ABSTRACT

Title of Dissertation:	ADDRESSING THE DISPROPORTIONALITY OF BLACK/AFRICAN AMERICAN STUDENTS IN ADVANCED PLACEMENT (AP) CLASSES
	John Paul DiFato, Doctor of Education, 2022
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Data at the national, state, and local levels all indicate disproportionately low enrollment of Black/African American students in Advanced Placement (AP) classes at the high school level. Black/African American students are missing out on educational opportunities and access to an equitable education by not participating in AP classes in high school. One method for high schools to address this issue is to explore the processes in place for recommending/selecting students for AP classes.

The purpose of this study was to develop and pilot a talent-spotting tool using student data for teachers and school counselors to use in the AP course recommendation process. Specifically, this protocol was developed to identify more students, especially Black/African American students, whose data indicated that they might be ready for AP coursework. The

researcher developed the talent-spotting tool, and the algorithm used to process the data, and tested its effectiveness in identifying students who should be recommended for AP classes.

The researcher employed the following methodology for the study: (a) developed a data-based talent-spotting tool protocol draft; (b) obtained input from potential users regarding current course recommendation practices (including the use of AP Potential) and their perceptions of the talent-spotting tool and its potential usefulness via an anonymous, web-based survey; and (c) piloted the talent-spotting tool and compared the results with course recommendations based on SY1819 AP Potential data and with the SY1819 actual course recommendations.

Based on survey responses from potential users, the majority indicated they want a process that is simple to use and can be a portion of the course recommendation process, but not the entire process. Participants appreciated the objectivity that the talent-spotting tool brought to the course recommendation process, but many were not ready to completely give up on the subjective human factors that are involved with course recommendations.

Furthermore, the talent-spotting tool accurately identified students who were recommended for AP courses. But, more importantly, the talent-spotting tool identified more students who were not recommended for AP courses but who have the aptitude to succeed in those courses. In fact, the talent-spotting tool identified a higher proportion of Black/African American students than white students. The adoption of this talent-spotting tool as part of the course recommendation process has the potential to directly impact the disproportionate representation of Black/African American students in AP courses.

ADDRESSING THE DISPROPORTIONALITY OF BLACK/AFRICAN AMERICAN STUDENTS IN ADVANCED PLACEMENT (AP) CLASSES

by

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Dedication

This dissertation is dedicated to my husband Rob for allowing me to pursue this dream and for putting up with the hours of work; to our son Patrick, may you grow up with a love a learning; and to my parents, who taught me about hard work, perseverance, and the value of education.

Acknowledgements

I would like to thank my advisor, Dr. Imig, for sharing his wisdom during this process; Dr. McLaughlin for all her guidance and feedback and for challenging my thinking; the teachers and staff in my building who helped me along in this journey; and those in my cohort who made the past few years enjoyable.

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Section I - Introduction

A disproportionately low number of Black/African American[1] and Hispanic/Latinx[2] students are participating in the College Board's Advanced Placement (AP) Program classes in high schools across the United States. According to data from the National Center for Education Statistics (NCES) in 2019, 14.7% of secondary students enrolled in public schools across the nation identified as Black/African American and 26.8% of students identified as Hispanic/Latinx. A review of the demographic make up of students who took an AP exam that year shows that Black/African American students comprised only 6.4% of the AP test takers and Hispanic/Latinx students comprised less than 22.0% of the test takers. Although both student groups were underrepresented in the AP test taker population compared to their makeup in the general student population, this disproportionality is more prominent for Black/African American students than for Hispanic/Latinx students. Black/African American students comprised about 15 percent of the secondary student population in this country, but only accounted for six percent of the students who took AP tests in 2019. This disproportionality is not only a problem at the national level, but it is also evident at the state and local levels.

In a Mid-Atlantic state, which will be referred to as "the State,"[3] during the 2016-2017 academic year, students who identified as Black/African American comprised a third of the student population but were less than a sixth (14.5%) of the AP test takers. When it came to AP tests in 2017, Maryland reported a disproportionality similar to the nation. This

[1] Terminology for this student group varies among sources. For the purposes of this paper I will refer to the student group as Black/African American as this is how my district refers to this student group. If individual sources or data refer to the student group by another name, I will use that designation.

[2] Similarly, the terminology for this student group varies among sources. In an effort to be inclusive, I will refer to this student group as Hispanic/Latinx. This term is inclusive of all Hispanic and Latino students and is also how my district refers to this student group.

[3] Due to a data privacy agreement with the district, the state is to be de-identified. For the purposes of this dissertation, the mid-Atlantic state in the United States will be referred to as "the State."

disproportionality also exists in a medium-sized public school district in a Mid-Atlantic state, the District Public Schools (DPS).[4] According to data from the district's website (DPS, 2020), during the 2019-2020 school year the student demographic breakdown of DPS was as follows: 34.0% of the students identified as White, 24.2 % of the students identified as Black/African American, 22.7% identified as Asian, 12.0% identified as Hispanic/Latinx, and 6.3% identified as two or more races. Disproportionate rates of AP exam participation by race/ethnicity is evident when comparing the district enrollment data with AP exam participation data. In 2017, 47.7% of the AP test takers identified as Asian, 34.6% of the test takers identified as White, 29.4% of the test takers identified as two or more races, 17.4% of the test takers identified as Hispanic/Latinx, and 13.8% of the test takers identified as Black/African American. Mirroring national trends, Black/African American students in the district were underrepresented in AP exam participation.

The Problem Statement

The focus of this paper is on the disproportionality of Black/African American and Hispanic/Latinx students participating in the AP Program. The term participation has three meanings in the context of AP Program participation: enrolling in and completing the AP course, taking the AP test in May (which requires a $94 exam fee), and passing the test (which involves scoring a three or better on a five point rubric). Although each of these components is important and the majority of studies focus on taking an AP test, enrolling in and completing an AP course is the first step in reducing disproportionality and thus needs to be further explored.

[4] Due to a data privacy agreement with the district, both the district and the school are de-identified. For the purposes of this dissertation, the name of the district and the school are pseudonyms and any connection to any real entity is entirely coincidental.

The disproportionately lower enrollment of Black/African American students in AP classes is an issue in DPS. Each year the district publishes a report on AP Program trends which presents data on the success and enrollment of students in AP classes. In the section that discusses AP course participation trends the 2019 report stated that the district's Black and Latinx students had lower AP course participation rates than their Asian, White, and two or more races peers.[5] While the report explores both course participation and exam participation, participation here is referring to students enrolling in the AP course. The report further discussed how the district intended to address the participation gaps among student groups. Included among the plan was a more standardized use of the PSAT and College Board's AP Potential[6] tool to increase both course and exam participation.

The issue of disproportionate enrollment and successful completion rates of AP courses among student groups is made even more urgent for DPS due to the State's adoption of the College and Career Readiness (CCR) Standards in 2013 and the Every Student Succeeds Act (ESSA) in 2015. One of the measures for student success, according to both CCR Standards and ESSA, is for students to take and pass at least one AP test with a score of a three or better by the time they graduate (SDE, 2018). The State CCR Standards define the knowledge and skills all students should master by the end of each grade level in order to graduate from high school fully prepared to enter college and the workforce. According to state policy, achieving a score of three or better on AP tests is one of several ways that students can earn their CCR designation by the time they graduate.

[5] Due to the data privacy agreement with the district, the board report reference is de-identified.
[6] AP Potential is a tool used by the College Board that is based on how the student scores on the PSAT. The College Board uses proprietary metrics to determine which AP exams, if any, the student would be likely to pass.

Achieving CCR for Black/African American and Hispanic/Latinx students is consistent with the DPS Strategic Plan (2018) that focuses on ensuring academic success for all students and closing the achievement gap. Addressing disproportionality is also a personal and professional goal in my current role as an assistant principal in a high school that has a diverse student population and a high disproportionality of Black/African American and Hispanic/Latinx students enrolling in AP classes and taking AP tests.

Scope of the Problem

Participation in the Advanced Placement (AP) Program may be assessed in two ways: number of students enrolled in an AP course and number of students taking an AP exam at the end of the course. Not all students who enroll in an AP course will take the corresponding exam at the end of the course. Various reasons exist for why students may not take an AP exam at the completion of a course. Two of the main reasons that have been documented are the costs of the exam being prohibitive for some students and students not feeling prepared to take a particular AP exam (Hallett & Venegas, 2011; Jeong, 2009). The data for test participation is more prevalent as it is easier to track who takes a test rather than who enrolls in a course. AP test participation is reported centrally by the College Board, which oversees the test administration and scoring. Course enrollments are maintained by local schools and/or school systems. Each summer, the College Board releases data on the prior year's administration of AP tests. According to the AP Data Overview website (College Board, 2020) there is no data on course enrollments. Test participation data can be found directly on the College Board AP Program Participation and Performance Data webpage. The College Board uses the term participation to report test participation data and not course participation. The data presented pertaining to test

takers represent the numbers of students taking a particular AP exam and not unique numbers of students because an individual student can take more than one exam.

Disproportionality in AP Test Taking Nationally

According to the most recently published data from the Office of Civil Rights (OCR) in the U.S. Department of Education (2017), which compiles self-reported data from districts and states, during the 2016-2017 school year Black/African American students comprised 15.5% of the total enrollment in public schools and White students made up 50.4%. When looking at national data on AP test participation, Black/African American students comprised 8.7% of the total test-taker population and White students represented 58.1% of the total test takers. In order to address the disproportionality in AP exam participation that exists among student groups the effort begins with addressing the disproportionality in enrollment in AP classes. Using OCR data for the 2013-2014 school year on participation in AP classes, similar disproportionality by student groups is observed. Black/African American students, who comprised 15.5% of the total population, made up 9.2% of the students enrolled in an AP class. Their White counterparts comprised 50.4% of the total population and accounted for 57.3% of all students enrolled in an AP class.

AP Test Taking in the State

AP test participation at the state level is comparable to national data. According to the district's 2019 State Department of Education's data report (SDE, 2019), Black/African American students accounted for 33% of the student population in the State at the secondary level in 2019; yet, they accounted for only 20% of the students who participated in an AP exam that year. In comparison, White students accounted for 41% of the secondary student population

in the State that year, but made up 47% of the students who participated in an AP exam (SDE, 2019).

Each year the State Department of Education report also includes AP exam results for school systems across the state. The report focuses on AP exam results and not enrollment in an AP course. The 2018 report stated that, "in 2017, AP exams were disproportionately taken by Asian and White students, and not taken by Black/African American and Hispanic/Latin[x] students" (SDE, 2018, p. 13). The 2018 report further showed that while Black/African American students made up 34% of the K-12 enrollment in the State during School Year 2017-2018 (SY1718) but only 15% of the AP test takers. In contrast, White students made up 38% of the K-12 enrollment in the State, yet they accounted for 52% of the AP exams taken in the State that school year.

The state-level disproportionality continued into the next school year according to a report of 2018 data. That report specified that Black/African American students represented 34% of the high school enrollment in the State, but comprised only 14% of the AP exams taken (SDE, 2019). In that same year, White students, who represented 39% of the high school population in the state, accounted for 52% of the AP exams taken that year.

Disproportionality at the Local System Level

The same disproportionality evident in the state data exists at both the district level in District Public Schools (DPS) and at Central High School (CHS), one of the high schools in the district. According to the OCR (2017), during the 2017 school year, Black/African American students comprised 22% of the total high school enrollment in DPS but made up only 14% of the total enrollment in AP classes that year. In comparison, White students comprised 39% of the total high school enrollment, but accounted for 45% of the enrollment in AP classes. When

considering the numbers of test takers, in May 2017 44% of all the Black/African American students in DPS who were enrolled in an AP class did not take an AP test, compared to 25% of their White peers who were enrolled in an AP class but did not take the test (OCR, 2017).

Each year DPS publishes a report on AP Program trends, which looks at the AP test takers and their results, as well as enrollment of students in AP classes. Among the 2017 AP test takers in DPS, 15% of the White test takers did not receive a passing score of three or better on the five-point rubric compared to over 30% of Black/African American test takers (OCR, 2017). While the ultimate goal is to address the disproportionality in AP test taking and pass rates, students cannot be successful in the classes if they are not enrolled in them. Addressing the disproportionality in AP course enrollment has the potential to be the first step to closing these gaps.

As mentioned previously, each year DPS publishes a report on AP Program trends, which looks at the success and enrollment of students in AP classes. The 2019 DPS report noted that during the 2017, 2018, and 2019 school years, the percentage of Black/African American DPS graduates who had enrolled in at least one AP class during their high school career was 51.7%, 50.6%, and 51.2%, respectively. The percentages of White students enrolled in at least one AP class during those same years were 77.9%, 79.8%, and 77.7%.

Based on the district-level data, the problem of disproportionality in the AP Program exists in AP course enrollments, AP exam participation, and AP exam performance. Further, district trends suggested no progress in improving AP course enrollment for Black/African American students.

AP Disproportionality at Central High School

Central High School (CHS) is one of the high schools in DPS. In September 2020, 1308 students were enrolled in Grades 9 through 12. Of the students, 24.3% identified as White and 40.1% as Black/African American. During the 2019-2020 school year, only 21.7% of the Black/African American students were enrolled in one or more AP courses representing a decrease from prior years. In fact, over the previous three school years, Black/African American students' AP course enrollment rate had steadily declined. In comparison, during those same school years, over 40% of White students were enrolled in one or more AP classes, a proportion that remained consistent.

It is evident that a disproportionately low number of secondary Black/African American students at the national, state, and local levels are enrolling in AP courses and taking AP exams. The consequences of this under enrollment will be discussed in the next section.

Consequences of Not Addressing the Problem

The benefits of students taking AP classes while in high school are well documented. The research shows that the students in AP classes tend to score better on the SAT, have a higher grade point average (GPA), and be more prepared for college or a career after high school (Warne et al., 2015; Willingham & Morris, 1986). However, inequities in AP Program participation have also been documented for decades. Schneider (2009) researched the history of the AP program and its benefits, dating back to the 1950s. In addition to mentioning the history of the program and its benefits, Schneider also mentioned the inequities that were discovered as a result of the AP program and how the recent push to instill equity was effective. According to Schneider, "The [AP] programme was conceived of shortly after the Second World War as a way of engaging and challenging the highest-achieving students at the best US high schools" (p. 813).

The program was not created to give all students the opportunity to access a rigorous curriculum, rather it was designed to give high-achieving students even more access to prestigious colleges and universities. Schneider quoted the second director of the AP Program who stated that, "the basic philosophy of the Advanced Placement Program is simply that all students are not created equal' and the program was created to benefit already high achieving students" (p. 817). According to Schneider, shortly after its inception in 1955, "advocates for students from less privileged backgrounds called for the expansion of AP to a wider range of schools, particularly urban public schools" (p. 813). Although it took time, that call for expansion and equity was heard. At the beginning of the program, virtually no students from minority backgrounds took AP classes. In 1979 the percentage of students from minority backgrounds who considered themselves to be AP students moved to 12% and continued to grow to 31% by 2002 (Schneider, 2009).

At the onset of the AP Program, concerns arose that college-level courses taken in high school were less rigorous than the same courses taken in college, thus leaving those students at a disadvantage when they moved to the college level (Schneider, 2009). To combat this concern, an independent cohort of three prestigious prep schools and three top-tier universities established the Committee on Admission with Advanced Standing in the early 1950s. This Committee formulated a plan for "developing college level curricula and standards that could be instituted at the high school level" (College Board, 2003, p. 1).

In addition, a study conducted at the University of Michigan in 1983 found that students who took introductory college-level courses, such as AP, in high school did not appear to be at an academic disadvantage compared to classmates who took those courses in college (Advanced Placement Study, 1983). In fact, this 1983 study found that students who took AP courses in high

school tended to have higher SAT scores, better GPAs, and higher-class ranks than non-AP students. More recent studies show that students who enrolled in AP classes in high school were at an academic advantage in college compared to their peers who did not participate in AP classes. Curry et al. (2000) found that, compared to their peers who did not take AP classes in high school, students who took AP classes in high school and went on to college were:

- better prepared academically,
- more likely to specialize in majors with tougher grading standards,
- more likely to complete more coursework,
- more likely to take additional higher-level college courses in their AP subjects,
- more likely to be superior in terms of leadership and significant accomplishments,
- more likely to graduate with a double major, and
- twice as likely to go on to graduate or professional school.

In short, students who enroll in AP classes while in high school are better prepared and more likely to accomplish more than their counterparts who did not participate in AP classes while in high school.

A similar finding from Ndura et al.'s (2003) study of over 58,000 students from a mid-sized school district in the western United States showed that students who enrolled in AP classes in high school tended to have higher GPAs, SAT scores, and performed better in college compared to students who were not enrolled in AP classes. McKillip and Rawls (2013) also found a positive and linear correlation between high school AP class participation and SAT scores. They discovered that performance in each AP course subject included in their research had a positive relationship with SAT outcomes, such that as AP exam scores increased, SAT scores also increased. Finally, Warne et al.'s (2015) study of two graduating high school cohorts

(about 90,000 students) found that students who took an AP exam were more likely to enroll in a four-year college, earn a higher GPA, and earn a bachelor's degree and earn higher incomes than students who did not take an AP exam.

Increasing Access

As noted in the previous section, the College Board (2001) has long been interested in increasing access to AP courses and equity in test performance and has assisted school districts in addressing the disproportionality of students enrolled in AP classes. In the 1990s, College Board established the Commission of the Future of the Advanced Placement Program (College Board, 2001) to provide recommendations for achieving equitable access to AP coursework while maintaining the rigor of the AP curriculum. The commission met six times over two years and made five broad recommendations centered on equity and access and appropriate curricula and standards. The recommendations were:

- Focus on expanding access to AP in underserved schools and for underserved populations, while continuing to maintain AP's high quality of instruction and rigor.
- Provide unconditional support for preparing teachers, schools, and school systems to offer high-quality AP programs—the teachers' needs are paramount.
- Engage leaders in the disciplines, pedagogy, and research to ensure that current reforms and best practices are reflected in AP.
- Develop and disseminate AP quality standards and accelerate rigorous research efforts to validate AP.
- Provide explicit guidelines and information about the appropriate use of AP and AP Examination results (College Board, 2001, p. 21).

The commission (College Board, 2001) noted that not all students attending high school in the US had access to AP classes; and even when schools offered AP classes, the enrollments lacked diversity. The commission also noted that, not only were students of color losing out on educational opportunities, but other students were losing out on learning from the different perspectives that students of color can bring to the classroom and the material. The College Board not only had to work on increasing student access to AP programming across the country, the organization needed to have a special focus on diversifying both the curriculum and the enrollment in those classes. In addition to the commission's report, the College Board also released internal reports on the status of equity and access.

The College Board prepares an annual AP Report to the Nation presenting data to note successes and challenges, as well as to set meaningful, data-driven goals to address the inequities in access to the AP program and provide opportunities for student success. In the most recently published report, *The 10th Annual AP Report to the Nation* (College Board, 2014), a section on opportunity discusses students' "right to rigor" and "promoting equity" (pp. 28-30). The report noted that "Black/African American students in the graduation class of 2013 were the most underrepresented group in the AP classrooms and in the population of successful AP Exam takers" (p. 30). The report went on to share "winning strategies from the 3rd annual districts of the year" (p. 38). These strategies ranged from "removing financial barriers" to "support[ing] teacher professional development," and also included identifying and "recruit[ing] students with potential" (p. 39).

The literature has documented clearly the disproportionality in the racial composition of student enrollment in AP classes (Theokas & Saaris, 2013). The College Board (2001) has acknowledged this problem and has processes in place to work with districts to address the issue

of this loss of opportunity among certain student groups, notably Black/African American high school students. This issue of disproportionality in AP Program access needs to be addressed because evidence shows student groups are losing out on opportunities for success in future college and career options. In addition, under ESSA, schools are now evaluated on their ability to provide all students with access to a rigorous curriculum (SDE, 2018). As evidence suggests, addressing the disproportionality of Black/African American students in AP classes would benefit both the students and the school system.

Theory of Improvement

This section first presents a causal systems analysis (CSA) that examines factors that have been shown to impact the problem of disproportionate enrollment in AP courses among Black/African American students. The CSA is followed by the theory of improvement that describes key areas that need to be addressed in order to increase AP course enrollment of Black/African American students.

Causal Systems Analysis

In order to fully understand the factors that contribute to the disproportionately low enrollment of Black/African American students in AP classes, the researcher engaged in a causal systems analysis (CSA) using a fishbone diagram to organize and illustrate key relationships among the various causal factors. These factors were grouped into major categories or "ribs." Based on a review of the literature and current practices at the state and local levels, three major categories of causes emerged: the classroom environment, available resources, and the course placement process (including course requests and course recommendations[7]). Each of these

[7] In the district there are two steps to the course placement/registration process. The first step is for teachers to enter course recommendations for students, but only for courses that are graduation requirements. The second step is for students to request other courses to make a complete schedule.

factors had been identified in the research as related to the numbers of Black/African American students who enroll in high school AP classes and will be discussed further below. Another factor identified in the research is students' preparedness for rigorous high school coursework; however, because this factor occurs prior to high school, the researcher did not include it in the CSA as this study focuses on students' high school experience and factors that might be improved at the high school level. Nonetheless, this topic deserves some mention.

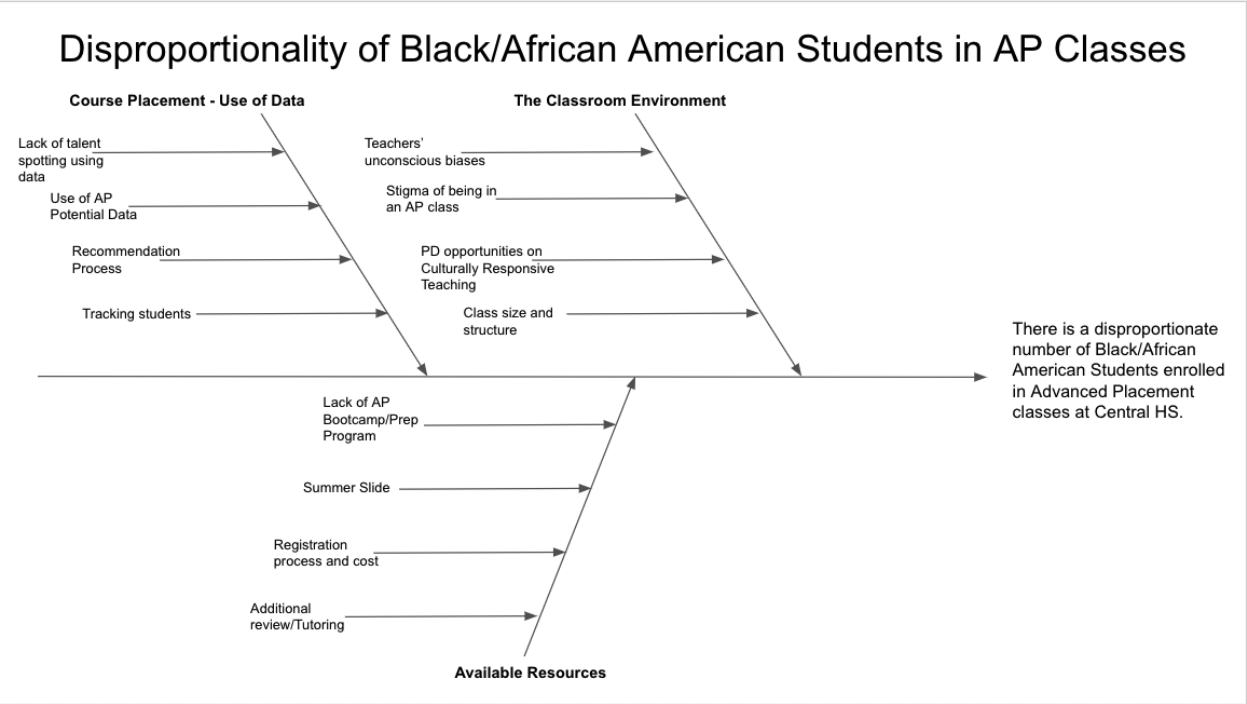
Preparation for Rigorous Courses. Preparation for taking rigorous courses begins early, including having access to early childhood education that provides children with the critical foundations in reading and math, among other skills (Bakken, 2017). Bakken demonstrated that children who had access to quality early childhood education performed better in the classroom and were more emotionally and socially competent than peers who did not have similar access. Access to quality and rigorous instruction must continue through elementary and middle school grades for the benefits of early childhood education to continue into high school. Conger (2009) conducted a study looking at panel data of 118,050 students from Florida who would have graduated in 2003 given normal grade progressions. Conger examined the racial, poverty, and gender disparities in advanced course enrollment and found that when controlling for pre-high school preparation such as access to early childhood education, the disparities were substantially reduced. Similarly, in 2010 the U.S. Department of Health and Human Services published a study about the impact of Head Start on educational outcomes. The study reported that access to early childhood educational programs, such as Head Start, improved both the cognitive and social-emotional learning in students (Puma et al., 2010).

Related to inadequate preparation for rigorous course-taking in high school is tracking. Tracking students, or organizing students based on ability level, is a practice that was intended to

create the most efficient learning environment for all students (Kolluri, 2018). However, research has established that ability tracking happens in elementary and middle schools and heightens the social inequalities students bring with them from home (Oakes, 2005). Once a student is tracked, they often remain in that track and it is difficult for that student to move from on-grade level to honors or other advanced coursework (Archbald & Keleher, 2008). Tracking also contributes to teacher and administrator perceptions about which students can be successful in advanced coursework (Archbald & Keleher, 2008). However, in selecting the causal factors, the researcher considered the role of a high school administrator and elementary and middle school tracking is mostly beyond the researcher's sphere of influence; however, the researcher aimed to examine possible ways to address tracking once a student advances to high school. As such, the researcher limited the fishbone diagram to causal factors at can be impacted at the high school level.

The research reviewed below focuses on the three causal factors (the classroom environment; the school's available resources; and the course placement process) and each one plays an important role in the disproportionality in AP class enrollment. The researcher acknowledges that the literature often does not separate race and socioeconomic status and poverty can also be strongly related to what happens to a student inside and outside of school. These intertwined factors may lead to a conflation of the research findings on racial disproportionality. As such, the researcher acknowledges the possible conflation and moved forward with focusing on the disproportionality observed by race. Figure 1 presents the fishbone diagram of the causal factors, each of which is described in more detail below.

Figure 1: *Causal Systems Analysis Fishbone Diagram*



The Classroom Environment. The classroom environment plays a role in determining if students register for or enroll in a specific class. For example, Burton et al. (2002) found that Black/African American students were more likely to register for a course if there were other Black/African American students who were registering for the same course or if there was a teacher of color teaching the course. Kerr (2014) conducted a year and a half long study looking at the various barriers to entry of AP classes in 35 social studies classes in Kansas and found that the classroom environment was a large barrier. Kerr cited teachers' perceptions surrounding who should take AP classes and the school's perceptions of elitism that AP classes are only for the top students as discouraging to non-White students who were considering enrolling in an AP class.

Related to teachers' perceptions, which influence the classroom environment, are teachers' unconscious biases and the lack of culturally-responsive teaching practices (Kerr,

2014). Conger (2009) and Oliver (2013) both discussed the impact of the lack of culturally-responsive teaching on the classroom environment. The College Board conducted an audit of the AP curricula in 2001 as part of its *Access to Excellence* report and determined the need for more culturally-responsive content and instruction to address disproportionate access to AP coursework (College Board, 2001).

Flores (2011) wrote about how school leaders view AP classes as one way to close the achievement gap, but they are also mindful of maintaining the rigor of AP classes. Flores described a struggle between "maintaining the ostensible purity of the AP program versus diluting it with program expansion" (p. 1). This perception of needing to maintain the so-called purity of AP programming may lead to teachers acting as gatekeepers or creating barriers to enter AP classes.

Within this rib of the fishbone, the researcher found a gap in the research concerning parental involvement in the classroom environment. In addition, the literature lacks in discussions of socioeconomic status (SES), including how SES is often conflated with race and how both of these characteristics impact the classroom environment.

Available Resources. A second major causal factor related to AP enrollment is availability of resources and supports for preparing students before and during an AP class. Resources such as access to tutoring and summer academic programs have been shown to help in preparing students for AP classes (Li et al., 2009). It is within this causal factor that the researcher identified some conflation between race and SES. The availability of resources as a contributing factor in AP course enrollment was also identified as an area of gap in extant research. This may be due to the fact that access to resources is school specific.

One example of a support is an AP Summer Boot Camp that has been shown to have a positive impact on preparing students for the rigor of an AP class (Li et al., 2009). Li et al. advocated for expanding access to such camps to all students. However, participation in these types of extracurricular support programs is not always possible, due to costs or availability. Ndura et al. (2003) noted that this limited access is an example of the conflation between race and SES. Some schools and school systems seek to lessen the impact of the disparities in student socioeconomic backgrounds by offering these programs at a reduced fee or free of charge.

As an example, CHS has offered a Summer Step It Up program for the past seven years. This program is designed for students who have demonstrated scholastic aptitude in on-grade level or honors classes and teachers or administrators want to encourage them to "step it up" during the following academic year. In making recommendations for the program, teachers and administrators target traditionally underserved populations such as Black/African American and Hispanic/Latinx students. The program costs students $25, which pays for a field trip to Washington, D.C. If a student cannot afford to pay, the school will cover the cost of the field trip for that student. During the week-long summer program the students engage in skill building and bolstering their foundational knowledge, such as common literature and historical events, in order to prepare them for AP classes during the following academic year. Over four years, 36 CHS students have participated in the program and all have gone on to enroll in at least one AP or GT class during their high school careers.

Individual tutoring is another type of resource that prepares students from groups underrepresented in AP classes for AP coursework (Flores, 2011; Young, 2018). Flores and Gomez (2011) showed that instituting an after-school and/or Saturday tutoring session is one strategy to increase AP participation for underrepresented students (p. 77). Unfortunately, Both

Flores (2011) and Young (2018) noted that many students cannot afford or do not have the time to engage in these tutoring programs.

Course Placement - The Use of Data. The third major causal factor explores how a school selects and/or encourages students to request certain courses, including AP courses. This causal factor also explores how that process involves the use of data. The literature on students joining AP courses discusses a variety of ways that schools select or talent spot students to encourage them to enroll. One of the more common data points used in the selection process is AP Potential, which comes from the College Board. The College Board provides this data to schools for the schools to share with students and families. Vaughn (2010) and the College Board (2010; 2018) emphasized the importance of using the AP Potential data to make informed decisions about which AP classes students should take. According to the College Board (2020):

> AP Potential is a free, web-based tool that allows schools to generate rosters of students who are likely to score a 3 or higher on a given AP Exam based on their performance on the PSAT/NMSQT, PSAT 8/9, PSAT 10, or SAT. (para. 1)

Also according to the College Board (2021), "the Preliminary SAT/National Merit Scholarship Qualifying Test (PSAT/NMSQT) and PSAT 10 measure what you're learning in school, determine if you're on track, and open doors for opportunities to prepare and pay for college" (para. 2).

The PSAT is administered by schools and schools either cover the cost of the test for the students or students who elect to take the test pay the $17 test fee. In DPS all ninth, 10th, and 11th graders sit for the PSAT/NMSQT and the cost is covered by the district. The PSAT scores are sent to each student and the school. The College Board then uses the student score to develop the AP Potential data and shares that with schools. AP Potential information allows schools to

take a student's PSAT score and reference a data table where schools can then look up the PSAT scores associated with the probability chosen (e.g., 60%) of that student scoring a 3 or higher on a specific AP exam. The College Board also provides schools with a list of their students who sat for the PSAT and the AP subjects in which they have demonstrated a likelihood to be successful, based on their AP Potential performance. School staff members have access to that list, which could be used when they have conversations with students regarding registering for an AP course.

DPS had a renewed focus on using the AP Potential data at the end of the 2018-2019 school year (DPS Board Report, 2019). CHS began using the AP Potential data during the 2018-2019 school year. During that year, CHS accessed the AP Potential data from the College Board and sent letters to parents/guardians of all students who met the threshold determined by the College Board to show which courses the student demonstrated AP Potential and hopefully to encourage their children to enroll in those AP courses in which they were likely to be successful. That initiative did not yield higher enrollments in AP classes in the following year and CHS experienced a small decline in the percentage of Black/African American students who participated in AP classes during the 2019-2020 school year. CHS continued using the AP Potential data the following year and added an AP Potential Parent Information Program. The school sent a personal invitation to all families who received an AP Potential letter and planned an information session to explain what the letter meant as well as the benefits of taking an AP class. From the school year 2019-2020 to 2020-2021 CHS had an increase of almost 4% in Black/African American students' AP class enrollment rates.

In addition to using AP Potential data to talent spot students for enrollment in AP classes, Kerr (2014) and Veldman (1984) also discussed the importance of the teacher recommendation

process. Teachers sometimes weigh student behavior more heavily than student aptitude in the recommendation process (Veldman, 1984). More specifically, teachers may not recommend AP classes for a student who may have the aptitude for AP classes, but not the work ethic or behavior expected. This can lead to the concept of tracking. Once a student is in a track it is hard for them to break out of that track and move to more advanced classes (Archibald, 2008). In short, students who performed at a lower level in elementary or middle school or had poor behaviors at that age may be stuck in the lower-level classes as they progress into and throughout high school.

Kerr's (2014) research demonstrated the effectiveness of giving teachers student-level data, such as assessment scores and grades, prior to when teachers recommend students for specific courses. In addition to providing student-level data, Kerr also found that asking teachers to include whether it was the student's aptitude or behavior that led to the recommendation, resulted in more recommendations focusing on aptitude rather than behavior. Kolluri (2018) determined that interactions between the school and family also can affect enrollment decisions for a student. Kolluri found that parents of traditionally underserved populations are often less informed than white parents about the opportunities for and value of advanced coursework. As such, parents from these groups can be at a disadvantage when attempting to support their children in advanced classes. Kolluri advised that teachers and schools use data, such as grades and assessment scores, in guiding those conversations with students and their families.

As discussed at the beginning of this section, ability tracking has a major impact on student enrollment in AP courses, both prior to high school and during the high school years. Using data to inform the course recommendation and talent-spotting process is one way to make selection more objective. Veldman (1984), Archibald (2008), and data from DPS (2018)

provided evidence of the negative impact of tracking on Black/African American students' enrollment in AP classes. Veldman (1984) compared various achievement levels of students in both higher- and lower-ability classes. He found that both the higher-ability and lower-ability students performed better in the higher-ability classes. In fact, class composition, based on race and ability level, had more of a negative impact on the lower-ability students. Archibald (2008) discussed the importance of data-driven decision making and using data to analyze inter-track mobility and monitoring course placement for all students. Archibald defined inter-track mobility as students moving from one track to a more rigorous track, such as from an on-grade level track to an honors track. In order to break ability tracking schools must use data to analyze student performance and consider inter-track mobility. Otherwise schools are perpetuating the problem of disproportionate student enrollment in advanced classes.

Although each of these three causal factors play a role in creating the problem of disproportionality in enrollment of Black/African American students in AP courses, the researcher believes that focusing on the course placement process and the use of data to drive talent spotting can affect the most change. "Course Placement - Use of Data" is also the most amenable to change within the sphere of influence of a high school administrator. Therefore, the following sections will discuss the theory of action that asserts how improving data use can increase enrollments in AP classes in the context of CHS.

Theory of Action: Drivers of Improvement

Following the causal systems analysis, the researcher developed a driver diagram to illustrate a theory of action to improve the percentage of Black/African American students enrolling in at least one AP class during their high school career at CHS. The aim of the theory of action is to increase by five percentage points the percentage of Black/African American

students who are successful[8] in at least one AP class during the 2024-2025 school year. As noted earlier, improving access to and success on AP exams starts with the more immediate aim of increasing enrollment in AP classes. Thus, a more intermediate aim of this study is to develop a data protocol for teachers and school counselors to employ in talent spotting during the course recommendation process by the spring of the 2022-2023 school year.

For the purposes of this research and due to the larger population of students who were eligible for English for Speakers of Other Languages (ESOL) programming at the school where this study was conducted, where 17% of the total population are eligible for the ESOL program, this research focused on addressing the disproportionality in AP classes for Black/African American students. Disproportionality exists and must be addressed for Hispanic/Latinx students; however, 47.3% of the Hispanic/Latinx students at CHS were eligible for the ESOL program. Many of these students had to enroll in other courses as part of their ESOL programming and thus did not have the same availability and flexibility to enroll in AP courses as their peers not in the ESOL program. In addition, the mobility rate is higher among ESOL students than non-ESOL students at CHS making it difficult to obtain complete data on assessments and coursework over multiple years. The inclusion of this cohort could complicate interpretation of the data in this study.

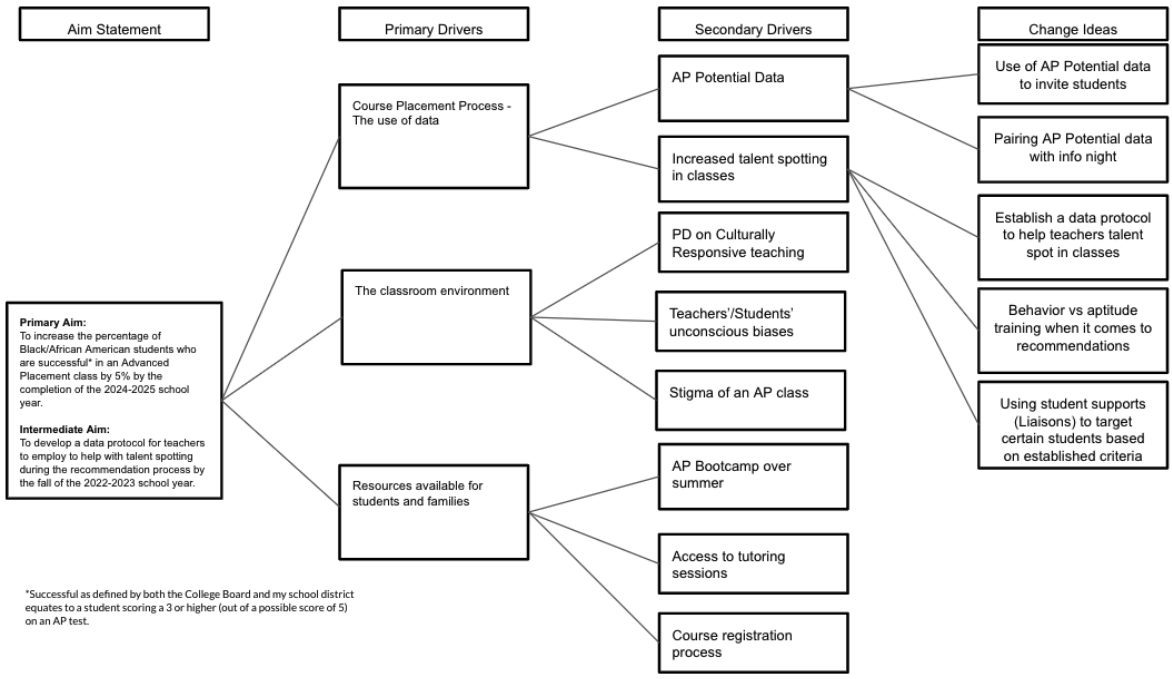
Figure 2 illustrates the major drivers for improvement that have the potential to reach the aim. These drivers are based on the CSA and focus on: addressing the classroom environment, increasing resources for families and students, and improving the course placement process through a focused use of data.

[8] Success as defined by both the College Board and DPS equates to a student scoring a 3 or higher (out of a possible score of 5) on an AP test.

All of these drivers fall within the sphere of influence of a high school administrator and have the potential to improve the disproportionality of Black/African American students in AP classes. However, as noted earlier, the decision was made to focus on changing the course recommendation and placement process through data use. The rationale is that this driver is central to increasing AP course enrollment and is likely to be implemented more quickly than other drivers. This driver is also an area that can be directly influenced through the role as an assistant principal.

Figure 2

Driver Diagram



The Classroom Environment. As discussed in the CSA, the classroom environment plays a role in determining if students will register for a specific class. This primary driver can be further broken down into three secondary drivers that affect the disproportionality of Black/African American students in AP classes.

Professional Learning on Culturally-Responsive Teaching. By including professional learning on culturally-responsive teaching (CRT), schools can change the classroom environment and help Black/African American students and other students of color feel more comfortable in the classroom. This type of professional learning for teachers ranges from discussing how CRT is linked to brain-based learning as well as ensuring that curricula represents all students and cultures (Hammond, 2015). Research shows that students preform better when they can access materials that relate to their own cultural experiences (Gay, 2018). Another way for schools to bring more CRT into the AP classroom is to be intentional about the teachers assigned to teach those classes. For example, school administrators should ensure that AP teachers are representative of the student body. DPS, including CHS, has been intentional in ensuring that teachers represent the student body over the past few years, by hiring teachers of color and being intentional about what courses they teach. In March of 2020 the district held the inaugural Recruitment Event for Teachers of Color. As this was a recent event, it was too early to see a measurable impact in the classroom, but over 80 prospective teachers participated in the event. Hiring teachers of color brings different perspectives into the classroom and is a way to address CRT in the classroom.

Unconscious Biases in the Classroom. Included in the classroom environment are the unconscious biases of both teachers and students and the perceived stigma of being in an AP class. One way to address teachers' unconscious biases is to look at the recommendation process and when/how teachers recommend students for AP classes. By removing the teacher recommendation step, which acts as a barrier to entry for some students, more students will be able to try an AP class (Theokis, 2013). In addition to removing barriers to entry, the school could also improve the classroom environment by controlling the narrative centered around the

climate and culture of the school, specifically when it comes to the AP classes. Creating a welcoming school environment in which all students feel welcome is one way to address biases and some perceived stigma of being in an AP class (Kugler, 2005). Another barrier to entry is teachers and school counselors being skeptical of students' readiness for AP when it comes to recommending them for AP classes (Flores, 2011). School staff must surmount these preconceived notions and treat all students as capable. By addressing teachers' unconscious biases and school culture , schools can improve the classroom environment and work toward reducing the underrepresentation of Black/African American students in AP classes.

Resources Available for Students and Families. In addition to the classroom environment, another primary driver of disproportionate AP course enrollment is the availability of resources for students and families. Some educators and the College Board (College Board, 2001) have proposed that to increase access to AP classes the barriers to entry must be removed. One way to remove barriers is to shift the climate and culture in the school to one that encourages all students to challenge themselves. Another way to remove barriers is to remove prerequisites for advanced classes and allow students to take a chance in an advanced class (Flores, 2011). A third way to remove barriers to AP entry is to provide students with access to a summer educational experience prior to their AP class, such as the AP Bootcamp program. Such summer programs benefit all students, especially those who are interested in taking AP classes (Li, 2009).

Three secondary drivers have the potential to support students in choosing to register for AP courses and completing the courses successfully. By providing the necessary resources for students and families, schools can disrupt the notion that AP classes are only for the most elite

students and build an infrastructure upon which all students can work towards being prepared for AP classes (Flores, 2011).

AP Bootcamp Over Summer and Access to Tutoring Sessions. Making summer boot camps and/or tutoring, both during the school year and over the summer, available to any student who needs additional assistance with AP classes is an important and empirically-supported strategy for increasing numbers in AP courses. Participation in summer programs such as AP Bootcamp and other academic camps, including summer programs for middle school students transitioning to high school, is positively correlated with enrollment into high school advanced classes for traditionally underserved students (Li, 2009). For the past decade CHS has offered the Step-It-Up program during the summer. The goal of this program is to provide students with the requisite skills and content knowledge in order to step it up the next year to an advanced-level class, including AP or gifted/talented (G/T) classes. Students are selected and invited to the program based on teacher recommendation. The program is usually capped at about 20 students each year. Not all students who complete the summer program eventually enroll in an AP class, but many students do. Those who do not enroll in an AP class enroll in at least one G/T class during their high school careers. Tutoring sessions during the school year complement summer programs and help students access the AP course materials in a variety of ways (Burton, 2002; Young, 2018).

Course Registration Process. Another improvement strategy is to reduce the complexity of the overall course registration process. Course registration processes are usually school specific, thus no comprehensive studies of effective course registration processes exist. However, research exists on the importance of increasing communications with families and involving them in the course registration process. Robinson (2017) found that by making parents

collaborative partners in education, schools can increase the enrollments of all students, including students of color, in AP classes. In her 2014 study Kerr found that involving parents in school decisions, such as the registration process, had a positive influence in increasing the numbers of minority students enrolled in AP classes. Finally, Ndura (2003) found that parents were the most influential factor in students registering for AP classes. The limited research suggests that schools need to examine how to revise the course registration process to include families.

Course Placement Process - The Use of Data. The third primary driver leading to improvement of the underrepresentation of Black/African American students in AP coursework is the way school staff select students and encourage their enrollment in AP classes, specifically, how school staff use data to inform the decisions about which students should be targeted to register for AP courses. This primary driver relies on two secondary drivers, each of which involves the use of data to encourage students to register for AP classes.

AP Potential Data. Using the College Board's AP Potential data, according to the College Board (2022), is an empirically-supported way to increase student enrollment into AP courses.. Using the AP Potential data from the College Board is a method that has been recommended by the district. AP Potential data can also inform parents and students about their probability for success in the AP program. A standard practice in CHS for recruiting students to register for an AP class is to use the AP Potential data from the College Board.

Each year CHS students in Grades 9 through 11 take the PSAT in October at no cost to them. In late December the College Board makes available the AP Potential data for CHS staff and creates a letter to send home to students' families. Based on how the student scored on the PSAT, the College Board AP Potential information provides the AP subjects, if any, that the

student would be likely to pass. According to the College Board (2020), "AP Potential is rooted in a long line of research showing moderate to strong correlations between PSAT/NMSQT® scores and AP Exam results" (para. 1). The College Board also claims that the AP Potential tool is designed to help schools increase equity and access to AP courses by ensuring that no student who has the potential to succeed in an AP course is overlooked.

CHS began using the AP Potential data and mailing home AP Potential letters during the 2018-2019 school year. In the 2019-2020 school year CHS included in the letters an invitation to attend a parent program. The parent program was held in January, during the scheduling window when students made their course requests for the following school year. Its purpose was to explain what AP Potential meant and the benefits of registering for an AP class. At the first meeting, nine families participated. During the 2020-2021 school year, which would have been the third year of providing families with the AP Potential letters, CHS did not offer the PSAT to students due to the interruptions to school schedules caused by the COVID-19 pandemic. Therefore, no AP Potential data or letters were available in 2020-2021.

Talent Spotting Using Data. Similar to using AP Potential data, teachers may use other student data to talent spot students for AP classes. Theokis (2013) recommended that schools conduct an audit of their requirements and procedures for enrolling students in advanced classes in order to identify barriers to equitable admission. In a 2013 article the Education Trust described several steps that schools could take to find the missing AP students. These steps included examining the data, such as GPAs and assessment scores, and asking questions about those missing students, like which students were missing and why. The article also explored how schools could examine what information about AP classes was provided to students and families and develop supports and strategies to address the preparation gap prior to and after enrollment.

Teachers play an important role in what classes a student will take the next academic year. Each year, teachers make recommendations for students on what classes they should take. Students either accept those recommendations or make changes after conferring with parents. (At CHS, a student can only change a course recommendation, made by a teacher, with parent approval.) Schools vary in their practices in regards to the recommendation process. While teachers play an important role in making those recommendations, schools need to put in place a process of using data to talent spot students, rather than looking at student behavior. As mentioned previously, Kerr (2014) demonstrated the effectiveness of giving teachers student-level data, such as assessment scores and grades, prior to recommending students for specific courses and resulting in more accurate placements for those students. If schools put a process into place that required teachers to use data to make course recommendations, then disproportionality in AP course enrollments may be reduced.

Theory of Change

The ultimate aim of the improvement initiative is to increase by five percentage points the percentage of Black/African American students who are successful in at least one AP class during the 2024-2025 school year. An intermediate aim is to develop a data protocol for teachers and school counselors to employ for talent spotting as part of the recommendation process beginning in the fall of the 2022-2023 school year.

For this improvement strategy to be effective and to reach the aim, the researcher first needed to develop a data protocol, using in-house data, that teachers and counselors could use in helping students and families make informed decisions regarding their course requests for the following academic year. The following theory of action guided this study:

IF the researcher works with CHS teachers and student support personnel to establish a protocol, which uses a variety of student-level data, to identify Black/African American students in Grades 9 through 11 who demonstrate aptitude to be successful in an Advanced Placement class,

THEN CHS teachers and school counselors can use that protocol to talent spot Black/African American students in their classes during the annual recommendation window to identify and recommend those students who would benefit from taking an AP class during the following school year,

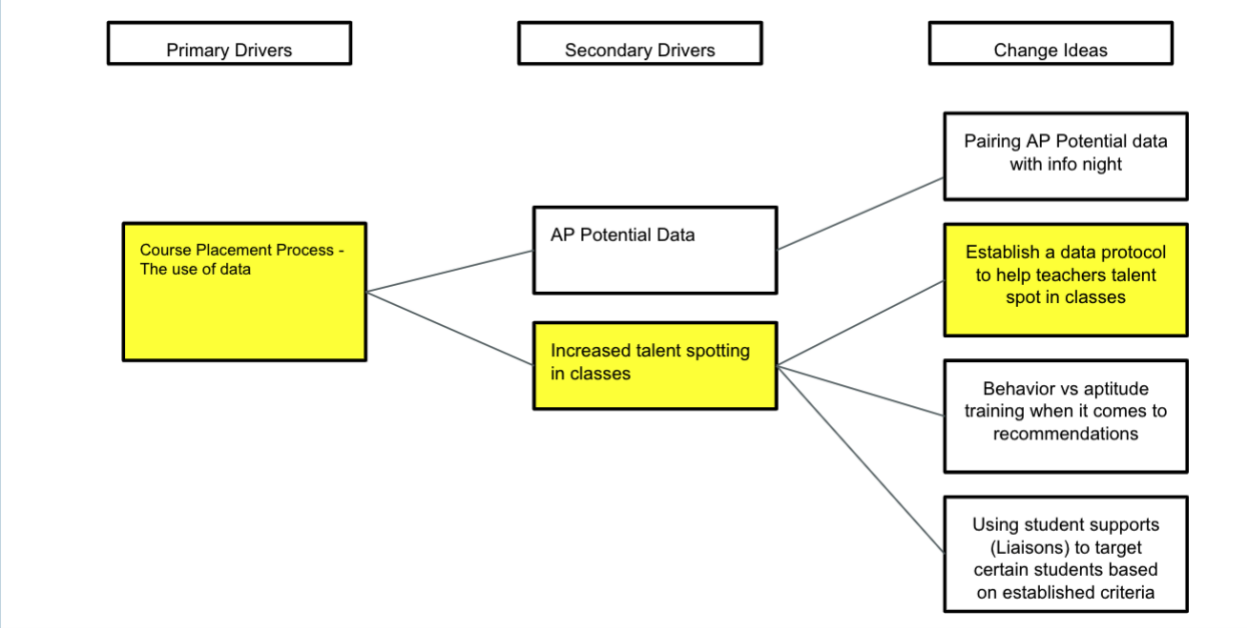
RESULTING in an increase in the numbers of Black/African American students who enroll, and are ultimately successful (as defined earlier), in Advanced Placement classes.

The theory of action reflects the researcher's belief that focusing on the use of data in the course recommendation and talent-spotting process can have the greatest short-term impact in achieving the primary aim. The researcher established a protocol at CHS that helps teachers and school counselors analyze student-level academic performance data, such as state assessment scores and GPA; as well as other measures like attendance; to identify students who meet a benchmark and are not already enrolled in an AP class. The intent was for teachers and students to use and analyze data to make informed decisions regarding enrollment in AP classes.

Figure 3 depicts the theory of action driver diagram.

Figure 3

Theory of Action Driver Diagram



Statement of Purpose

The data at the national, state, and local levels all indicate disproportionately low enrollment of Black/African American students in AP classes at the high school level. At all levels the Black/African American students participate in AP classes at a disproportionate rate to their peers. Ultimately, the goal is for all students in AP classes to be successful by passing both the class and the exam. Reducing disproportionality in the AP Program begins with equitable representation of students enrolling in AP classes. Thus, this study focused on testing one strategy for increasing Black/African American student enrollment in an AP class. Enrollment in an AP class is not the ultimate goal for achieving educational equity, but it is a strong indicator of students' college and career readiness. As discussed earlier, consequences of Black/African American students and other students of color not enrolling in and taking AP classes include having lower SAT scores, GPAs, and being less prepared for life after high school than their peers who enroll in AP courses. It is important that in reducing the underrepresentation of

Black/African American students in AP classes that the school is also supporting these students to be successful in AP coursework. A short-term goal of this study was to increase the enrollment of Black/African American students in AP classes, with the ultimate goal that these students are successful in AP classes. To this end, the researcher worked with AP teachers at CHS and the school's Black Student Achievement Program (BSAP) liaison to develop academic and social-emotional support for students who are recommended for AP classes.

By focusing on the problems that fall within school staff's sphere of influence, school staff can begin addressing the underrepresentation of Black/African American students in AP classes. Based on extant research and considering this study's aim of increasing the enrollment of Black/African American students in AP classes within the school's sphere of influence, the researcher determined that establishing a data protocol, using an algorithm to create a talent-spotting tool, has the most direct impact for CHS to reduce this disproportionality.

The overall goal of the study was to increase the enrollment of Black/African American students in AP classes. Success in those classes is equally important and is included in discussions of how to support the identified students; however, the protocol that was developed focused on enrollment in one or more AP classes because students cannot be successful in those classes if they were not enrolled in one. Thus, the purpose of this study was to develop and pilot a talent-spotting tool using student data that includes more indicators than the College Board's AP Potential tool. The talent-spotting tool was the researcher's attempt to embed equity and standardization into the AP course recommendation process at CHS. Part of this pilot involved obtaining teacher and school counselor feedback on the draft talent-spotting tool to improve the tool and increase the possibility that the tool would be adopted as a systematic process at CHS.

Findings from the current study have the potential to alter the course registration and recommendation process at CHS, as well as at other high schools in the district.

Section II - Study Design

Purpose Statement

As long as the disproportionately low enrollment of Black/African American students in AP classes perpetuates, Black/African American students will continue to experience inequitable educational opportunities and access to these college-level classes in high school. This study's theory of change posited that it is important that teachers and counselors have a systematic protocol based on student data in order to make informed decisions in talent spotting and recommending all students, but more specifically, Black/African American students, for AP classes.

The purpose of this study was to develop and pilot a talent-spotting tool using student data that is systematic and equitable by using more indicators than the College Board's AP Potential tool for teachers and school counselors to use in the AP course recommendation process. Specifically, this protocol was developed to identify more students, especially Black/African American students, whose data indicated that they might be ready for AP coursework. This study used student data from the 2018-2019 school year (SY1819), which, due to the COVID-19 pandemic, was the most recent year when students had complete assessment data.

The researcher developed the talent-spotting tool, and the algorithm used to process the data, and tested its effectiveness in identifying students who should be recommended for AP classes, and ultimately reducing disproportionality, using student-level data. The researcher first drafted the talent-spotting tool and solicited anonymous feedback on the draft from teachers and school counselors via a web-based survey. Survey items asked staff members about their knowledge and use of AP Potential data, their perceptions of the proposed talent-spotting tool,

and their thoughts regarding its potential use during the course recommendation process. In particular, survey items asked for respondent feedback on: the data points used to drive the talent-spotting tool's algorithm, the talent-spotting tool's perceived usefulness in the course recommendation process, and the likelihood that other staff members would use the tool during the course recommendation process. The researcher wanted feedback on the data points used to drive the algorithm and if the selected staff believed the tool would be helpful and used by others during the course recommendation phase. The researcher intended to make edits to the talent-spotting tool based on this survey feedback; however, after reviewing survey results, the researcher did not deem it necessary to make edits to the tool or its algorithm prior to the pilot. Based on the responses the large majority of respondents agreed with and approved the data points used to drive the algorithm.

The researcher used the pilot to examine how accurately the tool identified students who had been recommended previously for an AP course. The researcher then examined if the talent-spotting tool would increase the numbers of Black/African American students recommended for an AP course. The researcher also compared the results of the talent-spotting tool with College Board's AP Potential data for that same year.

The current study aimed to decrease disproportionality in AP class enrollment by increasing the enrollment of Black/African American students in AP classes through improving the course recommendation process. To achieve this aim, the researcher developed and tested a talent-spotting tool to increase the number of Black/African American students recommended for AP classes. As noted in Section I, supporting students' success in AP classes is equally important and is the next step after students are supported to enroll in the classes.

Research Questions

Three major research questions guided this study. The research questions focused on the talent-spotting tool and its predictive value and user-perceived usability. The questions were:

1. What components and processes of a data-based talent-spotting tool do AP teachers and school counselors perceive as effective and feasible to use to inform recommendations for enrollment in an AP class?
2. How accurately does the talent-spotting tool identify rising 11th grade students who were recommended for AP enrollment during the SY1819 recommendation window?
3. Does the talent-spotting tool identify additional rising 11th graders not recommended for enrollment and if so, how many and what are their characteristics?

Design

This study design was quantitative in nature and consisted of analyzing two data sets, both through the survey design. The first data set was obtained through a data request from the district and contained various student-level data that was used to develop the talent-spotting tool. That student-level data was then used to test the talent-spotting tool's accuracy in identifying Black/African American students who demonstrated aptitude to succeed in an AP course.

To address the first research question, an anonymous, web-based survey was administered to selected teachers, based on their role in the recommendation process, who taught and did not teach AP classes, as well as school counselors. The survey was designed to obtain teachers' and school counselors' feedback on the current recommendation process (including the use of AP Potential), as well as their perceptions of the proposed talent-spotting tool and its potential usefulness in the course recommendations process. If necessary, based on the responses from the survey, the researcher planned to make changes to the talent-spotting tool prior to

piloting it. A survey was chosen both due to it's rapid turnaround time and due to an agreement with the district's data privacy office. Analyses of survey responses provide quantitative descriptions of trends, attitudes, and opinions of a population, or tests for associations among variables (Creswell & Creswell, 2018).

Originally, the researcher explored using a convergent mixed methods design, a form of mixed methods in which qualitative and quantitative data are merged in order to provide a comprehensive analysis of the problem (Creswell & Creswell, 2018). The intent was to conduct focus groups with AP teachers, non-AP teachers, and school counselors. However, as a result of the research approval process with the district, in order to meet the request for complete anonymity of all participants due to possible role conflicts between the researcher, who is an administrator, and the teachers, the researcher altered the study design from a focus group format to an anonymous web-based survey. No major changes were made to the questions as a result of this change however, the depth of the information obtained from participants was limited by use of a survey instead of face-to-face discussion of the talent-spotting tool. In a focus group setting, the researcher would have been able to explain the talent-spotting tool and answer questions from participants; this was not possible with an anonymous survey. To compensate for the lack of ability to describe the talent-spotting tool to survey participants, the researcher wrote a synopsis of the talent-spotting tool and embedded it in the survey. Participants were instructed to review the synopsis prior to answering survey questions related to the tool.

Based on the feedback from the teachers and school counselors who responded, the researcher determined that no changes were needed to the talent-spotting tool or its algorithm prior to piloting it.

Methods

The following sections describe the methods and procedures for each of the three major components of the study: (a) developing a data-based talent-spotting tool protocol draft; (b) obtaining input from potential users regarding current course recommendation practices (including the use of AP Potential) and their perceptions of the talent-spotting tool and its potential usefulness; and (c) piloting the talent-spotting tool and comparing the results with course recommendations based on SY1819 AP Potential data and with the SY1819 actual course recommendations.

Developing the Talent-Spotting Tool

The first step in this study was the development of the talent-spotting tool**.** Prior to recruiting participants for the survey, the researcher created an algorithm to combine various student data to produce a single indicator score. The data used in the algorithm will differ for each grade level, as each grade level has different opportunities for assessments. For example, the majority of rising 10th graders most likely had not taken the SAT, whereas most rising 12th graders had taken the SAT. Rising 11th graders had the option to be recommended for an AP class in math, science, English, and social studies and thus had the most number of AP classes available as options for teachers to enter as course recommendations. Focusing on the rising 11th grade students allowed the researcher to pilot the algorithm with students who had an opportunity to be recommended for an AP class. Note that not all teachers were permitted to submit course recommendations; only those that are recommending students for a state graduation requirement. Table 1 displays the indicators used for each grade level in the talent-spotting tool's algorithm.

To pilot the talent-spotting tool, the researcher requested and obtained data from the district for SY1819 rising 11th graders at CHS. The data included state assessment scores in English language arts (ELA) and in mathematics, unweighted GPAs, attendance percentages, and relevant demographic data. In DPS, the state assessment was the Partnership for Assessment of Readiness for College and Careers (PARCC) assessments. The data requested was from the end of the school year and thus had all of the standardized tests and assessment scores, as well as calculated GPA and attendance data.

For the rising 11th graders, the algorithm included the following data points:

- PARCC ELA performance level (ranges from 1 to 5)
- PARCC Math performance level (ranges from 1 to 5)
- Cumulative unweighted GPA at the end of 10th grade (4.0 scale)
- Attendance score (ranges from 0 to 10)

The rationale for using the PARCC ELA performance level was to gauge a student's achievement in English. All students sit for the PARCC ELA assessment during 10th grade. Similarly; students sit for the PARCC Math assessment in 9th or 10th grade and their performance level is an indicator of their math achievement. An indicator score of 1 to 5 was chosen because that is the indicator score that PARCC reports. The rationale for using a student's unweighted GPA was that it is an indicator of the student's success in school. Unlike a weighted GPA, the unweighted GPA does not include bonus points for Honors, G/T, or AP classes. Using the unweighted GPA was more equitable than the weighted GPA because all students were scored on the same scale from 0.0 to 4.0, as opposed to just some students having access to a 5.0 scale because of the track they entered in middle school. Finally, the attendance score was used in the algorithm because students need to demonstrate a record of attending school and classes.

Based on a student's attendance percentage, they received a number from 0 to 10 that would be entered into the algorithm. For example, if a student has an attendance rate of 96% or above, they will receive an attendance score of 10. A rating of 1-10 was chosen for attendance, and for the rating to be weighted double the other indicators because of the correlation of attendance with success in school.

After receiving the data from the district, the researcher entered the data into a spreadsheet that contains the algorithm to assign each student a single score (see Table 1). The algorithm sums the four indicators used for the rising 11th graders. The maximum score a student could receive is 24 (e.g., 5 + 5 + 4.0 + 10 = 24.0). If a student scores over 20 points, the student will be considered to have the aptitude to succeed in an AP class. After looking at the raw data, a score of 20 was chosen as the threshold because a natural break in the data and it allows for varying degrees of success on the standardized tests and accounts for some leniency regarding GPA and attendance. This indicator score may differ for future implementations of this tool based on the data.

Table 1

Sample Spreadsheet

Student Name	PARCC ELA	PARCC Math	GPA	Attendance	Indicator score
Student A	4	5	3.92	8	20.92
Student B	3	4	2.72	9	18.72
Student C	4	3	3.43	10	20.43
Max score	5	5	4.00	10	24.00

This sample table was provided in the synopsis that was provided to the survey participants in section two of the survey (Appendix G). Survey participants were also provided with a rationale for using rising 11th graders for the pilot, as well as a rationale for the data points included in the algorithm. Section two of the survey asked participants to provide feedback on the data used in the algorithm for the researcher to improve the algorithm. However, feedback from the survey participants did not dictate changes be made to the algorithm or talent spotting tool.

Although teachers in the district have access to their students' data in data dashboards, the data dashboards are not intuitive and many teachers do not take the time to access and analyze the data. The goal of this study was to provide teachers with a single indicator score to make it easier for them to use data to inform their decisions during the course recommendation process.

The Survey

A 19-question survey was developed using an online survey platform, Qualtrics, through the university's account. The survey was administered to teachers and school counselors who were potential users of the proposed tool. Survey responses were anonymous to the researcher. This section details the procedures for survey participant selection, survey administration, and survey data analysis.

It is important to note that a limitation of this study was that the researcher conducted research in the school where he worked. As the researcher was an administrator in the district, teachers might be affected by the researcher's role when responding to the survey. To minimize that possibility, survey responses were anonymous and none of the questions asked for information that could have identified the respondent.

Participants. Three groups of school staff were recruited to participate in the survey regarding the talent-spotting tool and AP Potential. The first group consisted of school counselors from the school. The second group consisted of non-AP teachers who taught ninth, 10th, and/or 11th grade and submitted AP course recommendations. The third group consisted of teachers from the AP Teacher Cohort and were teachers who taught one or more AP classes.

School Counselors. CHS had five school counselors. One school counselor was the ninth grade team counselor and had a caseload consisting of all of the freshmen. The other four school counselors were assigned to the remaining 10th through 12th grade students based on student last names. The school counselors were closely involved with the course registration process and met with each student individually during the course request window to discuss graduation requirements and potential course registrations. They also discussed each course recommendation with the students. The school counselors had a unique perspective to share during the survey when offering feedback on the talent-spotting tool and offered insight into the types of student data that were used in the algorithm since they interacted with a variety of student data when monitoring students on their caseload.

Teachers Who Make Course Recommendations. The second participant group included in this study were the teachers who made recommendations on what classes students should take the following school year and taught ninth, 10th, and/or 11th grade. This group included 22 teachers. In the district not all teachers submit formal course recommendations; only teachers who recommended students for state graduation requirement courses would submit formal course recommendations. For example, DPS students must earn four credits in English to graduate. Each year the English teacher submits the recommended academic level for the student's English class in the next grade level. Thus, teachers who teach 12th grade English did

not need to make course recommendations. In social studies, students need to earn credits for U.S. history in ninth grade, American government in 10th grade, and modern world history in 11th grade in order to graduate. Thus, ninth and 10th grade social studies teachers would submit course recommendations for the following year; whereas 11th or 12th grade social studies teachers would not submit recommendations. Elective social studies classes, including AP elective classes, are available for 11th and 12th graders, but teachers do not submit formal recommendations for them because they are not required graduation courses.

AP Cohort Teachers. The third participant group included in this study were the teachers from the AP Teacher Cohort. This cohort included 16 teachers, some of whom made recommendations and some did not. Since they all taught AP classes and knew the skills and fortitude students needed to succeed in those classes, these teachers provided a unique perspective. The AP Teacher Cohort was composed of the CHS teachers who taught one or more AP classes, regardless of content. This cohort included teachers from all core content areas (English, science, mathematics, and social studies) as well as the non-core content areas (world languages, visual arts, and performing arts). During a typical school year, this cohort meets several times prior to the school year begins and then once a month during the school year.

The Survey Instrument. The researcher developed a 19-question, anonymous survey using Qualtrics, an online survey tool, and was administered to the teachers and school counselors who could be potential users of the proposed talent-spotting tool. The survey had four sections: introduction and informed consent, AP Potential, talent-spotting tool, and usefulness. The sections of the survey were designed to help answer this study's research questions and complied with the district's research approval requirements. During the research approval process with the district, DPS noted that a talent-spotting tool was already in place through the

College Board's AP Potential tool. This study aimed to find a more equitable and data-driven process in identifying students for AP coursework using other student data. As such, the researcher needed to assess teachers' and school counselors' understanding of the AP Potential data. The complete survey can be found in Appendix F.

The survey consisted of several question types. Eight items were yes or no questions, three of which were followed by open-ended items for participants to provide more narrative detail. Three questions asked participants to check all response options that applied. Three questions employed a Likert scale, one of which was followed by an open-ended item for participants to offer additional feedback. Finally, one of the numbered questions instructed the participants to read the talent-spotting tool synopsis.

Prior to dissemination of the survey, the researcher asked several faculty members to review the survey for feedback. Based on their feedback, several changes were made to improve the flow of the questions and semantics. In addition, the researcher asked the principal of the school where the survey was being conducted to review the survey. The principal provided grammatical edits and suggested removing a question asking how long respondents had been in their current job to avoid identifying a respondent. After the researcher made those edits, the survey was disseminated.

Introduction and Informed Consent. The first section of the survey explained the purpose of the survey and informed participants that they may skip any question to which they did not know the answer or did not want to answer. This section also informed participants that they should have completed the informed consent form prior to beginning the survey and provided a link to the form if they had not already done so. The informed consent reminded participants that responses were anonymous and that participation in the survey would have no

bearing on their employment with the district. To ensure that the participants completed the informed consent, the first question asked the respondent if they had completed the consent form. If they indicated "no," the survey locked and directed them to complete the informed consent. Only after indicating completion of the informed consent would the survey move on to section two.

AP Potential. The second section of the survey consisted of six questions: two Likert-type items, two were yes or no items, one was a selected response, and one was a choose-all-that-applied item. The questions focused on the College Board's AP Potential data and the participant's use and understanding of the AP Potential tool. As mentioned earlier, the district offers the PSAT to each student every year in the Fall and students receive their AP Potential based on their PSAT scores. Schools are given their students' PSAT scores and AP Potential information to use how they wish to inform the course recommendation process. This portion of the survey also asked respondents to indicate the extent to which they used the AP Potential information during the course recommendation process. The final question was administered to respondents who indicated that they "do not" or "rarely" used AP Potential in their recommendation process. This question allowed respondents to check all response options that applied to them, with seven response options and a space to write in other options.

Talent-Spotting Tool. The third section of the survey solicited feedback on the draft talent-spotting tool and the data that was used in the algorithm. The section opened with a synopsis of the talent-spotting tool (see Appendix G), the rationale for the tool, examples of the algorithm, attendance score conversion, and a sample spreadsheet of what the talent-spotting tool would look like to users. Respondents were asked to read the synopsis, review the examples, and respond to seven questions. The first two questions asked respondents if the data selected for the

algorithm was valid or not in assessing student aptitude for success in an AP course. The third question asked respondents if and which of the algorithm data points should not be included. The fourth question asked if they felt any other data should be used, followed by an open-ended question for them to specify the data point if they responded in the affirmative. The last two questions asked participants if they recommended including any non-quantifiable data points and what they might be.

Usefulness. The fourth and final section of the survey sought to gain an understanding of the participants' perceptions regarding the usefulness of the proposed talent-spotting tool in the course recommendation process. The first question in this section was a Likert-type item and asked participants about their perceived usefulness of this talent-spotting tool or a similar tool in the course recommendation process. The second item was an open-ended follow-up question for respondents to explain their responses to the previous question. The third question asked participants if they thought that using a talent-spotting tool, either the proposed tool or a similar one, should be required of teachers during the recommendation process. The fourth and final question was an open-ended follow-up question asking respondents to explain their responses to the previous question. The survey ended with a statement thanking the respondent for their time and letting them know that their responses had been recorded.

Procedures for Administering the Survey. Following approval to conduct research from both the University of Maryland's Institutional Review Board and the district and prior to recruiting teachers and school counselors for the study, the researcher sent an email to the principal requesting permission to conduct research in the school (Appendix A). The email stated the purpose of the research and detailed the methodology and the time commitment requested of the participants.

Once the principal granted permission, the researcher sent three separate emails to all staff members in the following groups: school counselors, non-AP teachers who would make course recommendations and taught ninth, 10th, and 11th grade students, and AP teachers (see Appendices B through D). The emails varied slightly across the three groups due to the differences in their roles in the school. Each email stated the purpose of the study and disclosed that the study was part of the dissertation requirement of the researcher's doctoral program at the University of Maryland. The emails informed the participants that they were being asked to provide anonymous feedback on a survey regarding their use of AP Potential and a potentially new talent-spotting tool. The solicitation email also explained how their role fit into the course recommendation process and that they offered a unique perspective into the process. Finally, the email stressed that participation was voluntary, they had no contractual obligation to participate, and that participation or lack thereof would have no impact on their employment with the school or district. The email contained a link to a digital informed consent form (Appendix E) and the survey (Appendix F). The emails also asked for participants to complete the consent form and survey within two weeks after the solicitation emails were sent. The researcher sent a reminder email after a week to these staff members to encourage study participation. As the survey was anonymous, the researcher did not know who completed the survey and who did not. To ensure anonymity of responses, the consent form was presented on a separate Qualtrics form from the survey. In addition, to respect anonymity, if they had any questions, the participants were directed to email the school principal, who acted as a research liaison. The principal in turn would ask the researcher for clarification and relayed the responses to the participants. During the two-week survey window, none of the staff members recruited for the study reached out to the school principal to seek clarification.

Piloting the Talent-Spotting Tool

As discussed earlier, part of the purpose of the survey was to determine whether revisions to the talent-spotting tool were recommended prior to piloting it with actual student data. Prior to conducting the pilot, the researcher reviewed survey responses and determined that no changes to the talent-spotting tool were necessary.

The talent-spotting tool used data of all rising 11th grade students from the 2018-2019 school year (SY1819).[9] Rising 11th graders had more data available than students in other grade levels because they had the most number of AP classes that required teacher recommendations compared to students in other grade levels. As a reminder, not all teachers enter course recommendations; only those teachers who teach students who will take a course required for graduation the following year would submit course recommendations. Rising 11th graders receive course recommendations in mathematics, science, English, and social studies, and each of those courses have an AP option.

The talent-spotting tool used an algorithm to produce a single indicator score for each student. The intent was for teachers and school counselors to use that indicator score to inform decisions regarding recommending students for AP classes during the course recommendation period.

For the pilot, the algorithm included the following data points:

- PARCC ELA performance level score
- PARCC Math performance level score
- cumulative, unweighted GPA at the end of 10th grade

[9] Due to the COVID-19 Pandemic and its subsequent impact on schools, SY1819 is the most recent year with complete student assessment data at the time of this research.

- attendance score

The rationale for using the PARCC ELA score was to gauge a student's achievement in English. All students sit for the PARCC ELA assessment during 10th grade. Similarly, students sit for the PARCC Math assessment in either ninth or 10th grade and their performance is an indicator of their mathematics achievement. For the purposes of the algorithm, the researcher converted the PARCC scores from their raw form into their performance level indicator. The rationale for using a student's unweighted GPA was that it is an indicator of the student's success in school. Unlike a weighted GPA, the unweighted GPA does not include bonus points for Honors, GT, or AP classes. Using the unweighted GPA was more equitable than the weighted GPA because all students were scored on the same scale from 0.0 to 4.0, as opposed to some having access to a 5.0 scale because of the track they entered in middle school. Finally, the attendance score was used in the algorithm because students need to demonstrate a record of attending school and classes. A student's attendance percentage was converted to a number from 1 to 10 that was used in the algorithm. For example, if a student had an attendance record of 96% or above, they received an attendance score (see Appendix G).

After computing each student's score using the algorithm, the researcher compared the talent-spotting tool's algorithm scores with both the AP Potential data and the course recommendations from SY1819.

Analyzing the Data

The following section describes the data analysis steps for the survey responses and student data . Data analysis involved two aspects. The first aspect centered on analyzing the feedback data from the survey regarding the talent-spotting tool. The second aspect dealt with

analyzing student data and the results of the algorithm in order to assess the efficacy of the talent-spotting tool in conjunction with AP Potential data.

Analyzing Survey Data

The researcher used the Qualtrics software to analyze survey responses. Apart from the introduction section, the survey had three main sections: AP Potential, talent-spotting tool, and usefulness. Following this structure, the researcher divided the analysis into three parts. Furthermore, the researcher examined the responses by the three participant role types to determine if the different groups had different understandings and uses of AP Potential. Additionally, the researcher was interested in exploring how the different groups felt about the talent-spotting tool and its usefulness during the course recommendation process. All analyses were descriptive. As noted earlier, the results of the survey did not suggest necessary changes to the talent-spotting tool. After analyzing survey data, the researcher ran the talent-spotting tool's algorithm for the rising 11th graders in SY1819.

Analyzing Student Data and the Efficacy of the Talent Spotting Tool

The researcher requested specific data from the district as described earlier in Section II. Students in the various grade levels had different data points, which required algorithms and indicator scores specific to each grade level for the final talent-spotting tool (see Appendix G). For example, the majority of rising 10th graders did not have an SAT score, whereas most rising 12th graders did. For the purposes of this pilot, the researcher included only the rising 11th graders in SY1819. The pilot began with a data request submitted by the researcher to the district for specific data from the end of SY1819. The researcher requested and obtained the following de-identified student data from the district:

- Student random identifier

- race/ethnicity
- PARCC ELA score
- PARCC Math score
- unweighted cumulative GPA
- attendance percentage
- course recommendations for mathematics, English, social Studies, science
- AP Potential met or not met for Calculus AB, Statistics, English Language and Composition, World History: Modern, Physics I, Chemistry, and Biology[10]

The researcher then converted the PARCC scores to performance levels (scored 1 to 5) and attendance percentages to an attendance score (scored 1 to 10). Next, the researcher ran the talent-spotting tool's algorithm to generate a single indicator score for each student. The researcher then compared the list of students who would have scored above the threshold according to the talent-spotting tool to the list of students who were recommended for AP in SY1819 and to the list of students who were indicated to have AP Potential by the College Board based on their PSAT scores from the Fall of 2018.

Using the list of students recommended and not recommended for AP, the researcher determined how many of the recommended students had an indicator score on the talent-spotting tool that was above the predetermined threshold of 20 points. The researcher expected the vast majority of those students recommended for AP would be above this threshold. The researcher then determined how many of the students who were not recommended for an AP class had a talent-spotting indicator score above the threshold. Next, the researcher compared the list of

[10] In the district, these were the AP courses for which teachers submitted course recommendations for the rising 11th graders. The district offers other AP courses, but they could not be submitted as course recommendations.

students who met AP Potential as defined by the College Board based on their PSAT scores from the Fall of 2018 with the list of students in the SY1819 cohort who had talent-spotting indicator scores above the threshold score of 20.

Institutional Review Board and Protection of Human Subjects

Prior to conducting research, the researcher obtained research approval from both the district and the University of Maryland. See Appendix H for the initial application and approval from the University of Maryland's Institutional Review Board (IRB). As a condition to be granted permission from the district to conduct research there, the researcher was asked to make changes to the methods of this study to ensure complete anonymity of participants to the researcher since the researcher was also an employee at the proposed study school site. After making those changes, which mainly involved using a survey instead of a focus group to gather anonymous responses, the district granted research approval (Appendix I).

Protection of Human Subjects

The following steps were taken to protect human subjects in this study. First, participation in this study was entirely voluntary and anonymous. Each staff participant in the survey completed an informed consent form as the first step to participate. Prior to beginning the survey, participants affirmed that they had completed the consent form. Plus, participant names and other potentially identifying information were not collected. Direct quotes from the open-ended questions in the survey that were used in the results did not have any names or other personally-identifiable information associated with them. In addition, at the direction of the district, both the school and the district were to have pseudonyms in reporting this study. Any information disseminated as part of this study, including the current paper, will be de-identified such that students, staff members, the school, and the district could not be identified.

All student-level data from the district and school were de-identified. When analyzing the student data, the researcher followed all rules and regulations related to data privacy and data security and maintenance set by the district. In addition, the researcher did not interact with students for this study.

Section III - Results and Conclusions

This section presents the results, conclusions, and potential implications of this research for the school and district.

Results

First, results from the survey sent to teachers and school counselors are discussed. These results addressed Research Question 1. The results of the pilot of the talent-spotting tool using SY1819 data are discussed later in this section and addressed Research Questions 2 and 3.

Survey Results

The survey was designed to help answer Research Question 1: Based on feedback from school counselors, AP teachers, and non-AP teachers, what components and processes of a talent-spotting tool, one that can be used to inform recommendations for enrollment in an AP class, do teachers and school counselors perceive as effective and feasible? As noted in Section II, the web-based survey was sent to 43 staff members at CHS: 38 teachers and five school counselors. A total of 30 surveys were completed for a return rate of almost 70%. All five school counselors responded to the survey. In the case of the teachers who were recruited, 14 of the 16 (87.5%) AP teachers responded to the survey and 11 of the 22 (50%) non-AP teachers who submitted recommendations (non-AP teachers) responded. The survey had three main sections: AP Potential, talent-spotting tool, and usefulness. The first section assessed the extent of knowledge respondents had about the AP Potential program and how much impact, if any, the AP Potential data had in their decision-making process when recommending students for AP courses. The second section of the survey sought participants' feedback and perceptions regarding the proposed talent-spotting tool. The final section of the survey asked respondents if

they considered the proposed talent-spotting tool to be useful in the AP course recommendation process.

Knowledge and Use of AP Potential. Questions 2.2 through 2.6 of the survey asked respondents to indicate the extent of their knowledge of AP Potential data, their use of that data, and its impact on course recommendations. Tables 2 to 6 present the responses by the three staff groups.

Table 2

Responses to Q2.2 Have You Heard of AP Potential by Staff Group

Response	AP teacher cohort	Non-AP teacher	School counselor	Total
	n (%)	*n* (%)	*n* (%)	*n* (%)
Yes	12 (86)	7 (64)	5 (100)	24 (80)
No	2 (14)	4 (36)	0 (0)	6 (20)
Total	14 (100)	11 (100)	5 (100)	30 (100)

Table 3

Familiarity with AP Potential Data for Respondents who Responded Yes to Q2.2

Response	AP teacher cohort	Non-AP teacher	School counselor	Total "Yes Responses"
	n (%)	*n* (%)	*n* (%)	*n* (%)
Slightly familiar	4(33)	3 (43)	1 (20)	8 (33)
Moderately familiar	7 (58)	2 (29)	3 (60)	12 (50)
Very familiar	1 (8)	2 (29)	1 (20)	4 (17)
Total	12 (100)	7 (100)	5 (100)	24 (100)

Table 4

Responses to Q2.4 Have Used AP Potential Data in AP Course Recommendations

Response	AP teacher cohort	Non-AP teacher	School counselor	Total
	n (%)	*n* (%)	*n* (%)	*n* (%)
Yes	2 (14)	0 (0)	2 (14)	4 (13)
No	12 (86)	11(100)	3 (60)	26 (87)
Total	14 (100)	11 (100)	5 (100)	30 (100)

Table 5

Responses to Q2.5 Extent of Impact of AP Potential on Recommendations

Response	AP teacher cohort	Non-AP teacher	School counselor	Total
	n (%)	*n* (%)	*n* (%)	*n* (%)
Always impacts	0 (0)	0 (0)	0 (0)	0 (0)
Sometimes impacts	2 (14)	0 (0)	2 (40)	4 (13)
Rarely impacts	2 (14)	0 (0)	0 (0)	2 (7)
Never impacts	3 (21)	1 (9)	1 (20)	5 (17)
Not used AP Potential when making recommendations	7 (50)	10 (91)	2 (40)	19 (63)
Total	14 (100)	11 (100)	5 (100)	30 (100)

Table 6

Why AP Potential Never or Rarely Impacts Recommendations

Response	AP teacher cohort	Non-AP teacher	School counselor	Total*
	n	*n*	*n*	*n*
I do not know what AP Potential is	2	4	0	6
Data is not accessible	0	2	0	2
Data is difficult to interpret	1	1	0	2
Do not believe AP Potential is valid assessment of student's aptitude	1	2	1	4
Not aware we had access to AP Potential	3	7	0	10
Not aware what factors determine AP Potential	3	4	0	7
Believe other factors are more important than AP Potential	3	1	2	6
Other	5	1	1	7
Total	18	22	4	44

*As this survey question permitted respondents to check all that applied, there are more responses than total respondents.

Of the seven respondents who indicated “Other” for Question 2.6, none elaborated on their selection.

In terms of the knowledge that each of the three groups reported having regarding AP Potential, 100% of the counselors, 86% of the AP teachers, and 63% of the non-AP teachers had heard of AP Potential. However, when asked about their familiarity with AP Potential, half of those who have heard of AP Potential indicated that they were “moderately familiar” with the

process and four indicated that they had not heard of AP Potential. These results suggest that those individual teachers who make recommendations about which students enroll in AP courses are potentially not using or not giving a great deal of attention to the AP Potential indicator when considering students. This is further confirmed when examining the results from the next question. When asked, "In the past, have [they] used AP Potential data to make (or alter) an AP course recommendation for a student," 26 (87%) of the 30 respondents reported that they had not used AP Potential data to make or alter a course recommendation for a student. Only four respondents indicated that they had used AP Potential data to make recommendations; two school counselors and two AP teachers. This was surprising since the district wants teachers and school counselors to use this information when making course recommendations. The next question asked the extent to which the AP Potential data impacted their decisions regarding AP course recommendations for their students. These results were a bit confusing as six (20%) of the 30 respondents claimed that AP Potential data "sometimes" or "rarely" impacted their decisions regarding course recommendations, despite the fact that only 4 had responded that they had used AP Potential Data to make recommendations in the prior question. Nonetheless, 24 (80%) of the 30 respondents (including 2 school counselors) indicated that AP Potential never impacted their decision to recommend or that they had not used AP Potential data when making recommendations.

The final question in this section sought to understand why teachers and school counselors may not use AP Potential data to inform their decisions during the course recommendation process. Respondents could select more than one reason and their most common single response (n=10) was not being aware that they had access to AP Potential data. However, not being aware of what factors determine AP Potential", difficulty in interpreting the

data, and lack of accessibility also indicated that knowledge and experience using AP Potential data was low. Questions about the "validity" of the AP Potential data as a measure of "student aptitude" were evident in 8 responses, including 4 indicating the belief that other factors were more important than AP Potential. The response option "other" was selected by 7 respondents. However, none of the participants who selected "other" expanded on that answer. **Talent-Spotting Tool.** The second section of the survey contained seven questions focused on the talent-spotting tool, the data that were used to drive the algorithm, and participants' perceptions of the tool. The section began by asking the participants to read a synopsis of the talent-spotting tool and the data used to drive the algorithm (see Appendix G).

Tables 7 to 9 present responses to Questions 3.2 to 3.4. As the last four questions in this section were open-ended, their responses are presented below Table 9.

Table 7

Agreement that the Data Used in Talent-Spotting Tool Algorithm were Sufficient by Staff Group

Agreement	AP teacher cohort	Non-AP teacher	School counselor	Total
	n (%)	*n* (%)	*n* (%)	*n* (%)
Yes	10 (71)	7 (70)	4 (100)	21 (75)
No	4 (29)	3 (30)	0 (0)	7 (25)
Total	14 (100)	10 (100)	4 (100)	28 (100)

Table 8

Agreement that the Algorithm Data Accurately Reflected Student's Potential for Success by Staff Group

Agreement	AP teacher cohort	Non-AP teacher	School counselor	Total
	n (%)	*n* (%)	*n* (%)	*n* (%)
Yes	9 (64)	6 (60)	4 (100)	19 (68)
No	5 (36)	4 (40)	0 (0)	9 (32)
Total	14 (100)	10 (100)	4 (100)	28 (100)

Table 9

Data that Should not be Included in Algorithm According to Each Staff Group

Data	AP Teacher cohort	Non-AP teacher	School counselor	Total
	n (%)	*n* (%)	*n* (%)	*n* (%)
All data presented should be used	10 (83)	8 (80)	2 (100)	20 (83)
PARCC scores	0 (0)	2 (20)	0 (0)	2 (8)
Unweighted GPA	0 (0)	0 (0)	0 (0)	0 (0)
Attendance	2 (17)	0 (0)	0 (0)	2 (8)
Total	12 (100)	10 (100)	2 (100)	24 (100)

In response to the first question regarding the data used to drive the algorithm of the talent-spotting tool, 21 of the 28 who responded indicated that they thought the data points were sufficient; seven indicated that they were not. By staff group, all four of the counselors who responded to this question considered the data points to be sufficient, whereas four of the 14 AP teachers considered the data points insufficient. The next item in this section was a follow-up question asking whether respondents considered the data used in the tool (PARCC scores, unweighted GPA, and attendance) accurately reflected student potential for success in AP classes. Of the 28 responses, two-thirds (n = 19; 68%) indicated "yes" and nine respondents, all teachers, did not consider the data points chosen to be a reflection of a student's potential for AP success.

The third question in this section of the survey asked the participants to indicate if any of the data used in the draft tool-spotting tool should not be used. Of the 24 individuals who responded to this question, 20 (83%) indicated that all data points listed should be used. Two respondents indicated that the PARCC scores should not be used and two respondents indicated that attendance data should not be used in the talent-spotting tool.

The last four questions in the talent-spotting tool section of the survey focused on other types of data that participants wanted to include in the algorithm. Question 3.5 asked participants if other data should be considered in the tool. Table 10 shows those results.

Table 10

Should Other Data Be Used for Algorithm: Response Counts by Staff Group

Response	AP teacher cohort	Non-AP teacher	School counselor	Total
	n (%)	*n* (%)	*n* (%)	*n* (%)
Yes	7 (50)	4 (40)	2 (50)	13 (46)
No	4 (29)	3 (30)	0 (0)	7 (25)
Do not know	3 (21)	3 (30)	2 (50)	8 (29)
Total	14 (100)	10 (100)	4 (100)	28 (100)

Question 3.6 was open-ended and asked respondents who had replied “yes” on Question 3.5 to list any additional data or information that should be included in the algorithm. A total of 13 respondents provided responses. Table 11 presents the items in order of the frequency that they were mentioned.

Table 11

Possible Other Data/Information to Include in Algorithm

Information/Data type	Frequency
Writing samples	3
PSAT score	2
Levels (Regular, Honors, G/T, etc) of course history	2
Prior content area course assessments	2
Non-quantifiable factors	2
Weighted GPA	1
Teacher recommendations	1
Total	13

Three respondents indicated that writing samples should be included in the talent-spotting tool. Two respondents indicated that PSAT scores should be included. Two more respondents noted the previous academic levels that the student took in the subject (regular, honors, G/T, AP) should be considered as part of the algorithm. One respondent indicated that assessment data from specific content areas or courses should be included. One respondent mentioned that the weighted GPA should be considered. Another one indicated that teacher recommendations should be included in the talent-spotting tool. Two respondents listed several non-quantifiable factors that should be considered. The topic of non-quantifiable factors was addressed in the final two questions in this section of the survey and results are shown in Tables 12 and 13.

Table 12

Should Non-Quantifiable Factors be Included: Response Counts by Staff Group

Response	AP Teacher cohort	Non-AP teacher	School counselor	Total
	n (%)	*n* (%)	*n* (%)	*n* (%)
Yes	8 (57)	6 (60)	2 (50)	16 (57)
No	3 (21)	1 (10)	1 (25)	5 (18)
Do not know	3 (21)	3 (30)	1 (25)	7 (25)
Total	14 (100)	10 (100)	4 (100)	28 (100)

Of the 28 responses to these questions, 16 respondents (57%) indicated that non-quantifiable factors should be considered in a talent-spotting tool. This question was followed by Question 3.8 which asked those respondents who had selected “yes” to the previous question to list the non-quantifiable factors that should be included. Table 13 presents the results in order of frequency mentioned.

Table 13

Non-Quantifiable Factors to Include in the Talent-Spotting Tool

Non-Quantifiable Factor	Frequency
Academic improvement from previous years	4
Teacher recommendations	3
Student's perseverance or work ethic	3
Student's interests or passions	3
Parent recommendation	1
Course history	1
Student's desire to "Step it Up"	1
Total	16

All 16 respondents who indicated that they believed non-quantifiable factors should be included listed one or more factors. Four indicated that a student's academic improvement from past classes and/or over the years should be taken into account. Three respondents listed teacher recommendations as part of the non-quantifiable information and another three indicated that they would like to see effort or perseverance included as a part of the talent-spotting tool. Three more respondents indicated that they would like to see a way to look at a student's interests or passions as a non-quantifiable data point for the tool. One respondent mentioned that parent recommendation should be included. Another respondent mentioned that course history should be explored. Finally, a respondent mentioned that the student's desire to "step it up" should be a factor that is explored using the talent-spotting tool.

As mentioned above, this section of the survey was designed to gain feedback on the talent-spotting tool and understand the perceptions of the intended users. The last section of the survey was designed to understand their perceptions regarding the potential usefulness of the tool.

Usefulness. The final section of the survey contained four questions on how useful the proposed talent-spotting tool, or a similar one, would be when making AP course recommendations. Tables 14 to 17 present the results.

Table 14

Usefulness of the Talent-Spotting Tool: Response Counts by Staff Group

Response	AP teacher cohort	Non-AP teacher	School counselor	Total
	n (%)	*n* (%)	*n* (%)	*n* (%)
Extremely useful	1 (7)	4 (40)	2 (50)	7 (25)
Moderately useful	12 (86)	3(30)	1 (25)	16 (57)
Neither useful nor useless	1 (7)	3 (30)	1 (25)	5 (18)
Not particularly useful	0 (0)	0 (0)	0 (0)	0 (0)
Not at all useful	0 (0)	0 (0)	0 (0)	0 (0)
Total	14 (100)	10 (100)	4 (100)	28 (100)

Of the 28 participants who responded, 23 indicated that they considered the tool would be "extremely useful" or "moderately useful." The other five respondents indicated that the tool would be "neither useful or useless - depending on the student." The second question in this section was an open-ended follow-up asking respondents to expand on their answers to the prior question. All 28 participants shared more detailed responses. A review of the responses yielded 14 responses that were deemed to be on topic and directly answering the question. The two most frequently noted responses referred to the benefits of the tool in bringing more data and more objective information to the course recommendation process. Several themes emerged across the 14 responses and are presented in Table 15 in order of frequency.

Table 15

Usefulness of the Talent-Spotting Tool: Themes from Open-ended Responses

Theme on Usefulness	Frequency
Benefit of Using Data Rather Than Personal Relationships to Make Decisions	5
Tool Brings Objectivity to a Subjective Process	3
More Information is Always Helpful	2
Use of Tool Bring Equity to Process	2
Tool Seems More Accessible	2
Total	14

Five of the respondents commented on the benefit of using more data to make course recommendations for students rather than relying on relationships with the students. One participant commented, “It could be good to use this tool versus your own anecdotal evidence of a student.” Similarly, another respondent commented:

> Most teachers are going to base their recommendations on their relationships with the student and their own personal perceptions of how successful a student can be. However, this is subjective, and there can be bias by just relying on that. Including these data points would help counter any bias or help illuminate a student’s true potential to a teacher who might not see it.

Two of the participants wrote comments that mentioned the talent-spotting tool would be useful because having more information about students to make course recommendations can only help. One of those participants claimed, “The more information that teacher have the better!” Another participant discussed how the talent-spotting tool would help teachers simplify the process of identifying students who have the potential to succeed in an AP course.

Two of the respondents wrote about how the use of the talent-spotting tool would bring more equity into the course recommendation process. The first discussed how “every student is unique, and test scores do not always accurately reflect ability.” The second respondent remarked, “I would find [the talent-spotting tool] a great guide and an equitable way to talent spot.”

Although the majority of the 28 comments regarding the talent-spotting tool’s usefulness were in favor of the tool, a few comments were critical of the tool. One of the comments mentioned, “I think attendance should be taken out. It is not a fair metric to judge students by in general, but especially in a pandemic year.” Another participant shared, “I focus more on the

student motivation with which class will help them most in the future." One respondent commented that they found the talent-spotting tool to be "moderately useful but [the tool doesn't show] the whole picture of the student's potential." Additionally, a participant commented that they thought the talent-spotting tool "would be a useful guideline, but knowing the student outweighs the quantitative measures of student readiness."

The final two questions of this section asked whether the talent-potting tool's use should be required of teachers during the course recommendation process. Of the 28 participants who responded to this question, 13 responded that its use should be mandatory and 15 responded that it should not be mandatory. Table 16 presents the responses to that question by staff group.

Table 16

Required Use of Talent-Spotting Tool by Staff Group

Response	AP teacher cohort	Non-AP teacher	School counselor	Total
	n (%)	*n* (%)	*n* (%)	*n* (%)
Yes	6 (43)	5 (50)	2 (50)	13 (46)
No	8 (57)	5 (50)	2 (50)	15 (54)
Total	14 (100)	10 (100)	4 (100)	28 (100)

Of the four counselors who responded to this question, two indicated that the tool should be required and two did not. Of the 14 AP teachers who responded to this question, six indicated that they thought it should be required for teachers to use the tool and eight did not; and five of the 10 non-AP teachers who submit recommendations indicated that the tool should be required and five did not.

The last question in the survey was an open-ended follow-up to the previous question and asked respondents to expand on their answers to whether the talent-spotting tool should be required. Twenty-six participants expanded on their answers. Several themes emerged across these 26 responses and are presented in Table 17 in order of frequency.

Table 17

Themes Regarding Required Use of Talent-Spotting Tool

Theme on Usefulness	Frequency
Human Factors More Important than Data in Recommendations	8
Use of Tool Should be Encouraged, Not Required	7
Talent-Spotting Tool Missing Components	6
Required Use Would Remove Subjectivity	5

The most frequent theme to emerge from this final item was the emphasis on "human factors." Eight of the participants pointed out that, while the talent-spotting tool was useful, they did not believe that the human factor should be taken out of the equation. One commented, "Machines are useful tools, but people are more important." Another wrote, "The tool would be very helpful in identifying students who may be successful in AP courses. I would, however, still like to have people make the final call." A third mentioned, "Teachers who make recommendations have had the students in their classes and are familiar with the capabilities and work ethic of the students regardless of the talent-spotting tool."

Although each of the 26 responses varied in their content and messaging, seven of the responses suggested that the use of the tool should be encouraged, but not required. One respondent commented, "I do not love the word 'required.'" Another participant wrote, "While it may be helpful as a consideration, it should not be required" to use the talent-spotting tool in the course recommendation process. A third shared, "A tool that gives a teacher more information for their decision is always helpful, but I do not think it should be required or a mandatory part of the decision making process."

In addition to wanting human factors to play a role in the course recommendation process and believing the tool's use should be encouraged rather than required, several respondents commented that the proposed talent-spotting tool, while useful, was missing some components. One respondent suggested a "revised tool to include personal statements from students answering why they are interested in AP course(s)." Another wrote, "While possibly beneficial, there are other factors that may indicate possible success in an AP course that this process might miss." Someone else shared that they "think teachers should continue to look at grades and attendance and how the student works in their class" and "less about test scores." One more participant

shared their opinion that, “Many factors need to be considered when recommending for AP courses.”

In terms of the use of the talent-spotting tool as a required part of the course recommendation process, several participants commented on how the tool would remove some of the subjectivity from the process. One respondent indicated that “crafting a required tool will support the elimination of the student-teacher bias that is inherent in course recommendations.” Another commented that “data can help remove some of the subjective nature of placement recommendations.” A third mentioned requiring the use of the tool would “level the playing field.”

Overall, the majority of the participants indicated the talent-spotting tool would be useful in the course recommendation process. Participants were more divided on the topic of whether or not the use of the talent-spotting tool should be required.

Summary of Survey Results

The purpose of the survey was to obtain information from three groups of staff regarding their knowledge and perceptions of using a data-based talent-spotting tool as part of the AP course recommendation process. Results of the survey pointed to several key areas that could inform future revisions of the talent-spotting tool as well as insights into current practices in the recommendation process.

First, the researcher was surprised to discover how few non-AP teachers had heard of AP Potential, considering they were the teachers who made the course level recommendations for students. Although the sample size was relatively small compared to all of the teachers at the school, those who participated were the majority of the teachers who completed course recommendations. This lack of knowledge about AP Potential is even more surprising because in

SY1819 the district noted that staff were working toward a more standardized use of the PSAT and College Board's AP Potential tool to increase both AP course and exam participation. It appears that even with the district's intent teachers who completed course recommendations were not aware of the AP Potential tool.

The lack of awareness of the AP Potential tool among non-AP teachers was corroborated by the finding that 87% of the participants, including two of the four school counselors who responded, indicated that they had not used the AP Potential tool while considering course recommendations. The responses of the school counselors were unexpected since they were tasked with using all available knowledge of students to help them and their families make informed decisions regarding their course selections. Given this lack of knowledge and use of AP Potential data, most (80%) of the respondents indicated that the AP Potential data had never impacted their decision making regarding which students should enroll in AP classes.

These findings are concerning for the district as the district pays for the administration of the PSAT and teachers and school counselors are expected to use the AP Potential information yielded by the PSAT data. Responses to the final question in the first section of the survey pointed to the potential reason that teachers and counselors were not aware of and did not use the AP Potential data. Most of the respondents indicated that they were not aware that they had access to the AP Potential tool, did not understand what this tool represented, and did not know how it could be used. Further, some respondents noted difficulty in interpreting the data and accessing the data. These are issues that can be addressed by both the district and the school.

The second section of the survey was designed to solicit feedback and perceptions from each of the three groups regarding the proposed talent-spotting tool and the data used in the algorithm of the tool. These responses were central to understanding potential revisions to the

tool and acceptance of the tool. About three-quarters of the respondents indicated that the data points were sufficient to determine student aptitude for AP courses and over 80% indicated that the proposed data points should be included. However, a larger percentage of the AP teacher cohort did not consider the data to be sufficient and mentioned the importance of human factors in open-ended questions. The AP teachers expressed that "knowing" the students from interacting with them in classes was the best assessment of a student's aptitude for an AP level class.

One of the respondents indicated that attendance should not be considered in the talent-spotting tool due to the fact that schools were in the midst of a pandemic and attendance was not a fair metric by which to judge students. At the time the survey was conducted, schools were in the third year of being impacted by COVID-19. Schools were seeing a rise in students either staying home to avoid contracting COVID-19 or quarantining at home because they had contracted COVID-19.

Just under half (46%) of the participants indicated that they felt there should be other data included in the algorithm. When given the opportunity to expand, many did not have practical other data points to include. For example, three respondents indicated that they wanted to see writing samples included as a data point in the algorithm, while another two respondents felt that the student's PSAT scores should be included in the algorithm. PSAT scores are already used in the AP Potential tool. Another respondent indicated that they felt teacher recommendations should be used as a data point in the talent-spotting tool. One of the purposes of this talent-spotting tool was to remove the subjective nature of teacher recommendations. The researcher does not propose removing teacher recommendations from the process; instead, the

proposal is to have a step prior to the recommendation being made that is data driven and informs teachers in their course recommendation decisions.

The final portion of this section of the survey asked about non-quantifiable data points and whether or not they should be included in the talent-spotting tool. Over 50% of the participants felt that there were some non-quantifiable factors that should be included in the tool's algorithm; however, participants' suggestions were not realistic. For example, including writing samples for every student who wanted to take an AP course.

Based on the responses to this portion of the survey, the researcher decided not to make any changes to the talent-spotting tool and its algorithm. The researcher piloted the tool as it was initially designed using SY1819 students' data.

The final section of the survey sought to understand if the three staff groups thought the proposed talent-spotting tool would be useful in the course recommendation process and if they felt the tool's use should be a mandatory component during the course recommendation process. Over 80% of the participants indicated that they felt the tool would be extremely or moderately useful in the course recommendation process. Nonetheless, 53% of the participants felt that using this talent-spotting tool should not be mandated in the course recommendation process. In other words, while the vast majority of the participants felt that the talent-spotting tool would be useful in the course recommendation process, about half of the same respondents did not think its use should be mandatory. Those participants who felt its use should be mandatory thought that the use of the talent-spotting tool would remove or lessen teacher bias and subjectivity from the course recommendation process.

The first research question asked: Based on feedback from school counselors, AP teachers, and non-AP teachers, what components and processes of a talent-spotting tool, one that

can be used to inform recommendations for enrollment in an AP class, do teachers and school counselors perceive as effective and feasible?

In response to this question, findings from the survey suggested that teachers and school counselors wanted a tool that is simple to use and can be a part of the course recommendation process, but not the only component in the process. While many of the participants acknowledged the subjective nature of the current process and lauded the objective nature of the talent-spotting tool, many were not ready to give up the subjective human factors currently used in course recommendations. Participants expressed some criticisms of the data used in the tool's algorithm, but the majority of the participants agreed with the data used. Ultimately, participants thought the tool would be a useful part of the course recommendation process.

Talent-Spotting Tool Algorithm Pilot Results

As noted in Section II, the results from the teachers and school counselors survey were considered prior to conducting a test of the proposed talent-spotting tool. Based on the findings from the survey, the researcher moved forward with piloting the algorithm that was presented to the participants using SY1819 data for rising 11th graders. The pilot addressed Research Questions 2 and 3, which were:

- How accurately does the talent-spotting tool identify rising 11th grade students who were recommended for AP enrollment during the SY1819 recommendation window?
- Does the talent-spotting tool identify additional rising 11th graders not recommended for enrollment and if so, how many and what are their characteristics?

Both of these questions focused on the efficacy of the talent-spotting tool in identifying more students, especially Black/African American students, for AP classes than the AP Potential tool and the current process of course recommendations. The researcher submitted a data request

to the district for the aforementioned data. The district provided that data in an Excel spreadsheet for the 380 students from the school (CHS) who were rising 11th graders. Of those 380 students, 359 of them had complete data, which included their PARCC ELA raw score, PARCC Math raw score, unweighted GPA, and attendance percentage. For the purposes of this pilot, the researcher included only the 359 students with complete data. To convert the raw PARCC scores into the performance levels, the researcher created a new column for the performance level scores. To convert the attendance percentages into the attendance score (see Appendix G, Table 3), the researcher created a new column, Column N. The unweighted GPAs were provided by the district and did not need to be converted. They were in Column L. After creating a column labeled "algorithm" in Column O, the researcher entered the formula "SUM(G3, K3, L3, N3)" into Cell O3. Then the researcher expanded that formula for all of Column O. This provided each student in the data set with the talent-spotting tool score. The talent-spotting scores ranged from 8.97-24.00 in this sample. For the pilot, the researcher rounded these scores up to the nearest whole number. Thus, a score of 19.50 was rounded to 20. For the 359 students in this sample, 197 students (55%) scored below the talent-spotting threshold of 20 points, 45 students (13%) scored 20 exactly, 117 students (33%) scored above 20, and 11 students (3%) scored a perfect 24. Table 18 displays the numbers and racial compositions of students who scored below, at, and above the threshold.

Table 18

Racial Composition of Students Scoring Below, At, or Above 20 Points on the Talent-Spotting Tool

Student race	Below 20 points	20 points	Above 20 points
	n (%)	*n* (%)	*n* (%)
Black/African American	97 (49)	18 (40)	38 (32)
White	51 (26)	16 (36)	45 (38)
Other	49 (25)	11 (24)	34 (29)
Total	197 (100)	45 (100)	117 (100)

Note. Other students include students identified as Asian, Hispanic, and two or more races.

As displayed in Table 18, of the 197 students who scored below the 20-point threshold, 51 (26%) were White and 97 (49%) were Black/African American. Of the 45 students who scored exactly at the 20-point threshold, 16 (36%) were White and 18 (40%) were Black/African American. Of the students who scored over the 20-point threshold, 45 (38%) were white and 38 (32%) were Black/African American.

SY1819 Course Recommendations. After computing a talent-spotting score for all students included in the sample, the researcher compared these students' SY1819 course recommendations against the talent-spotting tool results. Table 19 shows the racial composition of students recommended for at least one AP course. Table 20 shows the racial composition of students recommended by the number of the core four AP classes for juniors: AP Calculus, AP English Language and Composition, AP World History: Modern, and AP Physics I. This distinction is notable because a single Black/African American student could be recommended for more than one AP course.

Table 19:

Racial Composition of Students Recommended for At Least One AP Classes

Student race	Recommended for At Least One AP Course
	n (%)
Black/African Am.	44 (32)
White	56 (41)
Other	38 (27)
Total	138 (100)

Note. Other students include students identified as Asian, Hispanic, and two or more races. Classes include the core four - Math, Science, English, Social Studies

Table 20:

Racial Composition of Students Recommended for Number of AP Classes

Student race	0	1	2	3	4
	n (%)	*n* (%)	*n* (%)	*n* (%)	*n* (%)
Black/African Am.	109 (49)	20 (37)	5 (24)	12 (34)	7 (25)
White	56 (25)	15 (28)	12 (57)	13 (37)	12 (43)
Other	56 (25)	19 (35)	4 (19)	10 (29)	9 (32)
Total	221 (100)	54 (100)	21 (100)	35 (100)	28 (100)

Note. Other students include students identified as Asian, Hispanic, and two or more races. Classes include the core four - Math, Science, English, Social Studies

Table 21 shows a further disaggregated data set and shows the racial composition of students recommended for AP classes by course. Of the 359 students, 38 were recommended for AP Calculus AB, the introductory Calculus course for rising 11th graders. Only one student in the sample was recommended for AP Statistics. Seventy-seven students and 85 students were recommended for AP English Language and Composition and AP World History: Modern, respectively. In science, 91 students in the sample were recommended for AP Physics I, one student was recommended for AP Chemistry, and three students were recommended for AP Biology.

For White students and Black/African American students, the proportions of students recommended for AP classes were disproportionate. Black/African American students were underrepresented in the students recommended for AP classes. For example, while Black/African American students comprised over 40% of the student population at CHS, 30% of the 77 students who were recommended for AP English Language and Composition were Black/African American. In contrast, 35 (45%) of those students recommended for AP English were White. This pattern of disproportionality was similar for the other AP courses with the exception of AP Biology and AP Chemistry, in which the numbers of students recommended overall were small.

Table 21:

Racial Composition of Students Recommended for AP Classes by Course

Student race	Calculus AB	English	World History	Physics I	Chemistry	Biology
	n (%)	*n* (%)	*n* (%)	*n* (%)	*n* (%)	*n* (%)
Black/African Am.	7 (18)	23 (30)	29 (34)	30 (33)	1 (100)	0 (0)
White	17 (45)	35 (45)	34 (40)	44 (48)	0 (0)	1 (33)
Other	14 (37)	19 (25)	22 (26)	17 (19)	0 (0)	2 (67)
Total	38 (100)	77 (100)	85 (100)	91 (100)	1 (100)	3 (100)

Note. Other students include students identified as Asian, Hispanic, and two or more races.

The talent-spotting tool indicated more students, both White and Black/African American students, as potentially being prepared for an AP course than the actual numbers of students who were recommended for an AP course by teachers.

AP Potential Data. After comparing the talent-spotting tool results with the SY1819 course recommendations, the researcher compared students' talent-spotting tool results and course recommendations with their AP Potential results. Based on the data from SY1819, 60 students in the sample met the requirement for AP Potential in at least one of the AP courses examined. As mentioned previously, this study focused on the following AP courses: Calculus AB, Statistics, English Language and Composition, World History: Modern, Physics I, Chemistry, and Biology. Based on their PSAT scores, students were categorized as met" or "not met" for the various AP courses. As this pilot focused on rising 11th graders, the researcher only included AP Potential data for the classes that the students could take in 11th grade and for which they received course recommendations from teachers. A major difference between College Board's AP Potential tool and the proposed talent-spotting tool was that the AP Potential tool provided information by course such as AP Calculus or AP World History: Modern. Thus, a student could meet AP Potential for one course, but not others. In contrast, the proposed talent-

spotting tool took a holistic approach and did not generate scores by course. A student either scored below the threshold, at the threshold, or above the threshold. The tools are similar in that both the AP Potential and the proposed talent-spotting tool were designed to help teachers make better informed decisions regarding AP course recommendations.

Table 22 shows the numbers and racial composition of students who met AP Potential for each AP course.

Table 22:

Racial Composition of Students Who Met AP Potential by Course

Student race	Calculus AB	Statistics	English	World History	Physics I	Chemistry	Biology
	n (%)	*n* (%)	*n* (%)	*n* (%)	*n* (%)	*n* (%)	*n* (%)
Black/Afr Am.	2 (15)	6 (26)	18 (33)	11 (30)	1 (9)	3 (17)	3 (17)
White	6 (46)	9 (39)	27 (49)	19 (52)	5 (45)	8 (44)	8 (44)
Other	5 (38)	8 (35)	10 (18)	7 (19)	5 (45)	7 (39)	7 (39)
Total	13 (100)	23 (100)	55 (100)	37 (100)	11 (100)	18 (100)	18 (100)

Note. Other students include students identified as Asian, Hispanic, and two or more races.

In exploring further, 22 students met the score for potential in only one of the AP classes. The majority of these 22 students met the potential for AP English Language and Composition. In addition, 14 students met potential for two of the courses, six met potential for three of the courses, two met potential for four of the courses, three met potential for five of the courses, seven met potential for six of the courses, and six met potential for all seven of the courses. As seen in Tables 18 and 22, the number of students who met AP Potential, as determined by their PSAT scores, was much lower than the number of students who scored above the threshold on the talent-spotting tool. The number of students meeting AP Potential was also much lower than the number of students recommended by their teachers for those courses. For instance, according

to AP Potential, only 11 students met the AP Potential for that course, whereas 91 students were recommended for that course.

Summary of Pilot Results

As mentioned earlier in this section, the goal of the pilot was to answer the second and third research questions: How accurately does the talent-spotting tool identify rising 11th grade students who were recommended for AP enrollment during the SY1819 recommendation window? And does the talent-spotting tool identify additional rising 11th graders not recommended for enrollment and if so, how many and what are their characteristics? After an analysis of the data, the researcher determined that the talent-spotting tool accurately identified students who were recommended for AP enrollment during the SY1819 recommendation window. The talent-spotting tool also identified additional students who were not recommended for an AP course.

The AP Potential tool only identified 60 students out of the 359 rising 11th grade students as demonstrating potential for success in an AP course. In contrast, the talent-spotting tool identified 117 students who scored at or above the threshold. In terms of teacher recommendations, the number of students recommended for some of the courses aligned with results from the AP Potential tool, whereas the results for other courses varied more dramatically between AP Potential and teacher recommendation. For example, compared to other courses, AP World History: Modern and AP English Language and Composition were the two courses with the highest numbers of students either meeting potential or recommended. However, the course with the highest number of students recommended by teachers was AP Physics I with 91 students recommended; whereas only 11 students were deemed to demonstrate potential for success based on the AP Potential tool.

Whereas both the teacher recommendations and the AP Potential tool yielded AP course-specific information, the proposed talent-spotting tool looked at the whole student and was not course-specific. Although a course-specific tool, like AP Potential, may have advantages over a general tool like the talent-spotting tool, the AP Potential tool is based on one data source, a student's scores on their PSAT. If a student did not attend school to take the PSAT that day, they would not have the data to generate AP Potential information. The benefit of the talent-spotting tool is that it uses multiple data points that are collected over the academic year to determine a student's aptitude for AP classes. Neither tool should be standalone decision-making tools when it comes to AP course recommendations; information from both tools work in concert to support students, their families, and their teachers and school counselors when discussing appropriate course recommendations.

The following analysis focused on the four main AP courses for 11th graders: AP Calculus AB, AP English Language and Composition, AP World History: Modern, and AP Physics I. Enrollments at this school in AP Statistics, AP Chemistry, and AP Biology were lower than the four main AP courses.

Looking at the numbers for White and Black/African American students, the talent-spotting tool was 100% accurate in identifying students who were also recommended for AP Calculus AB. The talent-spotting tool was near 100% accuracy for AP English Language and Composition and AP World History: Modern. Many more students were recommended for AP Physics I than scored above the talent-spotting tool threshold. AP Physics I had the most number of course recommendations compared to the other courses and was also one of the courses with the lowest number of students meeting AP Potential.

Table 23:

Talent-Spotting Tool Identification Accuracy based on Teacher Recommendation by Race Group for each AP Course

Race	Calculus AB			English Language and Composition			World History: Modern			Physics I		
	R	T	Acc.	R	T	Acc.	R	T	Acc.	R	T	Acc.
	n	*n*	%	*n*	*n*	%	*n*	*n*	%	*n*	*n*	%
Black	7	7	100	23	20	87	29	24	83	30	19	63
White	17	17	100	35	30	86	34	31	91	44	32	73
Other	14	12	86	19	17	89	22	22	100	17	11	65
Total	38	36	95	77	67	87	85	77	91	91	62	68

Note. Other students include students identified as Asian, Hispanic, and Two or more races. R = teacher recommended; T = above talent-spotting tool threshold and was recommended; Acc. = talent-spotting tool identification accuracy, computed as the percent above threshold out of recommended students.

When assessing the accuracy of the talent-spotting tool in identifying students who were actually recommended for AP courses for SY1819 rising 11th grade students, in addition to analyzing the numbers of students who scored above the threshold and were recommended for an AP course, the researcher also analyzed the number of students who scored below the threshold but were recommended for an AP course. This analysis was to determine how many students were missed by the talent-spotting tool who would have been recommended for an AP course. As seen in Table 22, very few students scored below the threshold and were recommended for an AP course. Once again, AP Physics I was an outlier in this sample. Still, a low percentage of students scored below the threshold and were recommended for AP Physics I.

Table 24:

Students Recommended for an AP Course but Scored Below Talent-Spotting Tool Threshold by Race and AP Course

Student race	Calculus AB	English	World History	Physics I
	n	*n*	*n*	*n*
Black/African Am.	0	3	5	11
White	0	2	0	11
Other	2	5	3	7
Total	2	10	8	29

Note. Other students include students identified as Asian, Hispanic, and two or more races.

In response to research question two, findings suggest that the talent-spotting tool accurately identified rising 11th grade students from the SY1819 cohort who were recommended for an AP course. The third research question was whether or not the talent-spotting tool identifies additional rising 11th graders not recommended for enrollment in an AP course and if so, how many and what are their characteristics. Table 23 shows the number of students who scored above the talent-spotting tool threshold but were not recommended for an AP course by student race. Of note, for three of the four AP courses, Black/African American students composed a larger percentage than White students in the population of students who scored above the threshold but were not recommended for the AP course. This pattern suggests that using this talent-spotting tool may add to the AP course recommendation process and directly address the disproportionately low enrollment of Black/African American students in AP courses.

Table 25:

Racial Composition of Students Scoring Above Talent-Spotting Tool Threshold but Not Recommended for AP by Course

Student race	Calculus AB	English	World History	Physics I
	n (%)	*n* (%)	*n* (%)	*n* (%)
Black/African Am.	31 (38)	18 (36)	13 (33)	15 (39)
White	28 (35)	15 (30)	14 (36)	8 (21)
Other	22 (27)	17 (34)	12 (31)	15 (39)
Total	81 (100)	50 (100)	39 (100)	38 (100)

Note. Other students include students identified as Asian, Hispanic, and two or more races.

The talent-spotting tool missed very few students who were recommended for AP courses. In addition, it identified more students as having the potential to succeed in an AP class than either teacher recommendations or College Board's AP Potential tool. In fact, more Black/African American students scored above the threshold on the talent-spotting tool but were not recommended by teachers for an AP class than other racial groups. Using the talent-spotting tool to help inform decisions regarding course recommendations would directly address the issue of racial disproportionality in AP course enrollment.

Conclusions

The conclusions to the three research questions for this study are shared below.

Research Question 1

The first research question of this study asked, “What components and processes of a data-based talent-spotting tool do AP teachers and school counselors perceive as effective and feasible to use to inform recommendations for enrollment in an AP class?” The researcher employed the use of an anonymous survey and sent the survey to three groups of staff: AP teachers, non-AP teachers who completed course recommendations, and school counselors.

These three groups were chosen for the unique perspectives they would bring to the study. The survey had four sections: introduction and consent, AP Potential, talent-spotting tool, and usefulness. Each section of the survey was designed to explore staff perceptions on the various components of the current AP course recommendation process and solicit their feedback on the proposed talent-spotting tool and its potential usefulness in the course recommendation process.

Based on the responses from the three groups of staff for the AP Potential section of the survey, the majority of respondents had heard of AP Potential but were not familiar with the tool or its use. In fact, the majority of the staff members indicated that they did not use the AP Potential tool when making decisions regarding course recommendations. This was an interesting discovery because the district aimed for more teachers to use the tool in their course recommendation decisions.

When asked about the talent-spotting tool itself, the majority of respondents indicated that the data points used in the tool's algorithm were sufficient. When asked to propose other data points to use in the algorithm, participants did not offer any or offered unrealistic options. The majority of the participants responded that non-quantifiable factors should be included in the discussion, but were unable to suggest realistic ways to add them to the algorithm. Respondents had some criticisms of the data used for the algorithm, but no substantive changes were proposed. As such, the researcher moved forward with the talent-spotting tool without revision to conduct the pilot using SY1819 student data.

The final section of the survey sought to discover participants' perceptions regarding the usefulness of the talent-spotting tool. A large majority indicated that they felt the tool would be extremely or moderately useful in the course recommendation process. No participant indicated that the tool was not useful. However, respondents seemed resistant when asked whether the use

of the talent-spotting tool should be required of teachers during the course recommendation process. The majority agreed that the tool should be encouraged but not mandated.

Overall, the teachers and school counselors who responded appreciated the simplicity and ease of the talent-spotting tool. The majority agreed with the tool's use of data and the inclusion of more than just one data source, unlike the AP Potential tool. The talent-spotting tool was designed to combine student GPA, state assessment scores, and attendance data to provide teachers with a single indicator score that they could use to inform their course recommendation decisions. However, while the majority of participants agreed that the tool would be useful in the course recommendation process, they did not think it should be mandatory. Participants did not think the tool should replace other human factors, such as teacher perceptions of students and other anecdotal information.

Research Question 2

The second research question asked, "How accurately does the talent-spotting tool identify rising 11th grade students who were recommended for AP enrollment during the SY1819 recommendation window?" Through the pilot of the talent-spotting tool using SY1819 student data, the researcher concluded that the talent-spotting tool accurately identified rising 11th grade students who were recommended by teachers for AP enrollment for the following school year. Specifically, for the four main AP courses available to 11th graders: AP Calculus AB, AP English Language and Composition, AP World History: Modern, and AP Physics I; a large majority of students who were recommended for these AP courses also scored above the talent-spotting tool threshold. In addition, very few students scored below the threshold but were recommended for these AP courses. Findings suggest that the talent-spotting tool accurately

identified students who teachers and school counselors recommended for AP courses during the SY1819 recommendation window.

Research Question 3

The third research question asked, "Does the talent-spotting tool identify additional rising 11th graders not recommended for enrollment and if so, how many and what are their characteristics?" The results of the pilot showed that the talent-spotting tool did identify additional rising 11th graders who were not recommended for enrollment in AP courses. For each of the four main AP courses available to 11th graders, a substantial number of students were not recommended for AP courses but scored above the talent-spotting tool's threshold. For example, 81 students scored above the threshold but were not recommended for AP Calculus AB and 50 students scored above the threshold but were not recommended for AP English Language and Composition. When disaggregated by race, proportionately more Black/African American students than White students scored above the threshold but were not recommended for AP courses. This finding is significant because through the use of this tool, the school may have a direct impact on reducing the disproportionately low representation of Black/African American students in AP courses.

Limitations

The researcher faced several limitations during this study. The first limitation involved staff participation in the survey. The researcher sent the survey to 43 teachers and school counselors, but only 30 individuals completed the survey. The non-AP teacher group was the most underrepresented of the three groups. Additionally, response rates were lower for open-ended survey questions.

Another limitation was the shift in methodology from conducting focus groups to an anonymous survey, which was due to the research agreement with the district. Had the researcher been able to conduct focus groups as intended, follow-up questions and prompts on the open-ended questions might have yielded more robust qualitative information than survey responses. In a focus group setting, participants could interact and expand on each other's answers. That interaction was lost with an anonymous survey.

The third and final limitation was that the researcher conducted this study in the district and school where he was employed. Even though the survey was anonymous and no personally-identifying information was collected, some staff members might have hesitated to be completely honest and open in their responses.

Overall, the teachers and school counselors thought the talent-spotting tool would be a useful addition to the course recommendation process. Teachers and school counselors were largely in favor of the talent-spotting tool. They indicated that the tool's use of data brought an objectiveness to the course recommendation process. While they approved of the tool, they felt its use should not be required. Instead, participants felt that teachers and school counselors could use the tool as one factor in making course recommendation decisions.

When piloted with SY1819 rising 11th grade students' data, the talent-spotting tool almost doubled the number of students identified by the College Board's AP Potential tool, which was the only systemic objective process the district had in place for course recommendations. In addition, the talent-spotting tool identified more students who had the potential to succeed in an AP class than were actually recommended by teachers. Furthermore, the talent-spotting tool identified proportionately more Black/African American students than

White students. This last finding could directly reduce the underrepresentation of Black/African American students in AP courses.

Implications for the School and District

This study has several implications for both Central High School (CHS) and District Public Schools (DPS). Prior to discussing next steps for the school and district, there are several broader implications to be discussed. The first centers around College Board's AP Potential tool, how it is calculated and how it is accessed and employed at the school level. The AP Potential tool is centered around one data point, a student's PSAT score. If the student does not show up for the PSAT in the Fall, they will not have a score associated with their profile and thus no AP Potential data. Of the students who did not have a PSAT score associated with their data profile in the SY1819 data, near 50% of those students were Black/African American students. Additionally, as the teachers reported, they were not aware they had access to the data or where to find the data.

The second implication concerns the talent-spotting tool. Establishing the threshold score of 21 or above worked for this pilot and with this set of data. There was a natural division in the raw data at that point. The threshold appeared organically, and the researcher moved forward with that threshold for the pilot. The components of the algorithm were chosen due to the fact that they are the only standardized components that span the school year. The various data points in the algorithm were weighted based on their format. For example, GPA is calculated on a 4.0 scale, as such the GPA component of the tool was weighted out of 4 points. The PARCC scores are delivered in five levels of accomplishment, ranging from one to five. Attendance was weighted higher, out of 10, to act as a mechanism to provide checks and balances to the data. As

mentioned previously, the research and literature discuss the importance of attendance in student success.

The third implication concerns the two other primary drivers initially discussed in Section I and future research. While focusing on the course placement process and increasing talent spotting could result in more students, specifically more Black/African American students in AP classes, further considerations should be explored regarding the classroom environment and the resources available for students and families to support them once they are in the course. Increasing access to supports, such as tutoring and summer programs, for students can help them succeed in class. Additionally, focusing on culturally responsive teaching in the classroom can create a more welcoming environment for students. The impact of both drivers should be explored in future research.

Another aspect of this study that should be explored in future research is the impact of the "non-quantifiable" factors that teachers and school counselors indicated that they wanted included in the tool. The importance of grit and perseverance is prominent in the literature, but is difficult to assess with a tool like the talent-spotting tool. Programs like Equal Opportunity Schools and CliftonStrengths have developed ways to assess these non-quantifiable factors, but they come with a cost. Future research should explore ways to assess these characteristics at the school level.

Next Steps for Central High School

CHS should take steps to address the disproportionately low enrollment of Black/African American students in AP courses. Most of these steps center on bringing objectivity to the course recommendation process. Even though the use of College Board's AP Potential is a district initiative, a surprising number of teachers were not aware of the tool and its intended use. A

large majority of participants, including the school counselors, indicated that they did not use the AP Potential tool when making course recommendation decisions. CHS should work with its staff, both teachers and counselors, to ensure they know how AP Potential is determined and that they know how to use it to inform course recommendations. Additionally, CHS should ensure that the AP Potential information is readily accessible and easy to use. CHS should also encourage teachers to reference AP Potential prior to submitting course recommendations. Not only is the use of AP Potential a district initiative, it brings a layer of objectivity to the course recommendation process.

Secondly, CHS should adopt the use of the talent-spotting tool to inform the course recommendation decisions. However, due to the nature of the data used in the talent-spotting tool, the tool is not available for use during the course recommendation window. Course recommendations occur in December and January, but the talent-spotting tool uses end-of-year data in its algorithm. As such, CHS should adopt the practice of using the tool over the summer to review course recommendations. Courses may be changed until the first day of school and many students change courses over the summer. Once the necessary data are available in early summer, CHS administrators and school counselors can employ the talent-spotting tool to compare the list of students scoring over the threshold with the list of students who were not recommended for AP courses. The school counselors, who work over the summer, can then use that list to have conversations with students and their families regarding AP courses. These conversations can occur over the summer prior to the first day of classes. Adopting this process would add another layer of objectivity to the course recommendation process and may reduce the disproportionately low representation of Black/African American students in AP courses.

To monitor the tool's effectiveness and support student success, CHS school leaders should monitor class grades and AP test scores for students who were placed into an AP course due to their talent-spotting tool score.

Prior to the next course recommendation season, CHS should develop and share a checklist for teachers to consult as they proceed through the recommendations process. This checklist should include the various tools that teachers have at their disposal. The tool should be digital and link to the various data points, such as AP Potential and the talent-spotting tool, that teachers can consult. It should also link to the student's course history and transcript, so the teacher can have the full academic picture of the student.

Next Steps for District Public Schools (DPS)

Similar to CHS, District Public Schools (DPS) should work with schools and teachers on the use of the College Board's AP Potential tool. While this study only surveyed staff at one school, a large majority of them reported not using the AP Potential tool. Other schools in the district may also not have their staff use the AP Potential tool to its full potential. Since AP Potential uses PSAT data paid for by the district and is a tool that the district expects schools to use, district leaders may consider working with all of its high schools to ensure its use and make sure the data is user friendly and readily accessible during the course recommendation window.

Additionally, the district should explore adopting the use of the talent-spotting tool. This adoption would create the need to alter the course recommendation process to allow for more changes to courses than typical over the summer and would likely affect staffing and section numbers for courses. The district may consider piloting this process in a few high schools to assess the feasibility and impact on staffing and sections. Piloting this process of employing the talent-spotting tool over the summer with a few schools would allow the district to assess the

value of this talent-spotting tool and its impact in reducing the disproportionately low representation of Black/African American students in AP courses.

Summary

The purpose of this study was to (a) develop a talent-spotting tool that is systematic, equitable, and uses more indicators than the College Board's AP Potential tool and (b) pilot this talent-spotting tool using de-identified student data. Teachers and school counselors would use this talent-spotting tool to make more objective and informed decisions than the current process for making course recommendations for students. The researcher designed the talent-spotting tool and its algorithm and solicited anonymous feedback on the tool from teachers and school counselors via survey. Based on survey results, the researcher determined that no changes needed to be made to the talent-spotting tool.

The researcher piloted the talent-spotting tool using de-identified student data to determine the efficacy of the talent-spotting tool in identifying students for AP courses by comparing this tool's results to actual course recommendations made and results from the AP Potential tool. The talent-spotting tool accurately identified students who were recommended for AP courses. More importantly, the talent-spotting tool identified additional students who were not recommended for AP courses but may have the aptitude to succeed in those courses based on their performance on state assessments, GPA, and school attendance. Of note, the talent-spotting tool identified a higher proportion of Black/African American students than White students who exceeded the talent-spotting tool threshold score but were not recommended for AP courses. The adoption of this talent-spotting tool as part of the course recommendation process has the potential to reduce the disproportionately low representation of Black/African American students in AP courses.

Appendices

Appendix A - Initial Email to Principal for Permission to Conduct Research

<DATE>

Dear Principal of Central High School,

I am writing to request permission to invite teachers and staff from your school to participate in a study that is part of my dissertation research. I am currently enrolled in a School Leadership Ed.D program through the University of Maryland, College Park. I am researching how to address the disproportionality of Black/African American students in Advanced Placement classes at the high school level. My study is designed around the creation of a talent spotting tool that uses student level data to determine a student's aptitude in an AP class. For this, I would like to elicit teacher and staff feedback around the talent spotting tool and the student level data that is used to derive the algorithm that guides the tool.

I have obtained permission to conduct research from both the [District] Public Schools and the University of Maryland's Institutional Review Board (IRB). It is my hope that after reading about my study, you will grant permission for teachers and staff in your building to participate in my research study.

With your permission, I would like to start by sending emails soliciting participation in a 19 question survey to three different groups of staff: AP Cohort Teachers, Non- AP Teachers who make recommendations, and school counselors. The survey should take about 20-30 minutes to complete. I am soliciting feedback on AP Potential and a possible talent spotting tool to use during the course recommendation process.

The results of this study have the potential to alter how schools conduct their talent spotting and provide a more equitable approach to the recommendation process, and ultimately work towards addressing the disproportionality of Black/African American students in AP classes.

Thank you for your consideration,

John DiFato

Appendix B - Initial Email with Survey Invitation: AP Teacher Cohort

<Date>

Dear Teachers,

I hope you are enjoying your summer and thank you for taking the time to read this email. I am currently working on earning my doctoral degree in School Leadership through the University of Maryland, College Park and I have reached the point where I am ready to begin collecting feedback from teachers. I am researching how to address the disproportionality of Black/African American students in Advanced Placement classes at the high school level. My study is designed around the creation of a talent spotting tool that uses student level data to determine a student's aptitude in an AP class, rather than solely relying on AP Potential data from the College Board. For this, I would like to elicit teacher feedback around the talent spotting tool and the student level data that is used to derive the algorithm that guides the tool.

As an AP teacher, I am reaching out to see if you would be willing to participate. I am asking for interested participants to complete a 19 question survey that should take 20-30 minutes to complete. The survey asks questions about AP Potential and then solicits feedback regarding a talent spotting tool that could be used during the course recommendation process. I will share with you the talent spotting tool and the data used to feed the algorithm and I am looking for your feedback and perceptions.

Your participation in this research is completely voluntary. You may choose not to take part at all. If you decide to participate in this research, you may stop participating at any time. If you decide not to participate in this study or if you stop participating at any time, you will not be penalized. Your decision to participate or not participate will not have any impact on your relationship with the school system, future promotions, and/or placements. Your employment status in DPS will not be positively or negatively affected by your participation or non-participation in this study. In addition, your building principal is aware of this research study and is available if you have any concerns. Additionally, questions or concerns can be shared with the University of Maryland, College Park Institutional Review Board's office. For more information regarding participant rights, please visit: https://research.umd.edu/irb-research-participants

If this is something in which you would be interested in participating, please take a few minutes to read and complete this consent form. Once you indicate consent, it will take you to the survey. Please allow 20-30 minutes to complete the survey.

INSERT CONSENT FORM AND SURVEY LINK

Please complete the survey by (ENTER TWO WEEK DATE)

The results of this study may help to provide a more equitable and transparent course recommendation process at both the school and county level. Summarized results may be

published at professional development conferences and/or in academic journals. Please feel free to reach out to me with any questions/comments. I can be reached at jpdifato@gmail.com. Thank you for your consideration,

John DiFato

Appendix C - Initial Email with Survey Invitation: Non- AP Teachers who Submit

Recommendations

<Date>

Dear Teachers,

I hope you are enjoying your summer and thank you for taking the time to read this email. I am currently working on earning my doctoral degree in School Leadership through the University of Maryland, College Park and I have reached the point where I am ready to begin collecting feedback from teachers. I am researching how to address the disproportionality of Black/African American students in Advanced Placement classes at the high school level. My study is designed around the creation of a talent spotting tool that uses student level data to determine a student's aptitude in an AP class, rather than solely relying on AP Potential data from the College Board. For this, I would like to elicit teacher feedback around the talent spotting tool and the student level data that is used to derive the algorithm that guides the tool.

As a teacher who does not teach AP and submits recommendations, I am reaching out to see if you would be willing to participate. I am asking for interested participants to complete a 19 question survey that should take 20-30 minutes to complete. The survey asks questions about AP Potential and then solicits feedback regarding a talent spotting tool that could be used during the course recommendation process. I will share with you the talent spotting tool and the data used to feed the algorithm and I am looking for your feedback and perceptions.

Your participation in this research is completely voluntary. You may choose not to take part at all. If you decide to participate in this research, you may stop participating at any time. If you decide not to participate in this study or if you stop participating at any time, you will not be penalized. Your decision to participate or not participate will not have any impact on your relationship with the school system, future promotions, and/or placements. Your employment status in DPS will not be positively or negatively affected by your participation or non-participation in this study. In addition, your building principal is aware of this research study and is available if you have any concerns. Additionally, questions or concerns can be shared with the University of Maryland, College Park Institutional Review Board's office. For more information regarding participant rights, please visit: https://research.umd.edu/irb-research-participants

If this is something in which you would be interested in participating, please take a few minutes to read and complete this consent form. Once you indicate consent, it will take you to the survey. Please allow 20-30 minutes to complete the survey.

INSERT CONSENT FORM AND SURVEY LINK

Please complete the survey by (ENTER TWO WEEK DATE)

The results of this study may help to provide a more equitable and transparent course recommendation process at both the school and county level. Summarized results may be

published at professional development conferences and/or in academic journals. Please feel free to reach out to me with any questions/comments. I can be reached at jpdifato@gmail.com. Thank you for your consideration,

John DiFato

Appendix D - Initial Email with Survey Invitation: School Counselors

<Date>

Dear School Counselors,

I hope you are enjoying your summer and thank you for taking the time to read this email. I am currently working on earning my doctoral degree in School Leadership through the University of Maryland, College Park and I have reached the point where I am ready to begin collecting feedback from teachers. I am researching how to address the disproportionality of Black/African American students in Advanced Placement classes at the high school level. My study is designed around the creation of a talent spotting tool that uses student level data to determine a student's aptitude in an AP class, rather than solely relying on AP Potential data from the College Board. For this, I would like to elicit teacher feedback around the talent spotting tool and the student level data that is used to derive the algorithm that guides the tool.

As a School Counselor, I am reaching out to see if you would be willing to participate. I am asking for interested participants to complete a 19 question survey that should take 20-30 minutes to complete. The survey asks questions about AP Potential and then solicits feedback regarding a talent spotting tool that could be used during the course recommendation process. I will share with you the talent spotting tool and the data used to feed the algorithm and I am looking for your feedback and perceptions.

Your participation in this research is completely voluntary. You may choose not to take part at all. If you decide to participate in this research, you may stop participating at any time. If you decide not to participate in this study or if you stop participating at any time, you will not be penalized. Your decision to participate or not participate will not have any impact on your relationship with the school system, future promotions, and/or placements. Your employment status in DPS will not be positively or negatively affected by your participation or non-participation in this study. In addition, your building principal is aware of this research study and is available if you have any concerns. Additionally, questions or concerns can be shared with the University of Maryland, College Park Institutional Review Board's office. For more information regarding participant rights, please visit: https://research.umd.edu/irb-research-participants

If this is something in which you would be interested in participating, please take a few minutes to read and complete this consent form. Once you indicate consent, it will take you to the survey. Please allow 20-30 minutes to complete the survey.

INSERT CONSENT FORM AND SURVEY LINK

Please complete the survey by (ENTER TWO WEEK DATE)

The results of this study may help to provide a more equitable and transparent course recommendation process at both the school and county level. Summarized results may be published at professional development conferences and/or in academic journals. Please feel free to reach out to me with any questions/comments. I can be reached at jpdifato@gmail.com.

Thank you for your consideration,

John DiFato

Appendix E - Informed Consent

Institutional Review Board
1204 Marie Mount Hall ● 7814 Regents Drive ● College Park, MD 20742 ● 301-405-4212 ● irb@umd.edu

CONSENT TO PARTICIPATE

Project Title	Addressing the Disproportionality of Black/African American Students in Advanced Placement Classes
Purpose of the Study	This research is being conducted by John DiFato at the University of Maryland, College Park. It is directed by Dr. David Imig, advisor. We are inviting you to participate in this research project because, through your role as an educator, you provide a unique perspective that can add to this research. The purpose of this study is to develop and pilot test a talent spotting tool, using student data, that is more systematic and equitable and uses more indicators than the College Board's AP Potential. The overall goal of the study is to increase the enrollment of Black/African American students in Advanced Placement classes.
Procedures	You are being asked to participate in one survey with 19 questions. The survey should take about 15-20 minutes. You are being asked to share your feedback and perceptions regarding AP Potential and a talent spotting tool and its possible use during the course recommendation window. The surveys will be anonymous. There will be no identifying information recorded, such as your name. You will only be asked to indicate to which cohort you belong. Results will be reported in summary form and will not contain any information that will identify you.
Potential Risks and Discomforts	There are no known risks to participants. Participants can skip any question in the survey that they do not wish to answer. All findings will be presented in summary form and will not identify teachers by name.
Potential Benefits	There are no direct benefits to participants from participating in this research. However, it is our hope that results from this study will lead to a more systematic and equitable recommendation process, with data at the center of the process, that will ultimately lead to closing the achievement gap.

Confidentiality	Any potential loss of confidentiality will be minimized. Digital recordings and transcripts will be kept by the researcher on a password protected computer and the files will be stored directly on the computer, rather than in the cloud. No one other than the researcher will have access to those files. Any written reports of the findings will not focus on individual participants, but presented in summary form. If we write a report or article about this research project, your identity will be protected to the maximum extent possible. Your information may be shared with representatives of the University of Maryland, College Park or governmental authorities if you or someone else is in danger or if we are required to do so by law.
Compensation	There will be no compensation for this research study.
Right to Withdraw and Questions	Your participation in this research is completely voluntary. You may choose not to take part at all. If you decide to participate in this research, you may stop participating at any time. If you decide not to participate in this study or if you stop participating at any time, you will not be penalized. Your decision to participate or not participate will not have any impact on your relationship with the school system, future promotions, and/or placements. Your employment status in DPS will not be positively or negatively affected by your participation or non-participation in this study. In addition, your building principal is aware of this research study and is available if you have any concerns. Additionally, questions or concerns can be shared with the University of Maryland, College Park Institutional Review Board's office. For more information regarding participant rights, please visit: https://research.umd.edu/irb-research-participants If you decide to stop taking part in the study, if you have questions, concerns, or complaints, or if you need to report an injury related to the research, please contact the investigator: **John DiFato** **Contact Information Redacted**
Participant Rights	If you have questions about your rights as a research participant or wish to report a research-related injury, please contact: University of Maryland College Park Institutional Review Board Office 1204 Marie Mount Hall College Park, Maryland, 20742 E-mail: irb@umd.edu Telephone: 301-405-0678 For more information regarding participant rights, please visit: https://research.umd.edu/irb-research-participants

	This research has been reviewed according to the University of Maryland, College Park IRB procedures for research involving human subjects.	
Statement of Consent	*Your signature below indicates that you are at least 18 years of age; you have read this consent form or have had it read to you; your questions have been answered to your satisfaction and you voluntarily agree to participate in this research study. You may print a copy of this signed consent form.* *If you agree to participate, please click "I agree to participate" below, type your name, and date.*	
Signature and Date	**NAME OF PARTICIPANT** **PLEASE SIGN DIGITALLY**	
Signature and Date	**DATE**	

Appendix F - Survey

Talent-Spotting for AP Classes

Start of Block: Intro

Q1.1 The purpose of this survey is to obtain feedback from current [CHS] teachers/counselors regarding the use of AP Potential. In addition, this survey seeks to gain their feedback regarding a possible talent spotting tool which uses student level data and would create a more systematic process surrounding course recommendations. If you do not know an answer or do not want to answer a question, you may skip that question.

Prior to beginning this survey, you should have completed the informed consent. If you have not, please click CONSENT FORM to access to consent form.

Q1.2 I have completed the CONSENT FORM

- o Yes (1)
- o No (2)

End of Block: Intro

Start of Block: AP Potential

Q2.1 Which of the following best describes your responsibilities regarding AP course recommendations at [CHS]? (Please refer to your email if you serve a dual role.)

- o Teacher of one or more AP Classes (1)
- o Non-AP Teacher who submits recommendations of students for AP classes (2)
- o School Counselor (3)

Q2.2 Have you heard of AP Potential?

- o Yes (1)
- o No (2)

Q2.3 If you answered "Yes" to the above question - How familiar are you with AP Potential?

- o I answered "No" (1)
- o Slightly familiar (2)
- o Moderately familiar (3)
- o Very familiar (4)

Q2.4 In the past, have you used AP Potential data to make (or alter) an AP course recommendation for a student?

o Yes (1)

o No (2)

Q2.5 On average, to what extent did the AP Potential data impact your decisions regarding AP course recommendations for your students?

o Always impacts my recommendation decisions (1)

o Sometimes impacts my recommendation decisions (2)

o Rarely impacts my recommendation decisions (3)

o Never impacts my recommendation decisions (4)

o I have not used AP Potential data when making course recommendations (5)

Q2.6 If you answered that you have not used AP Potential or that it Rarely or Never impacts your recommendation decisions, please indicate why. (Check all that apply)

▢ I do not know what AP Potential is (1)

▢ The data is not accessible (2)

▢ The data is difficult to interpret (3)

▢ I do not believe AP Potential to be a valid assessment of a student's aptitude (4)

▢ I was not aware we had access to AP Potential (5)

▢ I am not aware of what factors determine AP Potential (6)

▢ I believe other factors are more important than AP Potential (7)

▢ Other (8) _____

End of Block: AP Potential

Start of Block: Talent-Spotting Tool

Q3.1 Now, I would like your opinion about a possible new tool that could be used to inform the course recommendation process for AP courses.
Please take a moment took review the Talent Spotting Tool and the student level data that is used.

Q3.2 Considering the data that will be used to drive the outcome of the tool, (PARCC/MCAP scores, unweighted GPA, and attendance) do you think these are sufficient?

o Yes (1)

o No (2)

Q3.3 Do you think the data (PARCC/MCAP scores, unweighted GPA, and attendance) accurately reflect student potential for success in AP classes?

o Yes (1)

o No (2)

Q3.4 Are there any data that should not be used? If yes, which of the following?

☐ The data presented should be used (1)

☐ PARCC/MCAP Scores (2)

☐ Unweighted GPA (3)

☐ Attendance (4)

Q3.5 Are there other data that should be considered?

o Yes (1)

o No (2)

o I do not know (3)

Q3.6 If yes, please list what other data should be considered:

_____

Q3.7 Are there other non-quantifiable factors that should be considered?

o Yes (1)

o No (2)

o I do not know (3)

Q3.8 If yes, please list what other non-quantifiable factors that should be considered:

_____

End of Block: Talent-Spotting Tool

Start of Block: Usefulness

Q4.1 How useful do you think this or another revised talent spotting tool would be when teachers are making AP course recommendations?

- o Extremely useful (1)
- o Moderately useful (2)
- o Neither useful nor useless - Depends on the student (3)
- o Not particularly useful (4)
- o Not at all useful (5)

Q4.2 Please explain your answer to the question above.

_____

Q4.3 Do you think this tool, or a revised talent spotting tool, should be required as part of the teacher recommendation process?

- o Yes (1)
- o No (2)

Q4.4 Please explain your answer to the question above.

_____

End of Block: Usefulness

Appendix G - Talent-Spotting Tool Synopsis from Survey

For the pilot of this talent-spotting tool I will only focus on rising 11th grade data and therefore only draw data that all 10th graders are expected to have by the end of their 10th grade year. (See Table 1 for full of indicators that will be used for each grade level in the algorithm) For example, the majority of rising 10th graders most likely do not have an SAT score associated with their profile in the data warehouse, whereas most rising 12th graders will have an SAT score associated with their profile. Rising 11th graders have the option to be enrolled in an AP class in math, science, English, and social studies and have the most AP classes as options for them for teachers to enter as recommendations. This will allow me to pilot the algorithm with students who had an opportunity to be recommended for an AP class. As a reminder, not all teachers can enter recommendations, only those that are recommending for a SDE graduation requirement.

For the rising 11th graders, the algorithm will include the following data points:

- PARCC ELA performance level (1-5 scale)
- PARCC Math performance level (1-5 scale)
- Cumulative, unweighted GPA at the end of 10th grade (4.0 scale)
- Attendance score (ranking out of 10)

The rationale for using the PARCC ELA performance level is it is an indicator of a student's achievement in English. All students sit for the PARCC ELA assessment during 10th grade. The same is true of the PARCC Math performance level; students sit for that assessment in 10th grade as well and it is an indicator of their achievement in math. The rationale for using a student's unweighted GPA is that it is an indicator of the student's success in school, and unlike a weighted GPA, it does not include bonus points for Honors, GT, or AP classes. Using the

unweighted GPA is more equitable because all students have an even playing field with the 4.0 GPA, rather than some having access to a 5.0 scale because of the track they entered in middle school. Finally, the attendance score is used in the algorithm because students need to show that they have a track record of attending school and classes. Based on a student's attendance percentage, they will receive a number that will be entered into the algorithm, for example, if a student has an attendance record of 96% or above, they will receive an attendance score of 10 to be entered into the algorithm. (See Table 2 for full chart.)

The four indicators that will be used for the rising 11th graders will be entered and summed. The maximum indicator score a student can receive is 24. (e.g., 5+5+4.0+10= 24) If a student has a score over 20, the student will be considered to have the aptitude to succeed in an AP class. A score of 20 was chosen as the threshold because it allows for varying degrees of success on the standardized tests and accounts for some leniency in regard to GPA and attendance.

Table 1

Algorithms by Grade Level

Grade level	Data points	Algorithm	Indicator score threshold
Rising 10th	• MAP Scores • Unweighted GPA	MAP + Unweighted GPA = X	TBD
Rising 11th	• PARCC ELA • PARCC Math • Unweighted GPA • Attendance	((PARCC ELA) + (PARCC Math) + Unweighted GPA + Attendance score) = 24(max)	20
Rising 12th	• PARCC ELA • PARCC Math • Unweighted GPA • Attendance	((PARCC ELA) + (PARCC Math) + Unweighted GPA + Attendance score) = 24 (max)	20

Table 2

Attendance Score Conversion

Attendance percentage	Attendance score
96% - 100%	10
90% - 95%	9
80% - 89%	8
70% - 79%	7
60% - 69%	6
50% - 59%	5
40% - 49%	4
30% - 39%	3
20% - 29%	2
0% - 20%	1

Appendix H - IRB Application and Approval

UNIVERSITY OF MARYLAND
INSTITUTIONAL REVIEW BOARD

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DATE:	November 4, 2021
TO:	John DiFato
FROM:	University of Maryland College Park (UMCP) IRB
PROJECT TITLE:	[1779783-4] Addressing the Disproportionality of Black/African American Students in Advanced Placement Classes
SUBMISSION TYPE:	Amendment/Modification
ACTION:	APPROVED
APPROVAL DATE:	November 4, 2021
EXPIRATION DATE:	August 4, 2022
REVIEW TYPE:	Expedited Review
REVIEW CATEGORY:	Expedited review category # 7

Thank you for your submission of Amendment/Modification materials for this project. The University of Maryland College Park (UMCP) IRB has APPROVED your submission. This approval is based on an appropriate risk/benefit ratio and a project design wherein the risks have been minimized. All research must be conducted in accordance with this approved submission.

Prior to final approval of this project scientific review was completed by the IRB Member reviewer

This submission has received Expedited Review based on the applicable federal regulations. This project has been determined to be a MINIMAL RISK project. Based on the risks, this project requires continuing review by this committee on an annual basis. Please use the appropriate forms for this procedure. Your documentation for continuing review must be received with sufficient time for review and continued approval before the expiration date of August 4, 2022.

Please remember that informed consent is a process beginning with a description of the project and insurance of participant understanding followed by a signed consent form. Informed consent must continue throughout the project via a dialogue between the researcher and research participant. Unless a consent waiver or alteration has been approved, Federal regulations require that each participant receives a copy of the consent document.

Please note that any revision to previously approved materials must be approved by this committee prior to initiation. Please use the appropriate Amendment forms for this procedure.

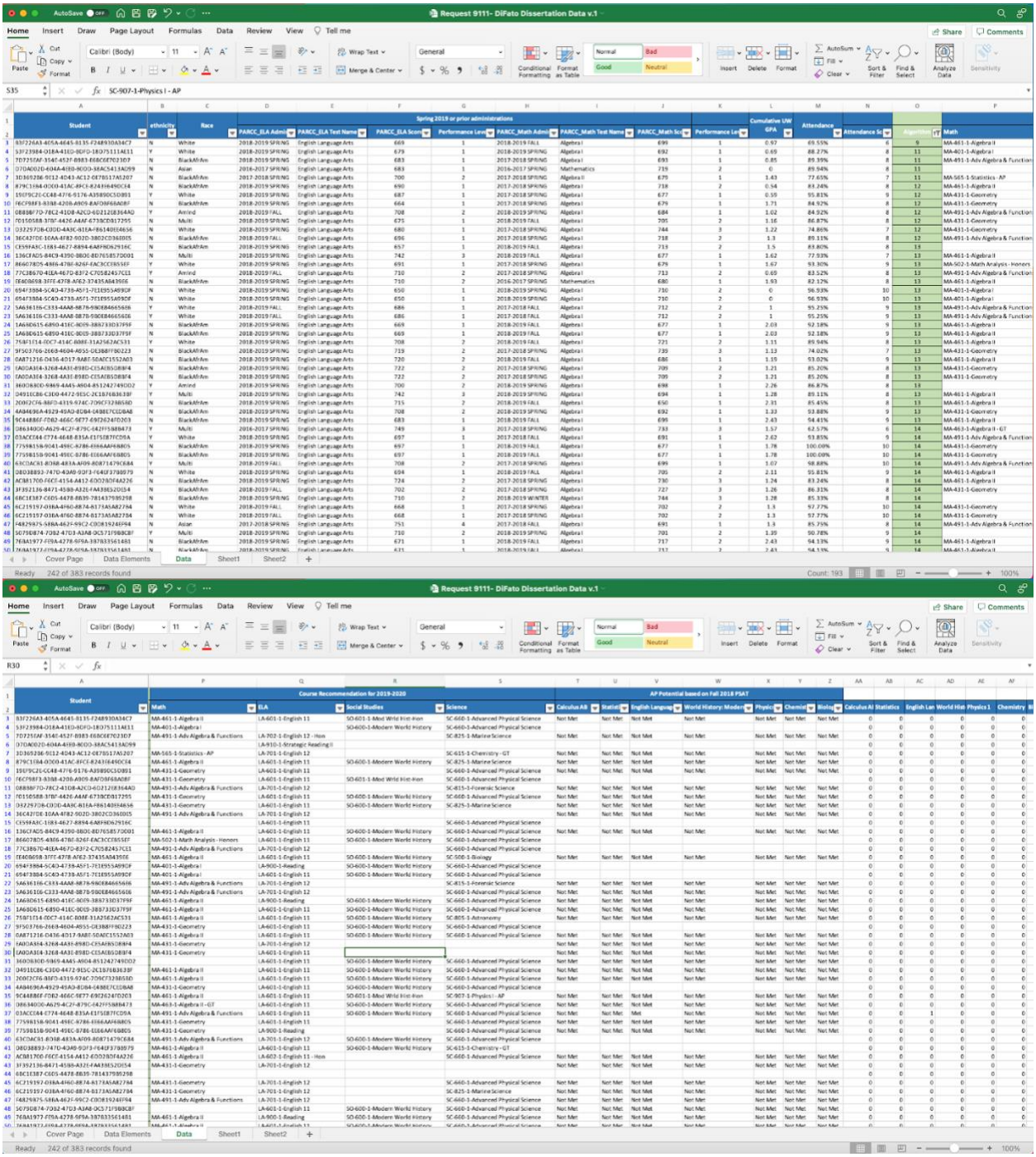
All UNANTICIPATED PROBLEMS involving risks to subjects or others (UPIRSOs) and SERIOUS and UNEXPECTED adverse events must be reported promptly to this office. Please use the appropriate reporting forms for this procedure. All FDA and sponsor reporting requirements should also be followed. All NON-COMPLIANCE issues or COMPLAINTS regarding this project must be reported promptly to this office.

Please note that all research records must be retained for a minimum of seven years after the completion of the project.

Appendix I - District Research Approval

Removed due to confidentiality agreement with District.

Appendix J - Data Excel Worksheet



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