommendation 1: Teacher participation in the APSI: DCPS teachers who taught an AP course in the 2016/17 or 2017/18 school year (366 teacher-year observations).
- Recommendation 2: Alignment of AP teachers' college major and AP course taught or its subject area: DCPS teachers with a college major on record who taught at an AP course in the 2014/15–2017/18 school years (277 teacher-year observations).

Methods. The study team used descriptive statistics to characterize the students enrolling in AP courses and their teachers. For all three research questions, differences of 5 percentage points or more between groups were considered substantively important.

For research question 1 on school-level AP mandates, the study team calculated the shares of students who enrolled in AP courses, who took AP exams, and who passed AP exams. For each school the study team calculated the rates for enrolling in any AP course and for taking and passing any AP exam as well as the rates for enrolling in the specific AP course or courses that the school required and for taking and passing the AP exams associated with those courses. The passing rate refers to grade 10–12 students in the school who passed at least one AP exam as a percentage of all grade 10–12 students in the school. Appendix B reports the shares of students who enrolled in one, two, and three or more AP courses; the shares who took one, two, and three or more AP exams; and the shares who passed one and two or more AP exams (few students pass three or more AP exams). Because of the low numbers of students who enroll in an AP course, who take an AP exam, and who pass an AP exam, appendix C reports these shares among students who enrolled in any AP course, who took any AP exam, and who passed any AP exam in order to provide a richer description of AP participation patterns among students who participate in AP.

For the research questions on teachers' APSI participation and alignment of teachers' college major, the study team calculated the shares of teachers who participated in the APSI and who whose college major aligned with the AP course they taught and its subject area. The shares were also calculated for subgroups of schools, including schools that offered more or fewer AP courses than the median number offered each year, application schools and nonapplication schools, and schools with shares of racial/ethnic minority students that were higher or lower than the median shares for each year. And the shares were calculated for subgroups of teachers, including teachers with more or less teaching experience. To classify whether teachers' college major

aligned with the AP course they taught and its subject area, the study team, in consultation with DCPS, mapped college majors to AP courses and subject areas (see table A4 in appendix A). Because subject areas are more broadly defined, the percentage of teachers whose major aligned with the subject area of the AP course they taught is greater than the percentage whose major aligned with the specific AP course. See appendix A for additional information on the study data sources, sample, and methods.

Limitations. The study design does not support causal conclusions. For example, the study cannot shed light on whether or how mandating AP course enrollment affected students' AP exam taking and passing rates, the mechanisms that would explain lower or higher APSI participation rates, or whether or how teachers' college major should determine who teaches an AP course.

This study is also limited by available data:

- Students' AP exam data were available only for the 2011/12 school year and later. One school began mandating AP course enrollment before 2011/12, so it was not possible to describe how AP exam taking changed in this school after the mandate.
- Data on APSI participation were available only for the summers preceding the 2016/17–2018/19 school years, so APSI participation rates could not be calculated before 2016/17.
- Data on teacher characteristics and the courses they taught were not available for the 2018/19 school year, so APSI participation rates could not be calculated for that year.
- Data were not available on whether teachers who did not participate in the APSI were exempt from the recommendation because they served as AP exam readers. However, based on conversations with DCPS leaders, the study team does not believe that these exemptions explain the low APSI participation rates observed in the study.
- Finally, data on college majors were available for only about half of AP teachers, and DCPS stakeholders are unaware of the reasons for these missing data. On average, AP teachers who had a college major on record had less teaching experience (7 years) than AP teachers who did not have a major on record (12 years). Teachers who had a college major on record were also more likely to teach an AP English course and less likely to teach an AP art course than teachers who did not have a major on record (see table B21 in appendix B). Therefore, the patterns of alignment of college major with AP course taught and its subject area in the study might not generalize to all AP teachers.

Findings

This section presents the findings for the study's research questions related to the three policies. Additional findings are available in appendixes B and C.

Schools mandating AP course enrollment generally had higher AP exam taking and passing rates after their mandate went into place, but passing rates were still low in three of the five schools.

Three of the four high schools that adopted a mandate on AP course enrollment (policy 1) during the study period had a higher AP exam taking rate at the end of the study period than at the beginning, with increases of 7–41 percentage points (table 1).² The exception is Columbia Heights Educational Campus, which had similar AP exam taking rates at the beginning and the end of the study period. Benjamin Banneker Academic High School adopted its mandate before the study period, so it is not possible to compare rates before and after the mandate went into place there. AP exam taking rates might have increased because more students enrolled in AP courses or because more students who were enrolled in AP courses took AP exams. The share of students who took an AP exam among those who enrolled in an AP course increased in McKinley Technology High School and was unchanged in Duke Ellington School of the Arts (see table C1 in appendix C)—the only schools for which the study had access to AP course enrollment data from before their mandates went into place. This suggests that AP exam taking rates increased in McKinley Technology High School in part because more students who were enrolled in AP courses took AP exams and that rates increased in Duke Ellington School of the Arts because more students enrolled in AP courses.

2. Rates of enrollment in specific AP courses and taking and passing rates for the associated exams are reported in appendix B, as are the average numbers of AP courses enrolled in, AP exams taken, and AP exams passed per student. The rates and average numbers among students who enroll in an AP course, who take an AP exam, and who pass an AP exam are reported in appendix C.

Each of the three schools in which the AP exam taking rate increased after the mandate on AP course enrollment went into place—Duke Ellington School of the Arts, McKinley Technology High School, and School Without Walls—also had a higher AP exam passing rate (grade 10–12 students in the school who passed at least one AP exam as a percentage of all grade 10–12 students in the school) at the end of the study period than at the beginning. However, the rate remained below 20 percent in Duke Ellington School of the Arts and McKinley Technology High School (see table 1). The passing rate increased 8 percentage points in Duke Ellington School of the Arts, 9 percentage points in McKinley Technology High School, and 20 percentage points in School Without Walls.

AP exam taking and passing rates also increased in schools that did not mandate AP course enrollment. The share of students taking an AP exam in these schools increased from 16 percent in the 2011/12 school year to 30 percent in the 2017/18 school year, and the passing rate increased from 5 percent to 10 percent over the same period (see table 1). Although the AP exam taking rate was lower in these schools than in schools that mandated AP course enrollment, at the end of the study period only three of the five schools that mandated AP course enrollment (Duke Ellington School of the Arts, School Without Walls, and Benjamin Banneker Academic High School) had a passing rate that was substantively higher than that in schools that did not mandate AP course enrollment.³

Table 1. Of the four District of Columbia Public Schools high schools that adopted a mandate on Advanced Placement (AP) enrollment during the study period, three schools had higher AP exam taking and passing rates every year after the mandate went into place, 2011/12–2017/18 (percent of students, unless otherwise indicated)

School year	High schools mandating AP course enrollment											
	Benjamin Banneker Academic High School (n = 290–352)		Columbia Heights Educational Campus (n = 615–848)		Duke Ellington School of the Arts (n = 379–406)		McKinley Technology High School (n = 432–497)		School Without Walls (n = 372–457)		Other DCPS high schools (n = 5,295–6,016)	
	Took	Passed	Took	Passed	Took	Passed	Took	Passed	Took	Passed	Took	Passed
2011/12	83	17	64	13	23	11	43	4	84	53	16	5
2012/13	71	13	60	12	37	12	48	4	88	54	18	5
2013/14	64	14	59	14	28	12	43	5	85	57	21	6
2014/15	69	26	62	16	35	15	51	6	88	53	23	7
2015/16	75	40	57	8	41	12	68	13	87	64	22	7
2016/17	72	34	61	11	40	12	63	13	88	66	26	8
2017/18	67	42	67	14	64	19	67	13	91	73	30	10
Change from 2011/12 to 2017/18 (percentage points)	-16	25	3	1	41	8	24	9	7	20	14	5

DCPS is District of Columbia Public Schools.

Note: Values in red indicate the years in which each school mandated that students enroll in AP courses. McKinley Technology High School required that all students take at least two AP courses during high school but did not require specific AP courses in specific grades; its mandate went into place for grade 9 students entering in 2012/13, and the first year in which these students could have completed the requirements by grade 12 was 2015/16. The sample size (n) represents the range in the number of students in grades 10–12 in each school between 2011/12 and 2017/18.

Source: DCPS student-level AP exam records for 2011/12–2017/18.

3. See appendix B for AP course enrollment by grade and year (tables B2 and B3); AP exam taking rates by grade and year (tables B4 and B5); AP exam passing rates by grade and year (tables B6 and B7); and enrollment, exam taking rates, and exam passing rates for the required AP courses and grades in which students were required to take them in each school (tables B8–B13).

Across all District of Columbia Public Schools high schools, fewer than one-fifth of Advanced Placement teachers participated in the Advanced Placement Summer Institute between 2016 and 2018, and participation rates were higher in schools offering more AP courses, in schools with lower percentages of racial/ethnic minority students, among teachers whose college degree aligned with the AP course they taught, and among more experienced AP teachers

Recommendation 1, in which DCPS encourages teachers to participate in the APSI once every three years, has not led to the desired participation rates. In the 2017/18 school year the three-year APSI participation rate (defined as attending in at least one summer in 2016, 2017, or 2018) among AP teachers was 17 percent and varied according to school characteristics (table 2).

Schools offering more AP courses and schools with lower percentages of racial/ethnic minority students had higher APSI participation rates than schools offering fewer AP courses and schools with higher percentages of racial/ethnic minority students (see table 2).

APSI participation rates were similar for application schools and nonapplication schools as well as for schools with higher and lower percentages of English learner students (see table 2).

Although one might expect less experienced teachers to participate in the APSI to make up for lack of experience, the participation rate was higher for more experienced AP teachers (table 3). One could hypothesize that teachers might also use the APSI to compensate for a lack of formal training in the subject area. However, the data provide no evidence to support such a hypothesis: Alignment of AP teachers’ college major with the broad subject area of each AP course they taught was unrelated to whether teachers participated in the APSI, and teachers whose

Table 2. Advanced Placement Summer Institute participation rates were higher in District of Columbia Public Schools high schools that offered more Advanced Placement courses and in schools with lower percentages of racial/ethnic minority students, 2016–18

High school characteristic	Number of AP teachers 2017/18	Teachers’ three-year APSI participation rate, 2016–18 ^a (percent)
Schools offering more AP courses ^b	115	19
Schools offering fewer AP courses	73	12
Application schools ^c	82	15
Nonapplication schools	106	18
Schools with higher percentages of racial/ethnic minority students	69	9
Schools with lower percentages of racial/ethnic minority students	119	21
Schools with higher percentages of English learner students	116	16
Schools with lower percentages of English learner students	72	17
All AP teachers	188	17

AP is Advanced Placement. DCPS is District of Columbia Public Schools. APSI is Advanced Placement Summer Institute.

a. Defined as attending the APSI in at least one summer in 2016, 2017, or 2018.

b. Benjamin Banneker Academic High School, Cardozo High School, Columbia Heights Educational Campus, Duke Ellington School of the Arts, School Without Walls, and Woodrow Wilson High School.

c. Schools that require an application for admission. Application schools are Benjamin Banneker Academic High School, Columbia Heights Educational Campus, Duke Ellington School of the Arts, McKinley Technology High School, Phelps High School, and School Without Walls.

Note: The cutoffs between schools with more and fewer AP courses, higher and lower percentages of racial/ethnic minority students, and higher and lower percentages of English learner students are the year-specific median for each measure across high schools in the sample. The medians across years ranged from 8 to 11 for AP courses offered, was about 99 percent in all years for percentage of racial/ethnic minority students, and ranged from 2 percent to 4 percent of English learner students.

Source: DCPS records on APSI participation for the summers of 2016, 2017, and 2018 and DCPS teacher records for 2017/18.

Table 3. Advanced Placement Summer Institute participation rates were higher among teachers in District of Columbia Public Schools whose college major aligned with the Advanced Placement course they taught and among more experienced teachers, 2016–18

Teacher characteristic	Number of AP teachers in DCPS, 2017/18	Teachers' three-year APSI participation rate, 2016–18 ^a (percent)
College major aligned with each AP course taught	42	19
College major not aligned with any AP course taught	50	14
College major aligned with the subject area of the AP course taught	61	16
College major not aligned with the subject area the of AP course taught	31	16
More experienced	72	22
Less experienced	93	12

AP is Advanced Placement. DCPS is District of Columbia Public Schools. APSI is Advanced Placement Summer Institute.

a. Defined as attending the APSI in at least one summer in 2016, 2017, or 2018.

Note: The analyses of college major alignment are limited to teachers with a college (undergraduate or graduate) major on record. Alignment with an AP course refers to the narrow topic area of the course (for example, a physics major who teaches AP Physics), whereas alignment with the subject area of an AP course is defined more broadly (for example, any science major who teaches any AP science course). See table A4 in appendix A for the mapping of AP courses and their subject areas to college majors. The cutoff between those with less and those with more teaching experience is the median number of years across the sample of AP teachers, which was eight years.

Source: DCPS records on APSI participation for the summers of 2016, 2017, and 2018 and DCPS teacher records for 2017/18.

Table 4. New Advanced Placement (AP) teachers in District of Columbia Public Schools high schools were less likely than experienced AP teachers to participate in the Advanced Placement Summer Institute, 2016–18

Teacher group	Number of teachers	APSI participation rate (percent)
New AP teachers	136	11
Experienced AP teachers	230	17

APSI is Advanced Placement Summer Institute.

Note: Number of teachers is the total number of teacher-by-year observations. For the purpose of this analysis, each record with a missing employee ID was counted as a unique AP teacher. APSI participation in 2016 corresponds to courses taught during the 2016/17 school year, and APSI participation in 2017 corresponds to courses taught during the 2017/18 school year.

Source: District of Columbia Public Schools (DCPS) records on APSI participation for the summers of 2016 and 2017 and DCPS teacher records for 2016/17 and 2017/18.

college major aligned with each specific AP course they taught were slightly more likely to participate in the APSI than teachers whose college major did not align with the course.

Although DCPS recommends that anyone teaching an AP course for the first time participate in the APSI beforehand, new AP teachers were not more likely to do so. Between the 2016/17 and 2017/18 school years the average participation rate among new AP teachers (11 percent) was lower than the participation rate among experienced AP teachers (17 percent; table 4).

Among AP teachers with a college major on record, 51 percent had a college major aligned with each specific AP course they taught, and 70 percent had a college major aligned with the broad subject area of each AP course they taught

As the number of DCPS teachers teaching AP courses increased from 2014/15 to 2017/18, the rate of alignment of college major with each AP course taught (for example, a physics major who teaches AP Physics) among teachers with a college major on record decreased (table 5). Assuming that the percentages are similar for DCPS teachers

without a college major on record, this suggests that schools might first staff AP courses with teachers who have expertise in those courses and, as they expand their AP offerings, staff courses with teachers who have less course-specific expertise (see tables B17–B21 for detailed findings on alignment of college major by course and subject area taught, school characteristics, and teacher experience).

The rate of alignment of college major with subject area of each AP course taught (defined more broadly—for example, a science major who teaches any AP science course) among AP teachers with a college major on record decreased from 75 percent to 66 percent from 2014/15 to 2017/18 (see table 5).

Table 5. The share of Advanced Placement teachers in District of Columbia Public Schools high schools whose college major aligned with the course they taught declined over the study period, 2014/15–2017/18

School year	Number of AP teachers	Number of AP teachers with a college major on record	Percent of AP teachers whose college major aligned with each AP course they taught, among teachers with a college major on record	Percent of AP teachers whose college major aligned with the subject area of each AP course they taught, among teachers with a college major on record
2014/15	115	40	60	75
2015/16	172	67	51	67
2016/17	172	78	47	71
2017/18	187	92	46	66
Average, 2014/15–2017/18	172	69	51	70

AP is Advanced Placement.

Note: The analyses of college major alignment are limited to teachers with a college (undergraduate or graduate) major on record. Alignment with an AP course refers to the narrow topic area of the course (for example, a physics major who teaches AP Physics), whereas alignment with the subject area of an AP course is defined more broadly (for example, any science major who teaches any AP science course). See table A4 in appendix A for the mapping of AP courses and their subject areas to college majors.

Source: District of Columbia Public Schools teacher records for 2014/15–2017/18.

Implications

This study’s finding that mandating AP course enrollment does not uniformly translate into increased AP exam passing rates suggests that, to be truly successful, course access policies need to be paired with stronger emphasis on student supports. Three of the four schools that adopted a mandate on AP course enrollment during the study period saw an increase in AP exam taking that was consistent with the intent of their policies. Yet in four of the five schools that mandated AP course enrollment as of the 2017/18 school year, fewer than 50 percent of students passed at least one AP exam, and in three of the five schools fewer than 20 percent did.

Although the study team is not aware of evidence-based interventions intended specifically to improve AP exam passing rates, evidence from the Institute of Education Sciences practice guide *Organizing Instruction and Study to Improve Student Learning* (Pashler et al., 2007) might support DCPS in achieving that goal. The recommendations include reviewing key concepts several weeks or months after students are introduced to them, having students solve problems on their own and work through problems that have been solved as a class, using both graphic and verbal descriptions of concepts, and connecting abstract concepts to concrete examples. An important caveat is that even if the mandate led to positive results (including larger percentages of students passing) at these competitive admissions schools, expanding the mandate might not have the same effect at neighborhood high schools that have no admissions requirements and serve higher proportions of disadvantaged students.

A survey of AP teachers might help DCPS better understand the barriers that prevent more widespread participation in the APSI, including teachers’ interest in it. If interest is low and DCPS wishes to better encourage

participation, it could consider further incentivizing participation or explore whether another type of professional development would be a useful substitute. If teachers are interested but unable to participate, DCPS could seek more information about barriers that hinder attendance, such as participation in other professional development activities or logistical barriers. DCPS covers registration costs for the APSI, and teachers receive professional development credit for participating. But DCPS leaders report that there is little flexibility in when teachers can participate in the APSI, with the local administration typically occurring in the same week each summer, suggesting that scheduling conflicts are one barrier to higher participation rates. They also report that the APSI is not available in the District of Columbia, so teachers might need to travel up to an hour each way by car. This could be a barrier for teachers who do not own cars.

DCPS might also consider additional recommendations that better target educators who could gain the most from the APSI with support and outreach to encourage participation. Teachers with fewer years of teaching experience and teachers new to AP were less likely to participate in the APSI. This could be because less experienced teachers are less committed to teaching and thus might see less long-term benefit from participating. Teachers whose college major aligned with the specific AP course they taught were more likely to participate than teachers whose college major did not align with the course they taught (though this was not true for broad subject area alignment). DCPS might consider whether new AP teachers and less experienced teachers or teachers lacking in subject area expertise could benefit more from the APSI than other teachers.

To further explore whether teachers are being optimally assigned to AP courses, DCPS might consider surveying principals to determine the criteria used to staff AP courses and whether principals believe they are able to staff AP courses with well-qualified teachers. Because DCPS high schools have expanded AP offerings, the percentage of teachers with an aligned college major has decreased among teachers with a college major on record. Although having a college major aligned with the AP course or subject area taught is likely a good indicator of an AP teacher's subject area expertise, principals making staffing decisions have access to more information about teachers than is available in administrative records.

Finally, DCPS might consider supporting causal research on the impacts of mandating AP course enrollment, recommending AP teacher participation in the APSI, and staffing AP courses with teachers whose college major aligns with the course or subject area before modifying its policies or recommendations. The body of evidence on programs such as the APSI and on alignment of teachers' college major with AP course taught is scarce. But DCPS could take several actions to conduct more rigorous research on these topics. For example, it was not feasible to estimate causal impacts of mandating AP participation because so few schools began mandating AP course enrollment during the study period, it was not possible to identify teachers who were exam readers and were therefore exempt from APSI participation, and it was not possible to identify all AP teachers whose college major aligned with the AP course or subject they taught due to missing data. DCPS would need to collect such data to facilitate future causal studies.

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REL 2021–077

April 2021

This report was prepared for the Institute of Education Sciences (IES) under Contract ED-IES-17-C-0006 by the Regional Educational Laboratory Mid-Atlantic administered by Mathematica. The content of the publication does not necessarily reflect the views or policies of IES or the U.S. Department of Education, nor does mention of trade names, commercial products, or organizations imply endorsement by the U.S. Government.

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Burnett, A., & Burkander, P. (2021). *Advanced Placement participation, staffing, and staff training in the District of Columbia Public Schools* (REL 2021–077). U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance, Regional Educational Laboratory Mid-Atlantic. <http://ies.ed.gov/ncee/edlabs>.

This report is available on the Regional Educational Laboratory website at <http://ies.ed.gov/ncee/edlabs>.