

Equity in Opportunity: Minority Student Enrollment in Advanced, Advanced Placement, and International Baccalaureate English & Mathematics Courses in Virginia Public High Schools

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Dissertation submitted to the faculty of the Virginia Polytechnic Institute and State University in partial fulfillment of the requirements for the degree of

Doctor of Education

In

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December 14, 2021

Richmond, Virginia

Keywords: access, economically disadvantaged, equity, minority, underrepresentation

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## **ABSTRACT**

Equal access in education has proven to be less than sufficient regarding academic success for all students (Atchison et al., 2017; Glynn & Wassell, 2018). Previous research indicates that despite efforts to impart significant reforms in public education within the United States, few gains have been made regarding equity among students (Glynn & Wassell, 2018). Some researchers have recommended that school divisions provide equal access to education pathways as a step in the right direction for educators, administrators, and school divisions; as employing equity in education provides all students with the resources needed to experience academic success (Atchison et al., 2017). This is because equity impacts educational opportunities as it entails the experiences of individuals and social identifiers (Atchison et al., 2017).

The purpose of this study was to identify variables that contribute to the minority student enrollment gap in advanced, Advanced Placement (AP), and International Baccalaureate (IB) English and Math courses at the high school level. The researcher used a multiple regression analysis to assess if significant gaps of enrollment in advanced, AP, and IB English and Math courses exist between minority and non-minority students in Virginia public high schools from 2015-2020. The possible impacts of attendance and economic status on minority student enrollment in advanced, AP, and IB English and Math courses were also examined. The results of the study yielded significant enrollment gaps between minority and non-minority students in advanced, AP, & IB English and Math courses in Virginia public high schools.

# Equity in Opportunity: Minority Student Enrollment in Advanced, Advanced Placement, and International Baccalaureate English & Mathematics Courses in Virginia Public High Schools

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## **GENERAL AUDIENCE ABSTRACT**

Equal access in education has proven to be less than sufficient regarding academic success for all students (Atchison et al., 2017; Glynn & Wassell, 2018). Previous research indicates that despite efforts to impart significant reforms in public education within the United States, few gains have been made regarding equity among students (Glynn & Wassell, 2018). Some researchers have recommended that school divisions provide equal access to education pathways as a step in the right direction for educators, administrators, and school divisions; as employing equity in education provides all students with the resources needed to experience academic success (Atchison et al., 2017). This is because equity impacts educational opportunities as it entails the experiences of individuals and social identifiers (Atchison et al., 2017).

The purpose of this study was to identify variables that contribute to the minority student enrollment gap in advanced, Advanced Placement (AP), and International Baccalaureate (IB) English and Math courses at the high school level. The researcher used a multiple regression analysis to assess if significant gaps of enrollment in advanced, AP, and IB English and Math courses exist between minority and non-minority students in Virginia public high schools from 2015-2020. The researcher also simultaneously examined the possible impacts of attendance and economic status on minority student enrollment in advanced, AP, and IB English and Math courses. The researcher found that significant gaps exist between minority and non-minority students in advanced, AP, & IB English and Math courses in Virginia public high schools.

### **Dedication**

This dissertation is dedicated to my husband, Justin Tyree Ackins Sr., mother, Cheryl Yvonne Alexander, and fifth-grade teacher, Ms. Tonya Woods who supported my passion to inspire youth to be their absolute best in whatever it is they desire to accomplish. Additionally, this dissertation is also dedicated to all educational leaders that recognize the educational gap among majority and minority students and are taking active steps towards closing those gaps. My goal for this study was to explore the educational transformations that have taken place in hopes of making learning equitable for all students while also highlighting the gaps that continue to exist in advanced learning for minority students. As an educational leader at the secondary level, it is my passion to work collaboratively with all stakeholders to assist students with reaching their maximum potential so that they may excel in any endeavor.

## Acknowledgements

I give all honor and praises to God who is my guider, protector, and strength. It is with God's unwavering grace and mercy that I was able to embark upon and successfully complete this doctoral journey. I am grateful for God's guidance in leading me to the apply for the doctoral program at Virginia Polytechnic Institute and State University and never allowing me to become discouraged when I felt overwhelmed.

Also, I am extremely grateful to my husband (Justin Sr.), daughters (Chyanna and Paige), sons (Justin Jr. and Jonah), mother (Cheryl Alexander), in-laws (James and Sherylann Bragton), friend (Terri White), fifth grade teacher (Tonya Woods) and a host of family members, friends, and sorority sisters that have encouraged and inspired me along the way. I am grateful for your love, thoughtful cards, motivational conversations, and the sacrifices that allowed me to both pursue and accomplish my dream.

Additionally, I would like to express my utmost gratitude to my awesome dissertation committee, Dr. Carol Cash, Dr. Jodie Brinkmann, Dr. John Gratto, and Dr. Tinkhani White. Words cannot express how appreciative and grateful I am for your advisement, constructive feedback, expertise, support, and time. Your encouragement and leadership have allowed me to expand my thinking as an educational leader in ways that I had never considered. Thank you for the knowledge and wisdom shared that facilitated my educational and professional growth.

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## Chapter One

### Introduction

Kristen Klopfenstein (2004), the executive director of the Education Innovation Institute at the University of Northern Colorado revealed that the same characteristics which cause students to take and excel in Advanced Placement (AP) classes mirror the characteristics that cause those same students to go to college and excel. Family support, a college-going culture at home, and a high school with post-secondary educational focus were all listed as characteristics that impact students' decisions to enroll in advanced courses. (Rich, 2013; Shaw et al., 2012). Kettler and Hurst (2017) identified school factors such as minority AP teachers, teacher expectations, and school connectedness as having positive impacts on minority student participation in advanced and AP courses. Klopfenstein (2004), Rowland and Shircliffe (2016), and Kettler and Hurst (2017) noted various options that could potentially increase minority student enrollment in advanced coursework. The options listed included AP incentive programs, hiring highly qualified teachers to serve as mentors for minority students, promoting AP instructional training for teachers, and implementing teacher and student incentive programs. (Kettler & Hurst, 2017; Klopfenstein, 2004; Rowland & Shircliffe, 2016).

Atchison et al. (2017) recommended that school divisions provide equal access to education pathways as a step in the right direction for educators, administrators, and school divisions as employing equity in education provides all students with the resources needed to experience academic success. This is because equity impacts educational opportunities as it entails the experiences of individuals and social identifiers. Social identifiers such as race, gender, ethnicity, socioeconomic status, disability, and family background have been correlated with educational opportunities (Atchison et al., 2017).

Clark et al. (2012) believed that schools should work to ensure that enrollment in AP courses is reflective of their student body population. Rich (2013) reported there have been several efforts to overcome the obstacles of getting low-income Black and Latino students enrolled in AP courses. An increasing number of school districts have worked to implement initiatives that increase AP course options and increase Black and Hispanic student participation (Rich, 2013). School districts have also worked to increase advanced course enrollment for students that are economically disadvantaged and first-generation college students (Rich, 2013). Barnard-Brak et al. (2011) reported updated federal funding policies that allot funds specifically

to increase advanced math and science course participation for economically disadvantaged and minority students. Klopfenstein (2004) and Kettler and Hurst (2017) reported that some schools use PSAT and/or SAT scores to limit student enrollment in AP courses. An AP Potential report is rendered to schools based upon student performance on the PSAT and/or SAT assessments (Kettler & Hurst, 2017). While minority students generally score lower than Asian and White students, schools often still use this report to decipher/recommend which students should enroll in AP courses (Barnard-Brak et al., 2011; Kettler & Hurst 2017).

Cha (2015) reported that even when advanced courses are available to minority students, the school culture is not supportive of minority student enrollment in advanced courses. Ford (2010) discussed three large problems that schools face with regards to minority underrepresentation in advanced and gifted education; two of which are pertinent, deficit thinking and culture-blindness. Deficit thinking was shown when educators ignore the strengths and potential of minority students by focusing on preconceived low expectations and stereotypes (Ford, 2010). Culture-blindness is the practice by which educators ignore the importance of cultural differences in curriculum, assessment, and expectations (Ford, 2010).

The role of teacher referrals for placement in advanced courses is a suggested barrier to advanced course enrollment (Barnard-Brak et al., 2011; Ford, 2010; Rowland & Shircliffe, 2016). Walker (2007) and Ford (2010) expressed that teachers' lack of advanced course recommendations for minority students stem from inappropriate reasons such as using minority students that perform above average academically to assist with minority students that perform significantly below average academically in other courses. Colgren and Sappington (2015) noted that inequity in educational opportunities between White and minority students is not only based upon limited access to academic rigor and noted the significant role of course design. It was further noted that achievement equity will require educators' attention to culturally responsive pedagogy (Colgren & Sappington, 2015).

The Virginia Department of Education (VDOE, 2020a) notes the increased focus on attendance by administrators, educators, and school divisions across the state as a significant factor that impacts students' academic success. Chronic absenteeism and/or tardiness have been linked to limiting student access to academic rigor (Kettler & Hurst, 2017). Chronic absenteeism was also correlated with low academic achievement, high school dropout rates, and unfavorable outcomes post high school (VDOE, 2020a).

## **Statement of the Problem**

Culture impacts curriculum which in turn impacts the knowledge delivered to students (Marshall, 2014). Covay (2011) reported that the racial composition of a classroom often influences the content covered. Inequities in educational systems have been associated with the underrepresentation of minority students in advanced coursework (Glynn & Wassell, 2018). Many of the advanced classroom populations in Virginia high schools fail to mirror the populations in the hallways. Kettler and Hurst (2017) revealed that for decades there has been inequitable participation across race and ethnic groups in advanced courses. The inequitable participation in advanced courses attributes to the lessened skills of minority and economically disadvantaged students with respect to academic advances (Kettler & Hurst, 2017).

Ford (2010) discussed the statistically significant underrepresentation of Black and Hispanic students in gifted and talented and advanced education programs. The racial divide coupled with other entities such as childhood poverty continued to create academic challenges for students (Colgren & Sappington, 2015). Ford (2010) specifically noted the underrepresentation of Blacks by 48% in advanced and gifted settings in US schools. She also noted that Hispanic students are underrepresented by 38% and Black and Hispanic males overall are the most underrepresented groups in advanced and gifted education (Ford, 2010). Covay (2011) stated that equal access to advanced coursework could be positively linked with reducing ubiquitous racial achievement gaps in the US.

## **Purpose of the Study**

The purpose of this study was to identify variables that contribute to the minority student enrollment gap in advanced, AP, and International Baccalaureate (IB) English and Math courses in School Division X. The intended outcome was to identify if student attendance and economic status have a direct correlation with the enrollment gap of minority students in advanced, AP, and IB English and Math high school courses. Glynn and Wassell (2018) noted that despite efforts to impart significant reforms in public education within the US, few gains have been made regarding equity in opportunity among students. This quantitative study consisted of an educational statistic data review from the VDOE and School Division X's Data Warehouse over a 5-year span (2015-2020). Student participation in the academic rigor experienced in advanced,

AP, and IB courses enhance post-secondary opportunities. These opportunities have the potential to affect the future of the economy.

### **Research Questions**

With the use of a multiple regression analysis and descriptive statistics, this quantitative study addressed the following research questions.

1. What is the gap, if any, of minority student enrollment in advanced, Advanced Placement (AP), and International Baccalaureate (IB) Math and English courses in School Division X High Schools from 2015-2020?
2. What are the comparative attendance and economically disadvantaged rates of Asian, Black, Hispanic, and White students in correlation with advanced, Advanced Placement (AP), and International Baccalaureate (IB) Math and English course enrollment in School Division X High Schools from 2015-2020?

### **Overview of the Study**

Minority student enrollment over a 5-year span (2015-2020) in advanced, AP, and IB English and Math courses in School Division X High Schools was assessed for significant gaps Pearson Correlation Coefficient range of  $-1,1$ ) when compared to non-minority student groups. An analysis of secondary data that were obtained from VDOE and School Division X's Data Warehouse was executed. A review and comparison of the correlations if any of attendance and socioeconomic status (free/reduced-price lunch) on minority student enrollment in advanced, AP, and IB English and Math courses in School Division X's High Schools was completed.

This quantitative research design was a correlational study in that the relationship of more than two variables was assessed. Creswell (2014) noted that a correlational design affords the researcher the opportunity to review relationships between variables. A multiple regression analysis was used to conduct the study. This type of analysis allowed the researcher an opportunity to review the durability of the relationship between the dependent variable and independent variables. A multiple regression analysis also assisted the researcher with assessing the importance of each independent variables' relationship to the dependent variable while yielding the statistical elimination of predictors.

## Methodology of the Study

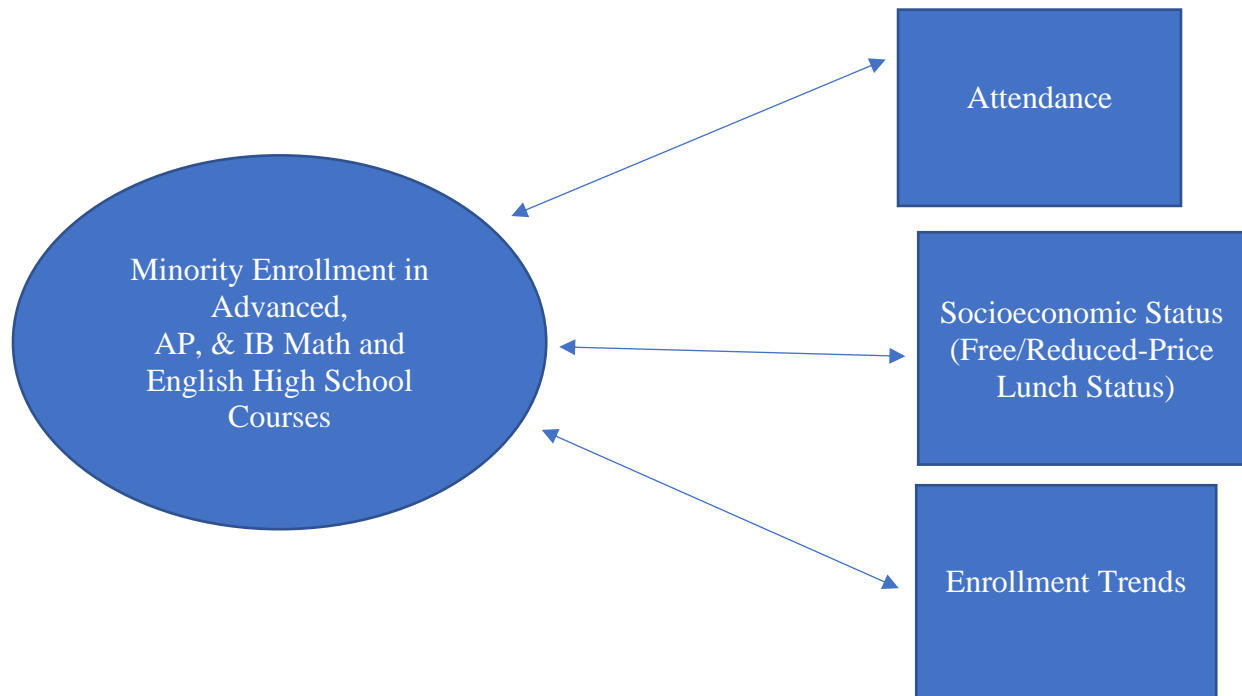
Pre-existing data were used for this study. Public school divisions in the Commonwealth of Virginia are mandated to track course enrollment data each school year. Enrollments counts and demographic information are captured through each school's master schedule and are compiled by school divisions to report to the state. Enrollment data for all School Division X High Schools from 2015-2020 was gathered. Information specific to advanced, AP, and IB English and Math courses was gathered. Division wide and school wide student demographic information such as attendance, economic status, and race was gathered masking any individualized student information.

The VDOE website was used to access the Statistics and Reports for School Division X. This option was used to provide the total numbers of students enrolled in each grade level over the 5-year span. The researcher repeated these steps to gain the total numbers of Black and Hispanic students enrolled in each grade level over the 5-year span. The culminating step the researcher used to gather data were to send a request for information to the Data Quality Assurance Coordinator in the Office of Accountability in School Division X.

The request was detailed asking for the following information:

- Percent of Students by School and Ethnicity
- Percent of Economically Disadvantaged Students by School and Ethnicity
- Percent of Chronically Absent Students by Serving School and Ethnicity
- Percent of Students Enrolled in an Advanced Math Course During each School Year by Ethnicity
- Percent of Students Enrolled in an Advanced English Course During each School Year by Ethnicity
- Percent of Students Enrolled in both an Advanced English Course and an Advanced Math Course During each School Year by Ethnicity

The requested information was used with a goal of revealing emergent themes and patterns within the data.

**Figure 1***Conceptual Framework*

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

There are factors both within and outside of school that have significant correlations with students' academic decisions and performance. The enrollment gap between minority and non-minority students in advanced course work has been significant in public education for a lengthy time frame. A multitude of resources in education dollars are spent yearly to close the educational gaps between minority and non-minority students. Figure 1 displays the factors within and outside of school the researcher believed to have a significant correlation with the minority student enrollment gap in advanced, AP, and IB English and Math courses.

**Definition of Terms**

Listed below are the operational definitions that were used in this study.

**Access** refers to advanced school course offerings in the content areas of English and Mathematics (Office of Civil Rights, 2012).

**Advanced English courses** refer to English courses that are weighted such that an A average yields a 4.5 GPA or higher. This description includes Advanced (Adv.), Advanced



Placement (AP), and International Baccalaureate (IB) English courses. Figure 2 provides an overview of advanced English *courses* in the Commonwealth of Virginia (VDOE, 2020).

**Advanced Mathematics courses** refer to Mathematics courses that are weighted such that an A average yields a 4.5 grade point average (GPA) or higher. This description includes Advanced (Adv.), AP, and IB Mathematics courses. Figure 3 provides an overview of advanced Mathematics courses in the Commonwealth of Virginia (VDOE, 2020b).

**Chronic Absenteeism** refers to a student missing school for at least 10% of a 180-day academic school year (18 or more total days per academic year). The absences include excused absences, unexcused absences, and suspensions (VDOE, 2020a).

## Figure 2

### Commonwealth of Virginia Advanced English Courses

Course Titles	
Adv. English 9	Pre-IBDP English 9
Adv. English 10	Pre-IBDP English 10
Dual Enrollment English 11	IB English I Literature (HL)
AP Language & Composition	IB English II Literature (HL)
Dual Enrollment English 12	IB English II (SL)
AP Literature & Composition	

Note. AP = Advanced Placement; IBDP = International Baccalaureate Diploma Program; IB = International Baccalaureate; HL = higher level; SL = standard level. Adapted from “Board of Education Courses Approved for Advanced and Standard Diplomas,” by the Virginia Department of Education, 2020b (<https://www.doe.virginia.gov/instruction/graduation/approved-courses.docx>).

**Economically disadvantaged** outlines students that meet one of the following criteria: (a) eligible for free or reduced-price meals, (b) receives Temporary Assistance for Needy Families, (c) eligible for Medicaid, or (d) identified as migrant or experiencing homelessness (VDOE, 2012).

**Equity** refers to providing all students no matter their level of ability with resources to be academically successful (Atchison et al., 2017).

**Minority** students refers to Black or Hispanic students for the purposes of this study.

**Race/ethnicity.** The VDOE uses the following descriptors for Black and Hispanic students.

- a. Black or African American. A person having origins in any of the Black racial groups of Africa (VDOE, 2015).

- b. Hispanic/Latino. A person of Cuban, Mexican, Puerto Rican, South or Central American, or other Spanish culture or origin, regardless of race (VDOE, 2015).

**Figure 3**

*Commonwealth of Virginia Advanced Mathematics Courses*

Course Titles	
Adv. Algebra I	Pre-IBDP Algebra I
Adv. Geometry	Pre-IBDP Geometry
Adv. Algebra II	Pre-IBDP Algebra II
Pre-Calculus AB	Pre-IBDP Algebra II - Trigonometry
Pre- Calculus BC	IB Math: Analysis and Approaches I (SL)
AP Statistics	IB Mathematics II (SL)
AP Calculus AB	IB Mathematical Studies (SL)
AP Calculus BC	IB Math: Analysis and Approaches I (HL)
Trigonometry	IB Mathematics II (HL)
Discrete Math	IB Computer Science Standard Level (SL)
Probability and Statistics	IB Computer Science Standard Level (HL)
Computer Math	Adv. Computer Studies
Adv. Computer Math	
AP Computer Science A	
AP Computer Science Principles	
Data Structures and Algorithms	
Multivariable Calculus	
Linear Algebra	

Note. AB = refers to Parts 1 & 2 of the calculus curriculum; BC = refers to Parts 2 & 3 of the calculus curriculum; AP = Advanced Placement; IBDP = International Baccalaureate Diploma Program; SL = standard level; HL = higher level. Adapted from “Board of Education Courses Approved for Advanced and Standard Diplomas,” by the Virginia Department of Education, 2020b (<https://www.doe.virginia.gov/instruction/graduation/approved-courses.docx>).

**Underrepresentation** refers to the disproportionality of a group of students enrolled in advanced, AP, or IB courses when compared to their percentage of enrollment in a school/division.

### Limitations/Delimitations

There are various restrictions within a study that a researcher considers a limitation simply because they are beyond the researcher’s control (Rudestam & Newton, 2014). Various identified limitations within this study are highlighted. Reported attendance data is dependent upon the accurate record reporting of classroom teachers and school division data collection

personnel. Human error in data reporting can affect the reported data. Factors outside of school that impact students' academic success are another limitation of the study.

Rudestam and Newton (2014) noted delimitations as controls of a study implemented by the researcher to omit generalizability of results and home in on the targeted audience.

Knowingly, some high school credit bearing courses are offered at the middle school level. This study will specifically examine high school courses taken at the high school level and omit any high school credit bearing courses taken at the middle school level. Another delimitation of the study is the selection of the school division in which that data will be obtained. The researcher will gather data from one of the largest school divisions in the Commonwealth of Virginia.

### **Organization of the Study**

The study is divided into five chapters. Chapter 1 incorporates a review of the statement of the problem, purpose of the study, research questions, overview of the study, methodology, conceptual framework, definition of terms, limitations and delimitations, and an outline of the organization of the study. Chapter 2 encompasses a review of literature relevant to the topic. Chapter 3 outlines the methodology of the study. In this chapter, the researcher describes the purpose of the study, research design, research questions, population sample, data collection procedures, and data management. Chapter 4 will present data findings, an explanation of the data, and any themes present within the data. Chapter 5 will culminate the study with a summary of major findings, discussion of the results, implications of the findings, suggestions for future research, and the researcher's reflection.

## **Chapter Two**

### **Review of the Research Literature**

#### **Background**

Howard (2010) and Ko and Marx (2019) noted significant gaps in academic performance among Black and Latino students when compared to their White peers and significant achievements gaps between economically disadvantaged students when compared to students from more affluent backgrounds. Colgren and Sappington (2015) and Rowland and Shircliffe (2016) noted that affluent students produce higher academic proficiency levels when compared to their low-income peers. The researchers believed that the lower levels of proficiency were correlated to the shortage of equitable freedoms to participate in rigorous/advanced course content (Colgren & Sappington, 2015; Gambrell, 2007; Gifted Child Today, 2008). A small number of economically disadvantaged students are achieving at the maximum levels. Moreover, they excessively fall out of the maximum-achieving group during elementary and high school (Gambrell, 2007; Gifted Child Today, 2008). When analyzing the quality of academic programming available to White students when compared to minority students, Marzano et al. (2005) indicated that experiencing high quality academic programs yield significant impacts student academic achievement.

Studies showed that often, economically disadvantaged students begin school with lower cognitive abilities than their affluent peers, attend schools with less funding and resources, and participate less in advanced classes in high school (Covay, 2011; Gambrell, 2007). Research also revealed that over three million students from economically disadvantaged backgrounds transcend and learn at the maximum levels; however, they increasingly lose educational ground over time (Anderson & Chang, 2011; Conger et al. 2009). Conger et al. (2009) discussed the educational quality received in primary schools (pre-high school disparity) as a significant factor impacting minority student preparedness and enrollment in advanced courses in high school. Primary school was designated as the most prominent educational level in which low-income and minority students get separated and/or fall out of high achieving groups (Barnard-Brak et al. 2011; Covay, 2011; Gambrell, 2007).

Marshall (2014) revealed that education is a human right; yet there are humans determining which individuals have access to education. While cultural values can dramatically

influence education designs and decisions, there are individuals in all cultural environments that are educated and make decisions concerning education access (Marshall, 2014; Rodriguez & McGuire, 2019). Considering the educational inequities of teaching and learning in schools with limited resources and large minority populations, minority and low-income students have been vulnerable throughout history to consequences of school failure (Cha, 2015; Maldonado et al., 2018). From the time lower income students enter school through the conclusion of their high school career, they increasingly perform at lower proficiency levels when compared to their affluent peers (Covay, 2011; Gambrell, 2007; Gifted Child Today, 2008; Marshall, 2014).

Marshall (2014) noted that because learning does not happen in isolation, entities that are a part of our culture (e.g., societal norms, history, and religion) are intertwined throughout. Culture impacts curriculum which in turn impacts the knowledge delivered to students (Marshall, 2014). Covay (2011) reported that the racial composition of a classroom often influences the content covered. Despite numerous major reform efforts in public education, few gains have been made regarding equitable access for students in the United States (Glynn & Wassell, 2018).

Kettler and Hurst (2017) revealed that for decades there has been inequitable presence across race and ethnic groups in advanced and Advanced Placement (AP) courses. The inequitable participation in advanced courses was further supported in other studies. Colgren and Sappington (2015) found that White students have exposure to elite educational programs both at school and outside of school thus generating a racial divide in public education. The racial divide noted by previous researchers in public education coupled with other entities such as childhood poverty continued to create academic challenges for students (Colgren & Sappington, 2015).

Ford (2010) discussed the statistically significant underrepresentation of Black and Hispanic students in gifted and talented and advanced education programs. It was specifically noted the underrepresentation of Blacks by 48% in advanced and gifted settings in US schools. She also noted that Hispanic students were underrepresented by 38% and Black and Hispanic males overall are the most underrepresented groups in advanced and gifted education (Ford, 2010). Covay (2011) stated that equal access to advanced courses could have a direct correlation with reducing pervasive racial achievement gaps in the United States.

Anderson and Chang (2011) reported that students that attended rural high schools appear to have decreased access to AP mathematics courses. This may be due to the finding that high schools with small student populations often have fewer advanced course options (Anderson &

Chang, 2011; Barnard-Brak et al., 2011). Achieve, Inc. (2013) stated that minority and economically disadvantaged students are less likely to have accessibility to enroll and excel in advanced-level math courses in high school than their more affluent peers. Hallett and Venegas (2011) discussed the intricacies of equity versus quality of AP courses in schools servicing minority and low-income students. AP course quality depends heavily upon teacher preparation, school resources, and students' previous knowledge (Hallett & Venegas, 2011; Kettler & Hurst, 2017).

It is imperative for academic rigor to be a component of equity if educators have any hopes of closing the advanced course disparity gap between minority students and White and/or Asian students (Kettler & Hurst, 2017). Covay (2011) reported that minority students are often exposed to less rigorous course content when taking advanced courses. In this study classes with the same titles were examined with regards to content coverage and depth while accounting for the classroom minority composition. Covay (2011) concluded that similar courses titles does not equate to similar content coverage. Stakeholders must be cognizant that similarity in course title does not equate to equal learning opportunities (Covay, 2011).

It is not uncommon for there to be an overrepresentation of white students and the absence of minority students in college preparatory/AP courses (Welton & Martinez, 2014). Ethnic minorities and females are still underrepresented in advanced level STEM courses (Ko & Marx, 2019). Barnard-Brak et al. (2011) indicated that students who are Hispanic and African American are underrepresented in AP courses. While both groups are underrepresented, Kettler and Hurst (2017) indicated that the pertinent factors connected with Black-White and Hispanic-White participation gaps differ.

Hanson et al. (2017) reported that Hispanic students that do not speak English as a first language have been underrepresented in advanced level courses simply because the schools, they attend often lack resources and higher-level course curriculums. Hanson et al. (2017) also discussed language barriers as an indicator that could account for the underrepresentation of Hispanic students regardless of their English language learner status in advanced level courses. Barnard-Brak et al. (2011), Clark et al. (2012), Cha (2015), Garland and Rapaport (2017), and Kolluri (2018) reported that while there has been a significant increase in African American and Hispanic student enrollment in AP courses, these groups remain seriously underrepresented when compared to Asian students who remain overrepresented in AP courses.

The College Board (2014) reported that between 2012 and 2013, representation of African American students in AP courses increased in 30 states and representation of Latino students increased in 28 states. Despite these increases, there are still significant gaps in academic achievement among Blacks and Latinos and their White peers regarding AP exam scores and class grades (College Board, 2014). Klopfenstein (2004) and Hanson et al. (2017) concluded that even when AP courses are offered in majority minority schools, Black and Hispanic students do not have equal entry to the courses due to not meeting required prerequisites.

Low-income and lack of teacher recommendation was noted as significant barriers regarding equal access to AP courses (Klopfenstein, 2004). Clark et al. (2012) reminded researchers to keep in mind that White students are also included in low-income groups which places minority enrollment in AP courses at even lower rates than suggested when barriers both inside and outside of school are considered. This was due to the notion that White students overcome income barriers with regards to academics at higher and faster rates than Black and Hispanic students (Clark et al., 2012; Hanson et al., 2017).

### ***Benefits of AP Course Enrollment***

Klopfenstein (2004) reported that the culture of academics offered by AP programs are usually beneficial to minority students who often are not exposed to a learning culture outside of school. Kettler and Hurst (2017) reported that student participation in AP courses often yield higher student GPAs and student exposure to higher quality teachers. Various researchers reported that enrollment and completion of at least one AP course in high school assists with the college admissions process (Conger et al., 2009; Covay, 2011; Garland & Rapaport, 2017; Hanson et al., 2017; Kettler & Hurst, 2017; Santoli, 2002; Shaw et al., 2012). Various researchers also reported that entry to AP courses is a pertinent issue for all students (Barnard-Brak et al., 2011; Clark et al., 2012; Hanson et al., 2017; Rowland & Shircliffe, 2016). Colgren and Sappington (2015) observed a significant correlation between increased enrollment in AP courses and improved scores on the ACT exam. Furthermore, Kettler and Hurst (2017) noted that completion of AP courses is correlated to successful academic achievement during students' first year of college.

Challenge Success (2013) reported that in a study of the college admissions process for 539 schools; 519 schools considered AP course experience in their admission decisions. Shaw et al. (2012) and James et al. (2017) reported that AP courses are a significant factor in the college admissions process of over 600 universities spanning across 60 nations. Schools were strongly advised to increase AP enrollment among minority and economically disadvantaged students (James et al. 2017; Lane et al., 2014). James et al. (2017) reported a correlation among lack of AP course enrollment, diminished enrollment, and fulfillment of college programs.

### ***Criticisms of AP Course Enrollment***

Wildhagen (2014) discussed how equity issues within education have been a major obstacle that has contributed to minority underrepresentation in advanced and AP courses. Accountability, equity, and teacher experience are the three recurring themes that have been categorized as pitfalls for students participating in AP courses throughout the US (Kettler & Hust, 2017). Rebak (2008), Siemer (2009), and Kettler and Hurst (2017) noted that accountability policies often have a negative impact on minority student enrollment in advanced and AP courses. Rowland and Shircliffe (2016) reported that accountability policies such as raising academic expectations and reducing racial and class disparities failed to address the academic needs of minority students and create barriers for AP course participation. The lack of free and accessible resources to assist with academic success was listed as a major obstacle (Wildhagen, 2014).

Minority student access to advanced and AP courses is sometimes blocked due to the structure (final grade pre-requisites in prior courses and teacher recommendations) of the advanced academic program within a school (Wildhagen, 2014). Kettler and Hurst (2017) noted that most often teachers of minority students at high poverty schools have fewer than 3 years of teaching experience, show less productivity gains with regards to student performance, and display the negative effects of teacher burnout (Kettler & Hurst, 2017). The teachers lack training to teach advanced level and AP courses. However, this is overlooked so that the school can have advanced course offerings available for students (Kettler & Hurst, 2017). In this case, the content and pace of an AP course at a high poverty school is significantly different than the same course taught at an affluent school (Wildhagen, 2014). This highlights issues of equity connected to content and curriculum delivered to students taking the same course at different



schools (Wildhagen, 2014). Wildhagen (2014) also noted at times, the schools are within the same school division.

Race inequalities are magnified when analyzing AP exam subject area data. College Board (2014) and Kolluri (2018) presented data explaining that African American students are marginalized in all AP exam subject areas. Research goes a step further and reveals that, Latino students are underrepresented in all AP exam subject areas except Spanish Language, Spanish Literature, and Italian Language and Culture (College Board, 2014). Kolluri (2018) also noted that scholars believe that the push for access and equity in AP courses has diluted the effective college preparation AP courses were historically created to implement. How can this be if resources are made readily available to assist with academic success? This is due to the notion that AP courses were never designed to be equitable and were designed to serve the academic elite (Kolluri, 2018). It is further believed that equity in AP courses would essentially grant access to students from marginalized communities that lack preparation for the academic rigors of AP courses (Garland & Rapaport, 2017; Kolluri, 2018).

### *Advanced Course Enrollment Statistics*

Rich (2013) reported that, every year, more than 600,000 academically promising high school students, most of them poor, Latino or Black fail to enroll in AP courses. The two main factors behind this result are that some students do not know about these courses and many are kept out of the courses by perceptions from educational staff, whose referrals are needed or required for course participation (Barnard-Brak et al., 2011; Ko & Marx, 2019; Rich, 2013). Theokas, director of research for Education Trust was quoted, if underrepresented students had taken AP courses at the same rate as their white and more affluent peers in 2010, there would have been about 614,500 more students in those classes (Rich, 2013). Garland and Rapaport (2017) and Kolluri (2018) noted that almost three-quarters of minority students attend secondary schools offering between 19 and 27 advanced and AP courses yet minority students demonstrating comparably high abilities complete three or fewer AP courses amid their high school careers.

Klopfenstein (2004) reported that, Black and Hispanic students enroll in AP courses at almost half the rate of White students. Klopfenstein (2004) and Conger et al. (2009) reported that affluent Asian and White students enroll in advanced courses at maximum rates when compared

to all other ethnic groups. Low socioeconomic status was listed as the key factor for this statistic (Klopfenstein, 2004). James et al. (2017) reported that, while Black and Latino students represent 38% of the students in United States schools that offer AP courses, they only account for 29% of students enrolled in at least one AP course.

Clark et al. (2012) reported that Whites comprise the largest ethnic group of students participated in AP courses within an urban school district. It was also reported that minority students enrolled in AP Math, Science, and English courses at diminished rates when compared to White students (Garland et al., 2017; Klopfenstein, 2004). AP STEM enrollment areas magnify minority underrepresentation (Kolluri, 2018). Black students make up 2.5% of AP Physics C enrollment and Latino students make up 7.3% (Kolluri, 2018). African American students make up 2.8% of AP Calculus BC enrollment and Latino students make up 8.7% (Kolluri, 2018). Black and Hispanic students comprise a combined 13.2% enrollment in AP Computer Science (Kolluri, 2018).

United States public school enrollment data noted the inequitable entry to advanced world language courses for minority students and encouraged educators to ensure that all students could enroll in advanced study courses in world languages (Glynn & Wassell, 2018). Advanced level language courses in high schools are filled predominantly by White students and African American students are less likely to enroll in AP language courses when compared to all other student groups (Glynn & Wassell, 2018). The Broad Foundation (2013) reported that the number of minority AP exam takers increased from 83,000 in 2002 to 263,000 in 2012. Even with this significant growth, Black students continue to be the most marginalized group in AP classrooms and produce the lowest AP exam scores (Broad Foundation, 2013).

### ***Advanced Math Enrollment Statistics***

Students enrolled in predominantly minority schools often have fewer opportunities to experience rigorous math content (Walker, 2007). Covay (2011) reported that Black students often benefit less when taking advanced math courses because Black students do not build math skills in the same ways as White students. This statement was built on the notion that equal access doesn't equate to equal practice opportunities (Covay, 2011). It was reported that while White students were strengthening their advanced math skills in advanced courses, Black students were working to strengthen their basic math skills in the same courses (Covay, 2011;

Riegle-Crumb & Grodsky, 2010). There remain differences in secondary advanced math course participation amid students grouped by race/ethnicity and socioeconomic status (Anderson & Chang, 2011; Walker, 2007).

Klopfenstein (2004) and Maldonado et al. (2018) suggested that urban schools take precaution of segregational pattern implications and the effects of student participation in advanced level math courses. Segregational patterns were identified in classrooms within urban schools in which the student composition lacked diversity (Klopfenstein, 2004; Maldonado et al., 2018). In a study conducted by Thurston et al. (2019), ability grouping, and tracking stability were listed as significant reasons that influenced minority student participation in advanced math courses. Anderson and Chang (2011) reported that approximately 5% of rural high school students in the United States, tend to begin their high school experience studying a lower-level mathematics than their counterparts in Urban Fringe or Central City high schools. For the sake of the study, Anderson and Chang (2011) defined rural as small towns in which the population is less than 2,500, Urban Fringe was defined as a large town in which the population is greater than or equal to 25,000, and Central City was defined as cities of all metropolitan statistical areas.

It was reported that fewer than 40% of rural high school students participated in Advanced Mathematics or Calculus, when compared to 60% high school graduates from Urban Fringe high schools that finished high school with Advanced Mathematics or Calculus course on their transcript (Anderson & Chang, 2011). Rural high school students often took their last mathematics course before their senior year when compared to students from non-rural high schools. This factor could potentially alleviate enrollment in advanced and AP mathematics courses. It was also reported that the rate Asian students participated and successfully completed advanced math courses three times more often than Black or Hispanic students. White students participated and successfully completed advanced math courses at a rate twice that of Black or Hispanic students (Anderson & Chang, 2011).

The National Center for Education Statistics (2012) reported that, about 71% of Black and Hispanic high school graduates take Algebra II and/or some trigonometry, compared with 83% of Asian and 77% of White high school graduates. The study further reported that approximately 70% of students in schools with in which 70% of students eligible for free/reduced-price lunch take Algebra II and/or some trigonometry at a 10% reduced rate when correlated to students in more affluent schools (National Center for Education Statistics, 2012).

The statistics highlighted differences by race and by the socioeconomic status of a school. The Civil Rights Data Collection (2012) reported that, while 82% of the schools in diverse districts serving the fewest Black and Hispanic students offer Algebra II, only 65% of the schools serving the most Black and Hispanic students offer students the same course. The data also showed that less than one third of high schools serving the most African American and Hispanic students offer Calculus, compared to 50% of all schools (Civil Rights Data Collection, 2012).

Graduation requirements can also be considered a contributing factor to minority low enrollment in advanced math courses. Cha (2015) reported that Algebra I is a required course for graduation completion in 26 states while Algebra II is a graduation requirement in only six states. The lack of advanced math requirements needed to graduate high school may attribute to fewer minorities enrolling in advanced level math courses (Cha, 2015; Covay, 2011).

### ***Advanced English Enrollment Statistics***

Jeffries and Silvernail (2017) noted various factors such as perceived course rigor, teacher involvement, parent involvement, and peer pressure/cultural identity that influence minority students' decision to enroll in advanced English courses. Hanson et al. (2017) noted significant gaps in Hispanic student participation in advanced English courses at the high school level regardless of their English learner status. It was further noted that too much emphasis was placed on previous GPA and previous performance on standardized assessments when reviewing access and enrollment of Hispanic students in advanced English courses (Hanson et al., 2017). While students enter high school with various levels of academic preparation, the pedagogical techniques of instructors can positively impact a classroom culture of diverse student talents and achievement ranges (Jefferies & Silvernail, 2017).

Young (2016) reported that African American students often opt out of taking advanced English courses due to perceived level of rigor and the perception that lower track courses are easier. Witenko et al. (2017) reported that a supportive network which includes parental support and peers being enrolled in similar courses significantly affected minority students' enrollment in English and other advanced courses. Positive involvement verses negative involvement of teachers was identified as significantly affecting minority student enrollment in advanced English courses (Siegle et al., 2014). Friend and Degen (2007) noted that education reform was

needed in the areas of teacher recommendations specifically as they relate to advanced course enrollment for students.

It was also noted that minority underrepresentation in advanced level English courses was linked to teacher recommendations on course completion and success (Friend & Degen, 2007). Teacher support of preparing students for advanced course work at the middle school level was linked to being impactful regarding minority student participation and success in advanced, AP, and IB English courses at the high school level. Implementing an open-enrollment policy at the high school level, positive teacher attitudes towards classroom diversity in advanced courses, and teachers maintaining high expectations for all students were directly linked with the increased participation of minority students in advanced English courses (Friend & Degen, 2007; Siegle et al. 2014).

Cultural identity and a sense of belonging was also linked to decreased minority student enrollment in advanced English courses (Jefferies & Silvernail, 2017). A perceived rejection from peers due to being labeled as a nerd or lacking the basic skills sets were linked to minority student decisions not to participate in advanced English courses (Legette, 2017). Roegman and Hatch (2016) noted that exposure to academic rigor in primary years can impact minority student participation in advanced English based courses in secondary school years. Challenge Success (2013) noted that student enrollment in advanced English courses at the high school level was directly related to improved student performance on SAT and ACT assessments. It was also noted that student enrollment in advanced and AP English courses at the high school level could be correlated to boosting college admission chances (Challenge Success, 2013).

### ***Attendance and Advanced Course Enrollment***

VDOE (2020a) noted the increased focus on attendance by administrators, educators, and school divisions across the state as a significant factor that impacts students' academic success. Chronic absenteeism has been associated with low academic achievement, high school dropouts, and unfavorable outcomes post high school (VDOE, 2020a). Allen et al. (2018) reported that chronic absenteeism has immediate lasting effects that negatively affect academic performance and high school graduation rates. Garcia and Weiss (2018) also reported that chronic absenteeism was linked with a significant reduction in academic performance. Balfanz and Byrnes (2012) reported that attendance strongly impacts graduation and dropout rates. It was also

reported that maximum-achieving lower income students drop out of high school or do not graduate on time at a rate twice that of their more affluent peers (Gambrell, 2007; Gifted Child Today, 2008).

Gage et al. (2013) reported that approximately 9% of United States students are absent from school daily with most of those students being identified as Black and Hispanic. Garcia and Weiss (2018) also reported in their study that minority students account for most students that are reported chronically absent across all grade levels. It was further discovered that truancy was linked to grade retention and course selection across all grade levels (Gage et al., 2013). A review of data indicated that most truant students enrolled in grade levels courses and did not enroll in advanced, AP, or IB level courses (Gage et al., 2013). The lack of participation of truant students in advanced classes was further reinforced by the lack of teacher recommendations to enroll in advanced courses (Gage et al., 2013; Schneider & Saw, 2016).

Childs and Lofton (2021) reported that students who are chronically absent often do not benefit from the many robust educational reforms put in place by schools to support academic achievement and rigor. Many reforms have been put in place at the secondary level to increase minority student enrollment in advanced courses (Child & Lofton, 2021; Schneider & Saw, 2016). It was further noted that educational policies regarding chronic absenteeism can distract from the various causes that have a direct impact on educational achievement and opportunities for underrepresented students (Childs & Lofton, 2021; Gage et al., 2013 ). It was revealed that once schools develop an effective conceptual framework that will positively affect chronic absenteeism, all students will benefit from education reform initiatives thus closing opportunity and education gaps among racial groups (Child & Lofton, 2021; Schneider & Saw, 2016).

The research shows that students need to attend school daily to be academically successful (Balfanz & Byrnes, 2012). Schools need to first identify which students are truant and which students are chronically absent before they can institute reform that will improve attendance and positively impact academic performance for all students (Balfanz & Byrnes, 2012; Child & Lofton, 2021). Chronically absent students are identified as students that are absent 10% of the academic school year for any number of reasons (Balfanz & Byrnes, 2012). It was further reported that low-income students begin becoming chronically absent in middle school and continue this behavior through high school (Balfanz & Byrnes, 2012; Child & Lofton,

2021). Balfanz and Byrnes (2012) also reported that achievement gaps which are increased at the elementary, middle, and high school levels are a result of chronic absenteeism.

### *Challenges*

Research indicated that while efforts to boost minority participation in advanced and AP courses have been successful, a noticeable participation gap still exists between minority and White students (Kettler & Hurst, 2017; Kolluri, 2018; Rowland & Shircliffe, 2016). Some researchers believed that minority student expanded access to advanced and AP courses is a smoke screen to mask persistent inequities in academic programs (Hallett & Venegas, 2011). Research revealed that African American educators still possess concerns about the lack of access to AP courses for African American students because of schools' educational programs (DeVance Taliaferro & DeCuir-Gunby, 2008). Educators believed that while experiences outside of school impact a student's decision to participate in advanced level coursework, gaps in the research exist with regards to minority student access to AP coursework as mediated by school characteristics (Gagnon & Mattingly, 2016).

Inadequate academic preparation for AP class content and rigor had to be one of the biggest hurdles minority students will endure during the quest for equity (Jeffries & Silvernail, 2017; Kolluri, 2018). Jeffries and Silvernail (2017) found that actual rigor versus perceived rigor proved to be a barrier with regards to minority student participation in advanced and AP courses. Research data suggested that as achievement gaps remain consistent or widened, low-skilled students will have trouble succeeding in advanced and AP courses (Kolluri, 2018). Early preparation for minority students is needed in advanced courses to have a chance of being successful in AP courses during their junior and senior years in high school (DeVance Taliaferro & DeCuir-Gunby, 2008). Parental advocacy was also revealed as a challenge for minority student enrollment in advanced and AP courses. DeVance Taliaferro and DeCuir-Gunby (2008), Borg et al. (2011) and Jeffries and Silvernail (2017) noted that minority parents often feel that they do not have the information needed to advocate for academic opportunities/programs for their students.

Teacher support is also pertinent to make an effective impact in closing the gap of minority student participation in advanced and AP courses. Teacher support within the school environment to assist with creating a culture of inclusion and setting high expectations are the

support avenues needed for African American students to succeed in advanced level course work (Borg et al., 2011; DeVance Taliaferro & DeCuir-Gunby, 2008). Jeffries and Silvernail (2017) also revealed that teacher instructional strategies are a reoccurring theme that often blocks qualified minority students from participating in advanced and AP courses. Students within the study reported avoiding advanced and AP courses due to previous negative instructional interaction with teachers (Jeffries & Silvernail, 2017). Borg et al. (2011) and Rowland and Shircliffe (2016) noted that a mindset shift for teachers will be needed pertaining to minority student success in advanced level coursework.

Peer pressure and cultural identity was also highlighted as a barrier which affects minority student participation in advanced and AP courses (Jeffries & Silvernail, 2017). Hallett and Venegas (2011) discussed student perceptions of AP courses which can also present a challenge with regards to enrollment and participation. Students revealed reasons which prevented them from enrolling in AP courses. Some of the listed reasons revealed that teachers were unmotivated and unprepared, the course material did not match the material on the AP exam, and negative class experiences because of school based instructional difficulties (Hallett & Venegas, 2011).

Rowland and Shircliffe (2016) and Thurston et al. (2019) reported that school academic tracking systems have played an intricate role with regards to the rate in which students participate in advanced level coursework. Tracking systems often widened educational gaps among students making it difficult for students to move to high track assignments over time thus limiting access to advanced level coursework (Thurston et al., 2019). Track exclusiveness is defined as the extent to which access to high status positions/resources is restricted (Thurston et al., 2019). This form of tracking coupled with other reasons influenced student academic achievement (Rowland & Shircliffe, 2016; Thurston et al., 2019). Diminishing and/or removing the barriers mentioned above could yield greater equality for all student participation in advanced level coursework to include poor White students (Rowland & Shircliffe, 2016).

### **Implications for Schools**

Kristen Klopfenstein, the executive director of the Education Innovation Institute at the University of Northern Colorado revealed that the same characteristics which cause students to take and excel in AP classes mirror the characteristics that cause those same students to go to



college and excel (Klopfenstein, 2004). Family support, a college-going culture at home, and high schools with a college-going culture were all listed as characteristics that impacted students' decisions to enroll in advanced courses (Rich, 2013; Shaw et al., 2012). Kettler and Hurst (2017) identified school factors such as minority AP teachers, teacher expectations, and school connectedness as having positive impacts on minority student participation in advanced and AP courses (see Figure 4 for an expanded list). Klopfenstein (2004), Rowland and Shircliffe (2016), and Kettler and Hurst (2017) noted various options that could potentially increase minority student enrollment in advanced coursework. The options listed included AP incentive programs, hiring highly qualified teachers to serve as mentors for minority students, promoting AP instructional training for teachers, and implementing teacher and student incentive programs. (Kettler & Hurst, 2017; Klopfenstein, 2004; Rowland & Shircliffe, 2016).

#### **Figure 4**

##### *Factors That Contribute to Adv., AP, & IB Course Enrollment*

Academic Preparation	Incentive Programs
Attendance	Minority Adv., AP, & IB Teachers
Classroom Diversity	School Connectedness
College-Going Culture at Home	Supportive Family
Funding	Teacher Expectations
High School With a College-Going Culture	Teacher Mentors
Hiring Highly Qualified Teachers	Teacher Training

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

Clark et al. (2012) believed that schools should work to ensure that enrollment in AP courses is reflective of their student body population. Rich (2013) reported there have been several efforts to overcome the obstacles of getting economically disadvantaged Black and Latino students enrolled in AP courses. An increasing number of school districts have worked to implement initiatives that increase AP course options and increase Black and Hispanic student participation (Rich, 2013). School districts have also worked to increase advanced course enrollment for students that are economically disadvantaged and first-generation college students (Rich, 2013). Barnard-Brak et al. (2011) reported updated federal funding policies that allot funds specifically to increase advanced math and science course participation for economically disadvantaged and minority students.

The role of teacher referrals for placement in advanced courses is a suggested barrier to course enrollment (Barnard-Brak et al., 2011; Ford, 2010; Rowland & Shircliffe, 2016). Walker (2007) and Ford (2010) expressed that teachers' lack of advanced course recommendations for minority students stem from inappropriate reasons such as using minority students that perform above average academically to assist with minority students that perform significantly below average academically in other courses. The school district in Orlando, abandoned the requirement of teacher recommendations for AP classes, and schools reviewed data from Preliminary SAT (PSAT) exams more extensively to identify students with the aptitude for more rigorous courses (Rich, 2013; Rowland & Shircliffe, 2016; Vaughn, 2010). Conversely, Klopfenstein (2004) reported that some schools use PSAT and/or SAT scores to limit student enrollment in AP courses. Anderson and Chang (2011) reported that school districts should advocate for more students to enroll in Algebra I by Grade 8 so that students have the option to enroll in at least one advanced or AP mathematics course in high school. This implied that schools must have strong elementary and middle school curriculum programs (Anderson & Chang, 2011).

Gifted Child Today (2008) reported that educators should increase their expectations for economically disadvantaged students and institute impactful strategies for maintaining and expanding advanced learning. Walker (2007) suggested that students' talents be the main focal point of schools rather than preconceived deficiencies and provide a school culture that supports academic rigor, enrichment, and advanced opportunities for all students. Anderson and Chang (2011) reported that a collaborative effort among educators and researchers is needed to comprise initiatives that will assist students with developing an interest in studying mathematics and promote opportunities outside of the school when students in any location have strong mathematical cognitive abilities. Maldonado et al. (2018) urged educational policymakers to place an intensive focus on equitable learning in math so that all high school students can exceed minimum graduation requirements and enroll in at least one advanced level math course.

Barnard-Brak et al. (2011) suggested that funds should be allocated to schools with higher percentages of students from minority backgrounds and lower socioeconomic statuses to develop AP courses. Researchers noticed a demand for effective ways of locating students for special programs that could potentially lead to AP coursework, including a need for culturally conscious placement instruments (Barnard-Brak et al., 2011). If AP courses are to be used

adequately to foster a difference in underserved schools, it will need to be part of an expansive initiative that includes changes in professional development and curriculum sequencing to improve the preparation of students for college-level work (Challenge Success, 2013).

Walker (2007) noted that teachers' perceptions of their students and their students' capabilities impact the type of curriculum, instruction, and assessment teachers offer to a fault. It has been reported that there are instances when teachers may present lower-level curriculum even in advanced classes based upon perceptions (Darling-Hammond, 2004; Walker, 2007). It was also reported that schools serving large populations of minority students emphasized providing less instead of more challenging content especially with regards to mathematics (Walker, 2007). Conger et al. (2009), Kelly (2009), and Cha (2015) reported that even when advanced courses are available to minority students, the school culture is not supportive of minority student enrollment in advanced courses. Ford (2010) discussed three large problems that schools face with regards to minority underrepresentation in advanced and gifted education; two of which are pertinent, deficit thinking and culture-blindness.

Colgren and Sappington (2015) noted that inequity in educational opportunities between White and minority students is not only based upon limited access to academic rigor, but instead course design also plays a significant role. It was further noted that achievement equity will require educators' attention to culturally responsive pedagogy (Colgren & Sappington, 2015). Goldsmith (2004) reported various studies which showed that negative school and classroom experiences have impactful effects on students' academic achievements and ambitions. Walker (2007) noticed that it is imperative for educators to ensure minority students develop a diverse peer network that supports academic achievement in different content areas (Walker, 2007).

Educators should recognize the importance between transactional and transformation change to truly make an impact in the achievement gaps between minority and White students (Colgren & Sappington, 2015). Research showed that inequities with regards to access of classroom rigor for African American students is significant at predominantly White high schools (Kolluri, 2018). Howard (2010) stated that transformative action will be the result of educators shifting their philosophical and pedagogical way of thinking and practicing. It was reported that educators can no longer allow the culture of the students they educate influence their perceptions about the students' intellectual capabilities (Colgren & Sappington, 2015).

Advanced, AP, and IB course enrollment disparity trends in the Commonwealth of Virginia would be of interest to review for perceived correlating factors both inside and outside of school. The review of the literature encompassed (a) benefits of taking advanced courses; (b) an overview of Black and Hispanic enrollment rates in advanced, AP, and IB courses; (c) the academic barriers that have been linked to minority student participation in advanced courses; (d) outside factors that have been noted as barriers to student enrollment in advanced courses; (e) equity as a precursor to minority student participation in advanced courses; (f) challenges for schools; and (g) implications for schools. Quantitative and qualitative studies were examined to gain a deeper awareness of any noted enrollment gaps over time and noted barriers to enrollment of minority students in advanced courses.

Data on this topic are of importance to educators across the Commonwealth of Virginia. The VDOE and College Board maintain student data with regards to AP course enrollment which will shed some light into the enrollment trends of minority students over time and more specifically in Virginia. The decision to review enrollment trends in advanced, AP, and IB courses in Virginia high schools as a follow up to the study conducted by Ballard (2015) in which he examined student entry to advanced math and science courses as a measure of college readiness in Virginia Public Schools would highlight current gaps in the literature. Ballard (2015) suggested examining course enrollment across four dependent variables.

Uncovering the barriers that have sustained the minority enrollment disparity and suggesting tangible options to significantly shrink the disparity over time for students in Virginia high schools is worth reviewing. Educators often look to administrators and experts in the field of how to improve educational services and resources for all students. Research has indicated that one of the ways in which schools have tried to close Black-White gaps in AP course enrollment is by increasing the number of AP courses available to students (Rodriguez & McGuire, 2019). While more course offerings increased minority student enrollment in at least one AP course, Black-White enrollment gaps were maintained (Rodriguez & McGuire, 2019).

The sustainability of enrollment gaps was attributed to White students enrolling at higher rates, Black students' decisions not to enroll in advanced courses, and schools with large economically disadvantaged populations having limited AP course options (Conger et al. 2009; Klopfenstein, 2004; Rodriguez & McGuire, 2019). Rodriguez and McGuire (2019) deduced that an increase in course offering will not significantly close the Black-White enrollment gap in AP

courses. After reviewing various printed professional journal articles, searching collegiate databases to include ERIC and EBSCO Host, and obtaining published dissertations from the Virginia Polytechnic Institute and State University database, even with the gains in minority advanced course enrollment over time, there is a continued disparity of minority representation in advanced courses as a topic of discussion. The literature continuously highlighted the need for assistance with equity initiatives for minority and underrepresented students in public education with regards to advanced course enrollment and opportunities.

The literature review indicated an increase of minority student enrollment in advanced, AP, and IB courses over time. While this is a move in the right direction regarding educational advances, there is still a need to review the disparities of minority student representation in advanced, AP, and IB courses when compared to their White and Asian classmates. Delving into the data reported by high schools highlighted trends regarding minority student enrollment and possible barriers. The obtained information proved to be beneficial for school divisions when working to close educational gaps.

## **Chapter Three**

### **Methodology**

This chapter delves into the research design and methodology for this quantitative study. The purpose of the study was outlined, and the research questions were listed. There was an overview of the secondary data that were obtained from all high schools within School Division X located in the Commonwealth of Virginia. There was also a review of the independent and dependent variables within the study. The processes that were used to gather, manage, and analyze data were described.

#### **Purpose of the Study**

The purpose of this study was to identify variables that contribute to the minority student enrollment gap in advanced, Advanced Placement (AP), and International Baccalaureate (IB) English and Math courses in School Division X. The intended outcome was to identify if student attendance and economic status have a direct correlation with the enrollment gap of minority students in advanced, AP, and IB English and Math high school courses. Glynn and Wassell (2018) noted that despite efforts to impart significant reforms in public education within the United States, few gains have been made regarding equity in opportunity among students. This quantitative study consisted of an educational statistic data review from the Virginia Department of Education (VDOE), and School Division X's Data Warehouse over a 5-year span (2015-2020). Student participation in the academic rigor experienced in advanced, AP, and IB English and Math courses enhance post-secondary opportunities. These opportunities have the potential to impact the future of the economy.

#### **Research Design & Rationale**

Minority student enrollment over a 5-year span (2015-2020) in advanced, AP, and IB English and Math courses in School Division X High Schools was assessed for significant gaps when compared to non-minority student groups. An analysis of secondary data obtained from the VDOE and School Division X's Data Warehouse was executed. There was also a review and comparison of the perceived correlations of attendance and socioeconomic status (free/reduced-price lunch) on minority student enrollment in advanced, AP, and IB English and Math courses in School Division X's High Schools.

This quantitative research design was a correlational study in that the relationship of more than two variables was assessed. Creswell (2014) noted that a correlational design affords the researcher the opportunity to review relationships between variables. A multiple regression analysis was used so that the researcher was able to simultaneously examine the possible impacts of all variables within the study. A Pearson Correlation Coefficient was used to examine the correlation between minority student enrollment in advanced, AP, and IB English and Math courses and, attendance and socio-economic status. A Pearson Correlation Coefficient has a range of  $(-1, 1)$ , with 0 indicating no relationship between the variables and the larger absolute values indicating a significant relationship between variables.

### **Research Questions**

With the use of regression analysis and descriptive statistics, this quantitative study addressed the following research questions.

1. What is the gap, if any, of minority student enrollment in advanced, Advanced Placement (AP), and International Baccalaureate (IB) Math and English courses in School Division X High Schools from 2015-2020?
2. What are the comparative attendance and economically disadvantaged rates of Asian, Black, Hispanic, and White students in correlation with advanced, Advanced Placement (AP), and International Baccalaureate (IB) Math and English course enrollment in School Division X High Schools from 2015-2020?

### **Sample Selection**

The VDOE (2011) requires all schools to collect and report master schedule course information as part of federal mandates. The gathered information contains state course codes, information about the instructor, and information about the students enrolled in the courses. The information gathered for students includes ethnicity and socioeconomic status data. Attendance data are also captured for all students under the mandatory school attendance mandates of the Code of Virginia Compulsory Attendance Law (VDOE, 2018). It is worth noting that religious exemptions of school attendance are recognized in the Commonwealth of Virginia (VDOE, 2018). Advanced, AP, and IB English and Math course information was included in the data gathered by the state. Middle School students can take advanced level math courses for high

school credit in School Division X Public Schools. For this study, only the enrollment information from School Division X Public High Schools was gathered and reported.

School Division X was chosen for this study because the researcher watched the trends in enrollment data over the past 8 and a half years specifically at the high school level. There has also been a recent push by superintendent personnel to increase the number of minority and economically disadvantaged students enrolled in at least one advanced course during their high school tenure. In 2020, several of School Division X High Schools received a National Math & English Initiative grant to support the increase of underrepresented students in advanced and AP courses.

The Commonwealth of Virginia is comprised of 133 school divisions that are split in to eight regions (VDOE, 2020). School Division X is in Region 4 – Northern Virginia (VDOE, 2020c). There are currently 13 high schools in School Division X. The data sets that were used for this study are based upon fall enrollment data from 2015-2020. Table 1 provides fall enrollment data from 2015-2020 of all School Division X High Schools by grade level and highlights minority student enrollment data. During this time frame, there were 11 total high schools from 2015-2016, 12 total high schools from 2016-2020, and 13 total high schools at the start of the 2021-2022 school year in School Division X. For this study, Black and Hispanic students represented the minority population.

### **Data Collection Procedures**

Pre-existing data were used for this study. Public school divisions in the Commonwealth of Virginia are mandated to track course enrollment data each school year. Enrollments counts and demographic information are captured through each school's master schedule and are compiled by school divisions to report to the state. Enrollment data for all of School Division X High Schools from 2015-2020 was gathered. Information specific to advanced, AP, and IB English and Math courses was obtained. Student demographic information such as attendance, economic status, and race was also gathered.

On the VDOE website (<https://www.doe.virginia.gov/>), the Statistics and Reports option was selected from the panel on the left side of the webpage. A new page opened, and the Enrollment & Demographics hyperlink tab was selected. Another page opened and the Fall Membership Reports hyperlink at the top of the page was selected. The fall membership table



builder opened, and the box was checked to indicate the researcher was not a robot. A green check mark appeared and the proceed button was selected. The table builder opened and school years 2015-2016, 2016-2017, 2017-2018, 2018-2019, and 2019-2020 was selected. The report level selected was division and School Division X was selected from the division tab. All races were selected from the races tab and Grades 9-12 were selected from the grade tab. The reporting categories are defaulted to all students and were not altered. The submit button was selected to provide the total numbers of students enrolled in each grade level over the 5-year span. A comma-separated values (CSV) file download populated in the lower left corner of the screen and the researcher clicked on the file to access the data.

**Table 1**

*School Division X High School Fall Enrollment Data (2015-2020)*

School Year	Race	Grade				Total
		9	10	11	12	
2015-2016	Black	1,598	1,542	1,320	1,341	5,801
	Hispanic	2,324	2,172	1,718	1,662	7,876
	All Students	7,298	6,956	6,151	6,029	26,434
2016-2017	Black	1,510	1,520	1,447	1,360	5,837
	Hispanic	2,692	2,304	1,905	1,744	8,645
	All Students	7,669	7,103	6,462	6,235	27,469
2017-2018	Black	1,540	1,444	1,386	1,500	5,870
	Hispanic	2,528	2,606	2,057	1,880	9,071
	All Students	7,327	7,418	6,578	6,494	27,817
2018-2019	Black	1,527	1,487	1,332	1,479	5,825
	Hispanic	2,627	2,434	2,312	1,984	9,357
	All Students	7,524	7,121	6,934	6,622	28,201
2019-2020	Black	1,582	1,481	1,390	1,404	5,857
	Hispanic	2,931	2,605	2,153	2,310	9,999
	All Students	7,671	7,390	6,628	7,026	28,715

Note. Adapted from Virginia Department of Education, 2021

The researcher repeated the steps exactly as stated until they reached the races tab. Black, not of Hispanic origin, and Hispanic races was selected from the races tab. Grades 9-12 was selected from the grade tab. The reporting categories are defaulted to all students and were altered to select Black and Hispanic students. The submit button was selected to provide the total

numbers of Black and Hispanic students enrolled in each grade level over the 5-year span. As previously stated, Black and Hispanic students will define the minority population sample for this study. A CSV download populated in the lower left corner of the screen and the researcher clicked on the file to access the data.

The researcher searched for Virginia School Profiles using <https://schoolquality.virginia.gov/> web address. Once accessed, the researcher scrolled to the bottom of the page and selected the Browse by Division tab. Once the page opened, the corresponding letter was selected, and the researcher clicked on the hyperlink for School Division X. The College & Career Readiness tab was selected, and the researcher scrolled down to the Advanced Program Information chart. This gave the researcher access to the school division's 3-year enrollment trends in Advanced Placement and International Baccalaureate courses for all students.

The culminating step the researcher used to gather data were sending a request of information to the Data Quality Assurance Coordinator in the Office of Accountability in School Division X. The request was detailed and asked for the following information.

- Percent of Students by School and Ethnicity
- Percent of Economically Disadvantaged Students by School and Ethnicity
- Percent of Chronically Absent Students by Serving School and Ethnicity
- Percent of Students Enrolled in an Advanced Math Course During each School Year by Ethnicity
- Percent of Students Enrolled in an Advanced English Course During each School Year by Ethnicity
- Percent of Students Enrolled in both an Advanced English Course and an Advanced Math Course During each School Year by Ethnicity

It took approximately 7 days for the request to be fulfilled based on the Data Quality Assurance Coordinator's availability.

### **Data Management**

The data collected for this study did not contain identifiable information that can be used to single out any individuals. All data collected regarding race, attendance, and lunch status was reported numerically using both whole numbers and percentages. The data were reported by

individual high school and overall, for School Division X. The data collected for the Math and English courses taken was reported in three separate categories by subject. Advanced English and Math courses included all courses taught at the high school level in School Division X in which the title begins with advanced (Adv) and Pre-Advanced Placement (Pre-AP). AP English and Math courses included all courses taught at the high school level in School Division X in which the title begins with the initials AP. IB English and Math courses included all courses taught at the high school level in School Division X in which the title begins with the initials IB.

The data were recorded in chart format using Microsoft Excel. The data were captured and recorded using multiple charts titling the specified information. The first chart included minority enrollment data for each high school in School Division X for school years 2015-2016, 2016-2017, 2017-2018, 2018-2019, and 2019-2020. The second data chart included minority socio-economic status data for each high school in School Division X for school years 2015-2016, 2016-2017, 2017-2018, 2018-2019, and 2019-2020. The third data chart included minority chronic absentee data for each high school in School Division X for school years 2015-2016, 2016-2017, 2017-2018, 2018-2019, and 2019-2020. The fourth data chart included minority and non-minority advanced, AP, and IB Math course enrollment data for each high school in School Division X for school years 2015-2016, 2016-2017, 2017-2018, 2018-2019, and 2019-2020. The fifth data chart included minority and non-minority advanced, AP, and IB English course enrollment data for each high school in School Division X for school years 2015-2016, 2016-2017, 2017-2018, 2018-2019, and 2019-2020.

Once all data were captured and recorded in a CSV file, it was loaded into SPSS Statistics Software. A multiple regression analysis was used to assess if significant gaps (+1 or -1) of enrollment in advanced, AP, and IB English and Math courses for school years 2015-2016, 2016-2017, 2017-2018, 2018-2019, and 2019-2020 exist between minority and non-minority students in School Division X high schools. The analysis was used to simultaneously examine possible impacts of attendance and economic status on minority student enrollment in advanced, AP, and IB English and Math courses for school years 2015-2016, 2016-2017, 2017-2018, 2018-2019, and 2019-2020 in School Division X high schools. The timeline to secure all data after receiving Institutional Review Board (IRB) approval was 30 days.

To summate, this quantitative study attempted to identify variables that impact and/or exacerbate the minority student enrollment gap in advanced, AP, and IB English and Math

courses in School Division X High Schools. The goal was to identify factors both within school and outside of school that have a direct correlation with the enrollment gap of minority students in advanced, AP, and IB English and Math high school courses.

### **Data Analysis**

This quantitative research design was a correlational study in that the relationship of more than two variables were assessed. Creswell (2014) noted that a correlational design affords the researcher the opportunity to review relationships among variables. It was further discussed that a correlational study is also best used for longitudinal studies when reviewing relationships among variables (Creswell, 2014). A multiple regression analysis was used to conduct the study. This type of analysis allowed the researcher an opportunity to review the strength of the relationship among the dependent variable and independent variables. A multiple regression analysis also assisted the researcher with assessing the importance of each independent variables' relationship to the dependent variable while yielding the statistical elimination of predictors. Previous researchers indicated that a multiple regression analysis is best to use when assessing for the strength of relationships between variables (Borlaza et al., 2021; Nagarajan et al. 2021; Siddiq et al., 2021).

### **Ethical Safeguards**

This study was an analysis of existing data that is available to the public on behalf of the VDOE and is not classified as confidential. The data obtained encompassed school division and school identifying information. The identifying information was concealed with the use of non-identifying naming conventions. Also, the data obtained does not include individual or group student identifying information. A request for study approval was submitted and received from Virginia Polytechnic Institute and State University's IRB. It was determined that the proposed research activity is not research involving human subjects. Data were stored in SPSS and password protected (see Appendix B).

### **Permission to Conduct Research**

The researcher completed a training program related to Social & Behavioral Research. Refer to Appendix A for information regarding completed Social & Behavioral Research Training. An application was submitted to Virginia Polytechnic Institute and State University's

IRB to request Human Research Determination. Virginia Polytechnic Institute and State University's Institutional Review Board produced a response indicating that the study would not employ the use of human subjects and approved the use of existing data for analysis.

### **Methodology Summary**

The purpose of the chapter is to present the methodology and analysis that was employed to conduct this study. The study was designed to identify factors both within and outside of the school setting that have a direct correlation to the perceived minority student enrollment gap in advanced, AP, and IB Math and English courses in Virginia high schools. The chapter starts with a concise overview, statement pertaining to the purpose of the study, and a rationale for the intended research design. This is followed by listing the research questions, providing information on sample selection, and an explanation of data collection procedures. Lastly, intended data management processes were presented along with ethical safeguards, and permission to conduct research.

## **Chapter Four**

### **Results of the Study**

#### **Introduction**

The purpose of this study was to identify the gap (disproportionate enrollment percentages) if any of minority student enrollment in advanced, Advanced Placement (AP), and International Baccalaureate (IB) English and Math courses in School Division X. The researcher reviewed variables that are believed to have a correlation with student enrollment in advanced, AP, and IB English and Math courses in School Division X. The intended outcome was to identify if student attendance and economic status have a direct correlation with the gap of minority student enrollment in advanced, AP, and IB English and Math high school courses. This chapter encompasses the summaries of collected data, coded data, and the results of the study's two research questions. The independent and dependent variables are clearly identified. The data collected will be used to explore the hypothesis of each research question.

The researcher obtained pre-existing data from the Virginia Department of Education (VDOE) and the data warehouse for School Division X. School Division X is one of the largest school divisions in the Commonwealth of Virginia and services over 90,000 students. Captured data is representative of the 12 high schools within the division from 2015-2020. It is worth noting that one of the high schools did not open until the 2017-2018 school year and will only possess 3 years of data. Once all data was captured, the researcher looked for enrollment trends in advanced, AP, and IB English and Math courses by ethnicity to ascertain if a gap exists and if the gap does exist, does the gap decrease, widen, or stay the same over time. The researcher also reviewed the correlation if any of student absenteeism percentages and student economically disadvantaged percentages on student enrollment in advanced, AP, and IB English and Math courses.

#### **Research Questions**

1. What is the gap, if any, of minority student enrollment in advanced, Advanced Placement (AP), and International Baccalaureate (IB) Math and English courses in School Division X High Schools from 2015-2020?
2. What is the comparative attendance and economically disadvantaged rates of Asian,

Black, Hispanic, and White students in correlation with advanced, Advanced Placement (AP), and International Baccalaureate (IB) Math and English course enrollment in School Division X High Schools from 2015-2020?

## **Presentation of Results**

A multiple linear regression analysis was used so that the researcher was able to simultaneously examine the relationship between all variables within the study while accounting for change in both the independent and dependent variables. Pearson Correlation Coefficient was used to examine the correlation between minority student enrollment in advanced, AP, and IB English and Math courses and attendance and socio-economic status. Pearson Correlation Coefficient has a range of  $(-1, 1)$ , with 0 indicating no relationship between the variables and the larger absolute values indicating a significant relationship between variables (Howell, 2011).

## **Data and Methods**

Descriptive statistics for the independent and dependent variables of the 12 high schools within School Division X located in the Commonwealth of Virginia are presented in this chapter. The independent variables are student absenteeism percentages, student economically disadvantaged percentages, and change over time (2015-2020 school years). The dependent variables are advanced, AP, and IB English and Math course enrollment percentages. The data specifically delves into the enrollment percentages of each school within the division to provide an overview of absenteeism, socioeconomic status, and trends over time to ascertain if a gap exists and if the gap does exist, does the gap decrease, widen, or stay the same. Numbers were used to maintain the confidentiality of actual school names. It is important to note that the numbers used have no correlation to the location and/or opening date of the high schools represented in this study. Enrollment trends were reported with two dependent variables (advanced, AP, and IB English and Math course enrollment percentages). Enrollment trends were examined based upon enrollment percentages of students at each school, attendance percentages at each school, economically disadvantaged percentages at each school, and advanced, AP, and IB English and Math course enrollment percentages at each school.

A multiple linear regression analysis was used to depict an estimation of change over time for the independent (student absenteeism percentages, student economically disadvantaged

percentages, and change over time; school years 2015-2020) and dependent (advanced, AP, and IB English and Math course enrollment percentages) variables. Within this analysis, the researcher examined the relationship if any between two or more quantitative variables over time (Howell, 2011).

The researcher took the analysis a step further and used a general estimating equation for both dependent variables within the study. This was executed to estimate the parameters of possible unknown correlations between outcomes within this longitudinal study. It is important to note that the parameter estimates yielded from the general estimating equation models presented in this section are consistent even when the covariance structure is improperly detailed under mild regularity conditions.

The enrollment percentages of Asian, Black, Hispanic, and White students for each high school in Division X were highlighted to assist with the explanation of statistical trends from 2015-2020. School Division X reported the following high school student enrollment during its fall membership count. The 2015-2016 school year enrolled a total of 87,823 high school students. The 2016-2017 school year enrolled a total of 89,377 high school students. The 2017-2018 school year enrolled a total of 90,595 high school students. The 2018-2019 school year enrolled a total of 90,876 high school students. The 2019-2020 school year enrolled a total of 92,270 high school students. These numbers are indicative of a steady enrollment increase over a 5-year span. This data will correlate with statistical enrollment trends of Asian, Black, Hispanic, and White students at each high school. Table 2 provides the enrollment data of School Division X from 2015-2020 by grade level and shows a .0863 increase in overall student enrollment from the 2015-2016 school year to the 2019-2020 school year.

Table 2

*School Division X High School Total Fall Enrollment Data (2015-2020)*

School Year	Race	Grade				Total
		9	10	11	12	
2015-2016	All Students	7,298	6,956	6,151	6,029	26,434
2016-2017	All Students	7,669	7,103	6,462	6,235	27,469
2017-2018	All Students	7,327	7,418	6,578	6,494	27,817
2018-2019	All Students	7,524	7,121	6,934	6,622	28,201
2019-2020	All Students	7,671	7,390	6,628	7,026	28,715

*Note.* Adapted from Virginia Department of Education, 2021



## **Research Questions Analysis**

High school enrollment trends in advanced, AP, and IB English and Math courses were examined with three independent variables. Advanced, AP, and IB English and Math course enrollment trends were examined based on the percentages of Asian, Black, Hispanic, and White students enrolled in the courses, absenteeism rates of students and the economic status of students over a 5-year span. The total number of high schools included in the study was 12. Each school's enrollment percentages by ethnicity were examined.

### ***Research Question 1***

What is the gap, if any, of minority student enrollment in advanced, AP, and IB Math and English courses in School Division X High Schools from 2015-2020? To answer this question, the researcher had to analyze the comparative enrollment rate of Asian, Black, Hispanic, and White students in School Division X High Schools from 2015-2020. The researcher also had to analyze the percentage of Asian, Black, Hispanic, and White students enrolled in advanced, AP, and IB Math and English courses in School Division X High Schools from 2015-2020. The null hypothesis was that there was no gap of minority student enrollment in advanced, AP, and IB Math and English courses in School Division X High Schools from 2015-2020.

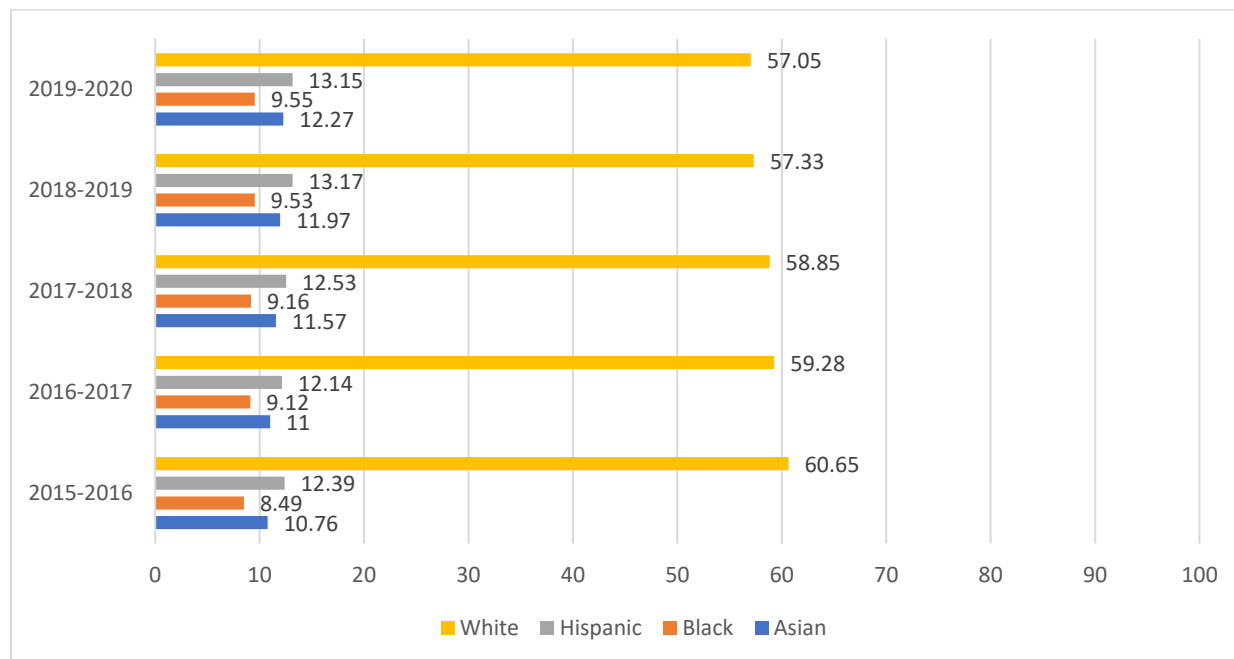
### ***Analysis 1***

The researcher investigated student enrollment by ethnicity at each school in School Division X from 2015-2020. Enrollment percentages were analyzed to assess the minority and majority student populations in School Division X from 2015-2020. The student enrollment percentages at High School 1 are captured in Figure 5. Enrollment trends indicated that White students were the majority population and the enrollment of White students slightly decreased each school year from 2015-2020 (60.65%, 59.28%, 58.85%, 57.33%, 57.05%;  $M = 58.63\%$ ). Hispanic students were the second largest ethnic group among enrolled students, however the enrollment percentages of Hispanic students slightly fluctuated from 2015-2020 (12.39%, 12.14%, 12.53%, 13.17%, 13.15%;  $M=12.68\%$ ). Asian students were the third largest population and the enrollment of Asian students slightly increased each school year from 2015-2020 (10.76%, 11%, 11.57%, 11.97%, 12.27%;  $M=11.51\%$ ). Black students were the fourth largest population and the enrollment of Black students slightly increased each school year from 2015-

2020 (8.49%, 9.12%, 9.16%, 9.53%, 9.55%;  $M=9.17\%$ ).

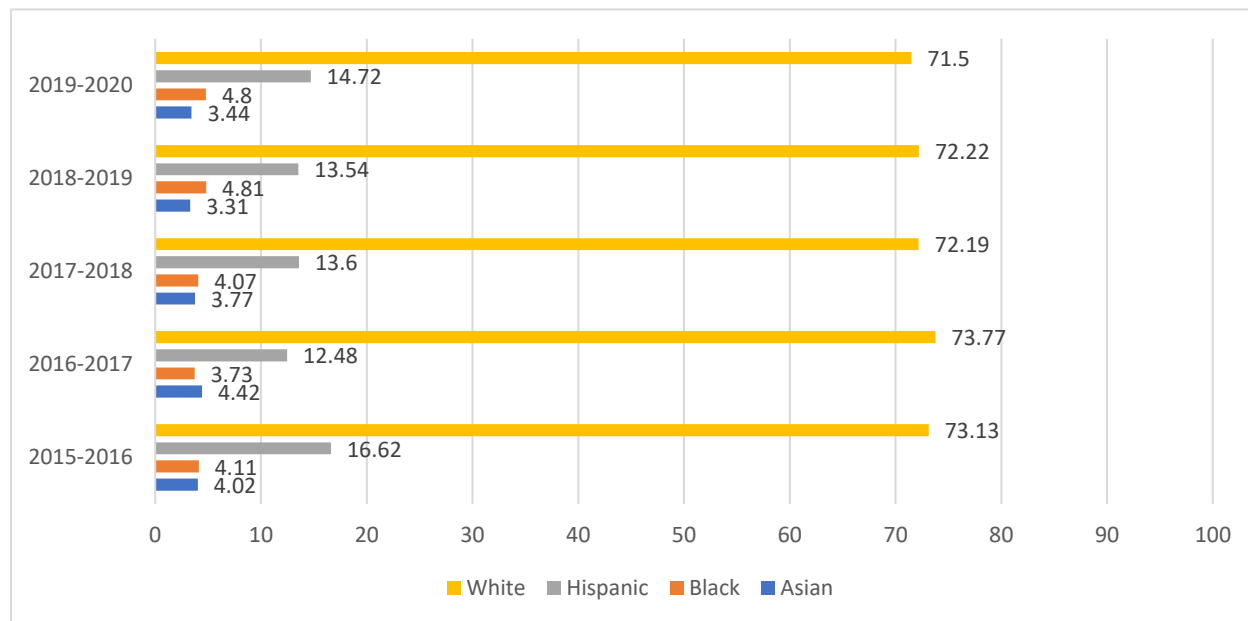
### Figure 5

*Percent of Student Enrollment by Ethnicity at High School 1*



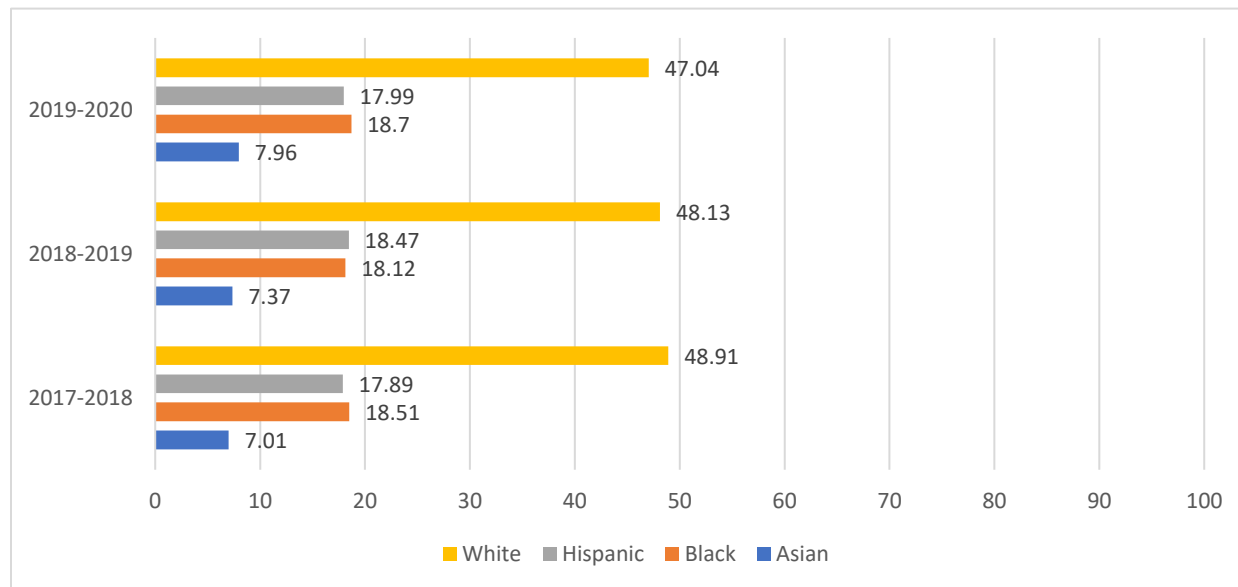
Note. Reported data represent the total student population for each ethnic group referenced.

The student enrollment percentages at High School 2 are captured in Figure 6. Enrollment trends indicated that White students were the majority population and the enrollment of White students slightly fluctuated each school year from 2015-2020 (73.13%, 73.77%, 72.19%, 72.22%, 71.50%;  $M=72.56\%$ ). Hispanic students were the second largest ethnic group among enrolled students and the enrollment percentages of Hispanic students also fluctuated from 2015-2020 (13.62%, 12.48%, 13.60%, 13.54%, 14.72%;  $M=13.59\%$ ). Black students were the third largest population and the enrollment of Black students slightly fluctuated each school year from 2015-2020 (4.11%, 3.73%, 4.07%, 4.81%, 4.80%;  $M=4.30\%$ ). Asian students were the fourth largest population and the enrollment of Asian students slightly fluctuated each school year from 2015-2020 (4.02%, 4.42%, 3.77%, 3.31%, 3.44%;  $M=3.79\%$ ).

**Figure 6***Percent of Student Enrollment by Ethnicity at High School 2*

*Note.* Reported data represent the total student population for each ethnic group referenced.

The student enrollment percentages at High School 3 are captured in Figure 7. It is important to note that High School 3 is the newest high school in School Division X and opened at the beginning of the 2017-2018 school year. Enrollment trends indicated that White students were the majority population and the enrollment of White students slightly decreased each school year from 2017-2020 (48.91%, 48.13, 47.04;  $M=48.03\%$ ). Black students were the second largest ethnic group among enrolled students (18.51%, 18.12%, 18.70%;  $M=18.44\%$ ). Hispanic students were the third largest population (17.89%, 18.47%, 17.99%;  $M=18.12\%$ ). The enrollment percentages of both Black and Hispanic students fluctuated each year from 2017-2020. Asian students were the fourth largest population and the enrollment of Asian students slightly increased each school year from 2017-2020 (7.01%, 7.37%, 7.96%;  $M=7.45\%$ ).

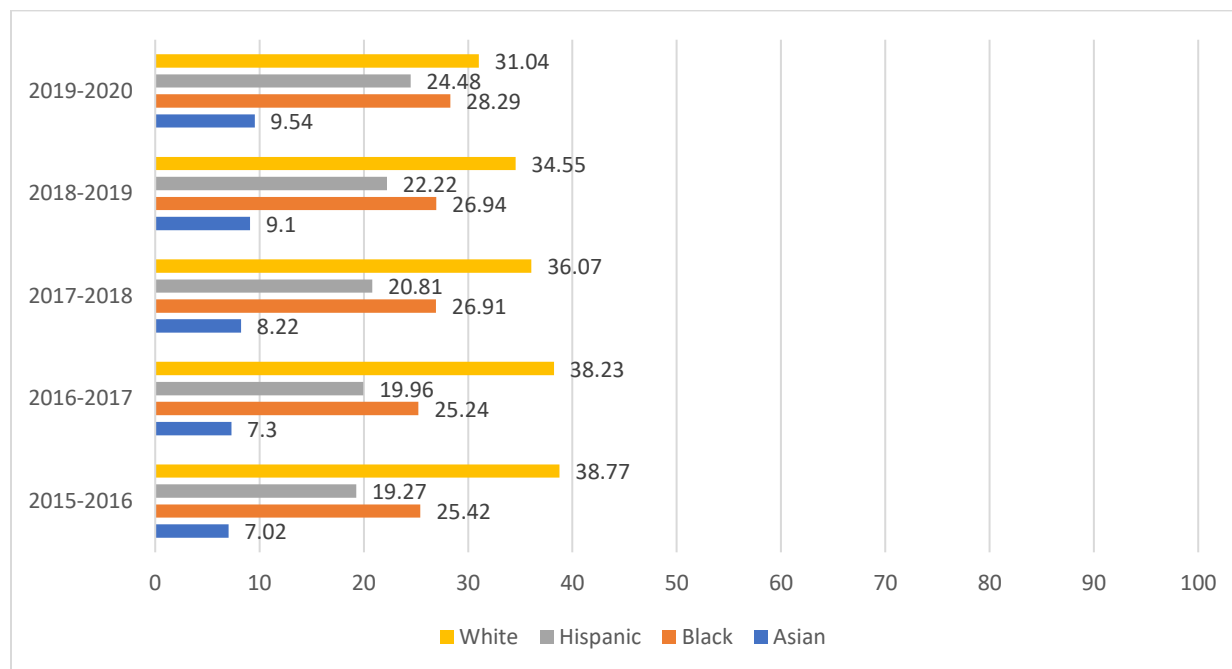
**Figure 7***Percent of Student Enrollment by Ethnicity at High School 3*

Note. Reported data represent the total student population for each ethnic group referenced.

The student enrollment percentages at High School 4 are captured in Figure 8. Enrollment trends indicated that White students were the majority population and the enrollment of White students consistently decreased each school year from 2015-2020 (38.77%, 38.23%, 36.07%, 34.55%, 31.04%;  $M=35.73\%$ ). Black students were the second largest ethnic group among enrolled students and the enrollment percentages of Black students increased from 2015-2020 (25.42%, 25.24%, 26.91%, 26.94%, 28.29;  $M=26.56\%$ ). Hispanic students were the third largest population and the enrollment of Hispanic students consistently increased each school year from 2015-2020 (19.27%, 19.96%, 20.81%, 22.22%, 24.48%;  $M=21.35\%$ ). Asian students were the fourth largest population and the enrollment of Asian students slightly increased each school year from 2015-2020 (7.02%, 7.3%, 8.22%, 9.10%, 9.54%;  $M=8.24\%$ ).

**Figure 8**

*Percent of Student Enrollment by Ethnicity at High School 4*

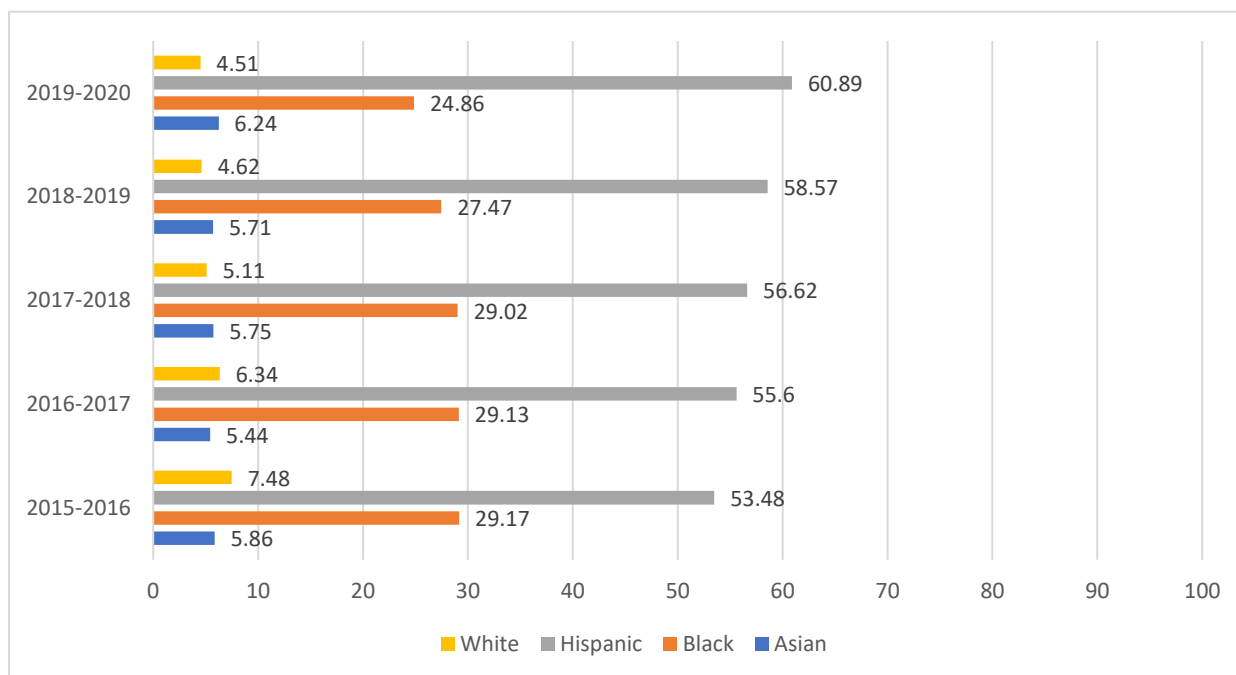


*Note.* Reported data represent the total student population for each ethnic group referenced.

The student enrollment percentages at High School 5 are captured in Figure 9. Enrollment trends indicated that Hispanic students were the majority population and the enrollment of Hispanic students consistently increased each school year from 2015-2020 (53.48%, 55.6%, 56.62%, 58.57%, 60.89%;  $M=57.03\%$ ). Black students were the second largest ethnic group among enrolled students; however, the enrollment percentages of Black students slightly decreased each year from 2015-2020 (29.17%, 29.13%, 29.02%, 27.47%, 24.86%;  $M=27.93\%$ ). The enrollment percentages of both Asian and White students were significantly lower than the enrollment of Hispanic and Black students each year from 2015-2020. It is important to note that enrollment slightly fluctuated each school year from 2015-2020 for Asian students (5.86%, 5.44%, 5.75%, 5.71%, 6.24%;  $M=5.8\%$ ), however there was a consistent decline of enrollment each school year from 2015-2020 for White students (7.48%, 6.34%, 5.11%, 4.62%, 4.51%;  $M=5.61\%$ ).

**Figure 9**

*Percent of Student Enrollment by Ethnicity at High School 5*

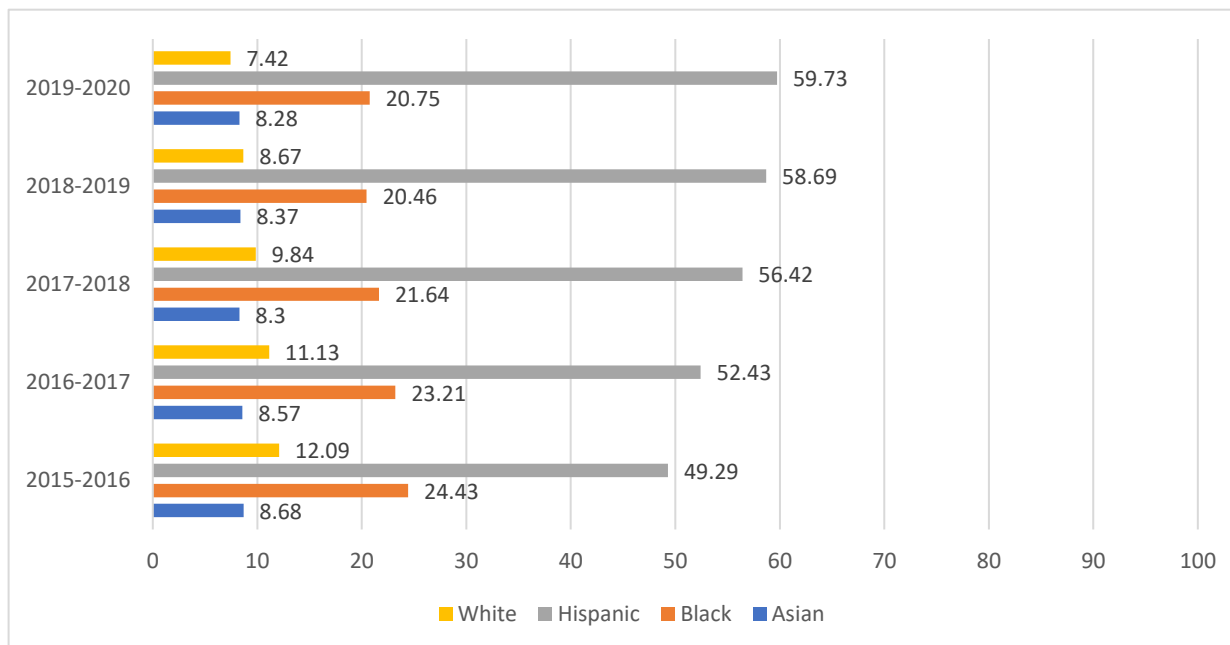


*Note.* Reported data represent the total student population for each ethnic group referenced.

The student enrollment percentages at High School 6 are captured in Figure 10. Enrollment trends indicated that Hispanic students were the majority population and the enrollment of Hispanic students consistently increased each school year from 2015-2020 (49.29%, 52.43%, 56.42%, 58.68%, 59.73%;  $M=55.31\%$ ). Black students were the second largest ethnic group among enrolled students, however the enrollment percentages of Black students slightly decreased from 2015-2020 (24.43%, 23.21%, 21.64%, 20.46%, 20.75%;  $M=22.1\%$ ). White students were the third largest population and the enrollment of White students consistently decreased each school year from 2015-2020 (12.09%, 11.13%, 9.84%, 8.67%, 7.42%;  $M=9.83\%$ ). Asian students were the fourth largest population and the enrollment of Asian students slightly decreased from 2015-2020 (8.68%, 8.57%, 8.3%, 8.37%, 8.28%;  $M=8.44\%$ ). By the 2019-2020 school year, the enrollment of Asian students surpassed the enrollment of White students.

**Figure 10**

*Percent of Student Enrollment by Ethnicity at High School 6*

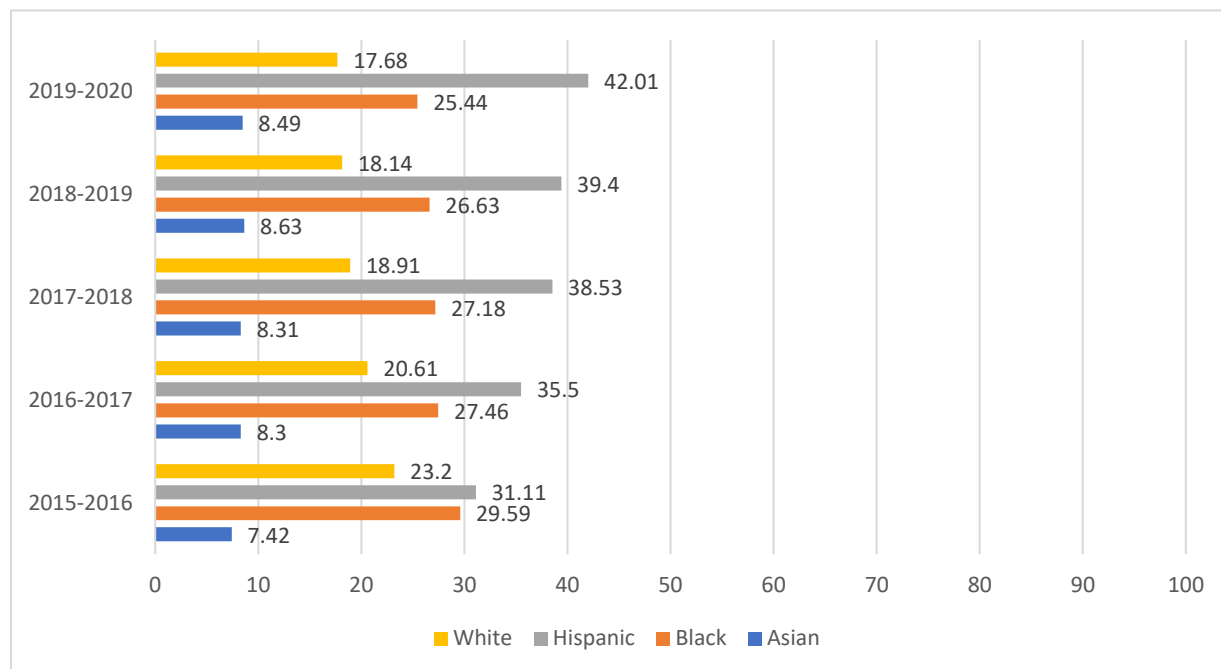


*Note.* Reported data represent the total student population for each ethnic group referenced.

The student enrollment percentages at High School 7 are captured in Figure 11. Enrollment trends indicated that Hispanic students were the majority population and the enrollment of Hispanic students consistently increased each school year from 2015-2020 (31.11%, 35.5%, 38.53%, 39.4%, 42.01%;  $M=37.31\%$ ). Black students were the second largest ethnic group among enrolled students, however the enrollment percentages of students Black slightly decreased each year from 2015-2020 (29.59%, 27.46%, 27.18%, 26.63%, 25.44%;  $M=27.26\%$ ). White students were the third largest population and the enrollment of White students also slightly decreased each school year from 2015-2020 (23.2%, 20.61%, 18.91%, 18.14%, 17.68%;  $M=19.71\%$ ). Asian students were the fourth largest population and the enrollment of Asian students slightly increased from 2015-2020 (7.42%, 8.3%, 8.31%, 8.63%, 8.49%;  $M=8.23\%$ ).

**Figure 11**

*Percent of Student Enrollment by Ethnicity at High School 7*



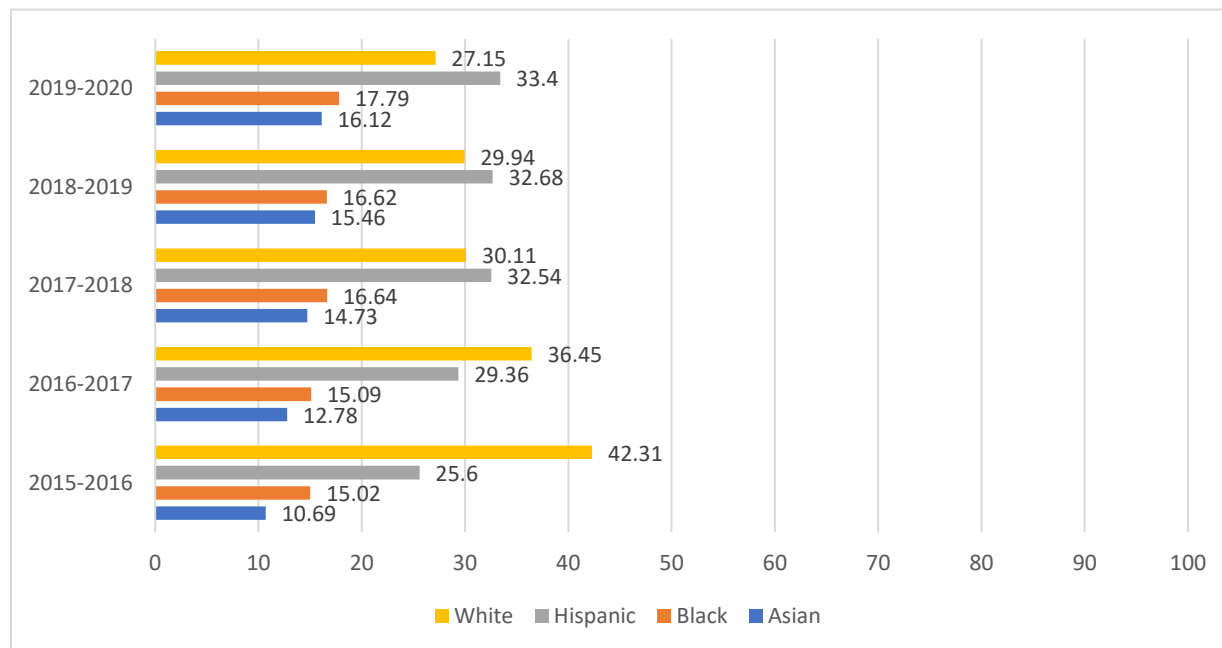
*Note.* Reported data represent the total student population for each ethnic group referenced.

The student enrollment percentages at High School 8 are captured in Figure 12. Enrollment trends indicated that White students were the majority population from 2015-2017, however the enrollment of White students consistently decreased each school year from 2015-2020 (42.31%, 36.45%, 30.11%, 29.94%, 27.15%;  $M=33.19\%$ ). Hispanic students became the new majority population during the 2017-2018 school year and remained the majority population through 2020. The enrollment percentages of Hispanic students consistently increased each school year from 2015-2020 (25.6%, 29.36%, 32.54%, 32.68%, 33.4%;  $M=30.72\%$ ). Black students were the third largest population and the enrollment of Black students slightly increased from 2015-2020 (15.02%, 15.09%, 16.64%, 16.62%, 17.79%;  $M=16.23\%$ ). Asian students were the fourth largest population and the enrollment of Asian students also slightly increased each school year from 2015-2020 (10.69%, 12.78%, 14.73%, 15.46%, 16.12%;  $M=13.96\%$ ).



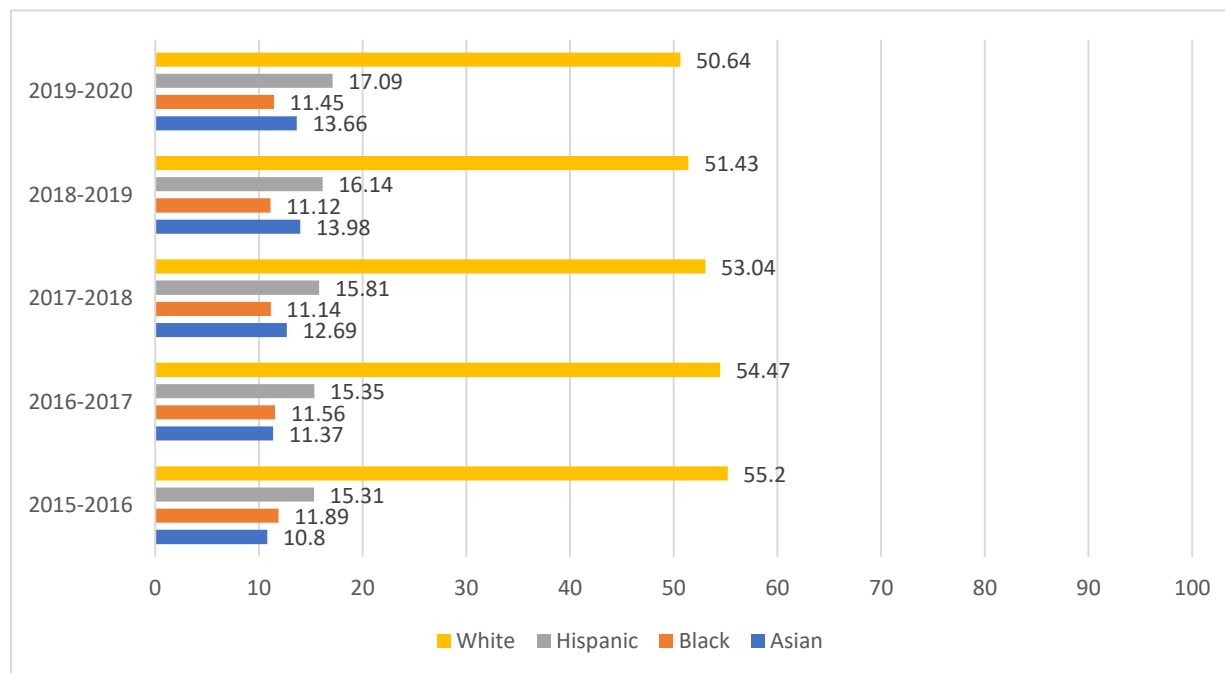
**Figure 12**

*Percent of Student Enrollment by Ethnicity at High School 8*



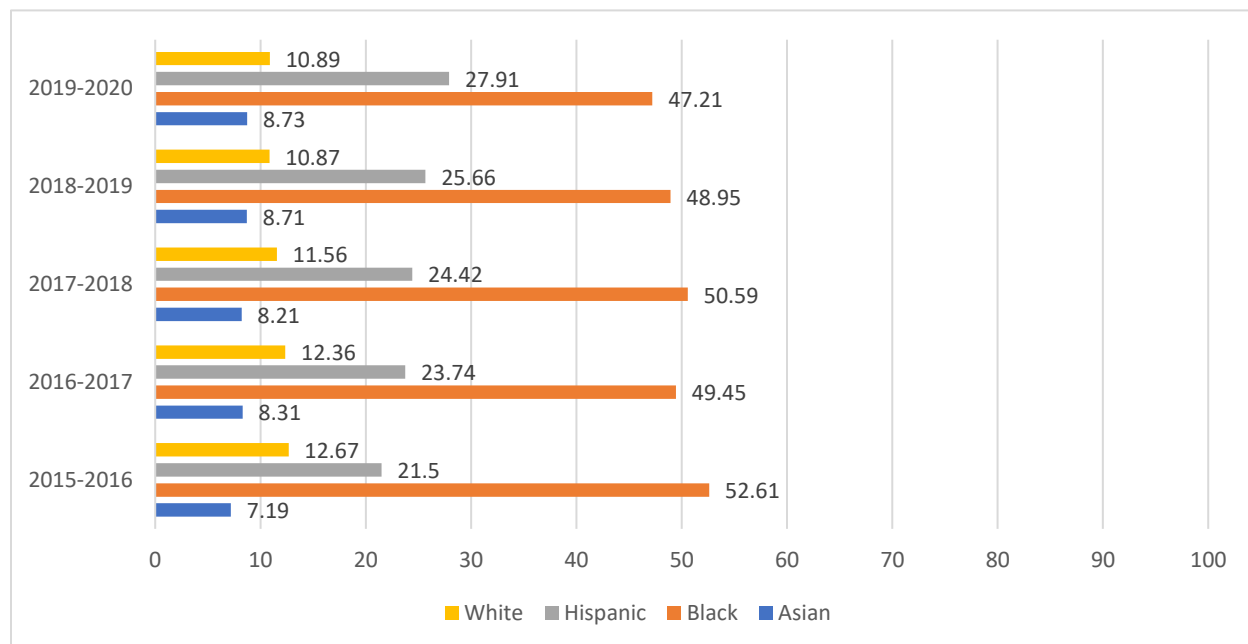
*Note.* Reported data represent the total student population for each ethnic group referenced.

The student enrollment percentages at High School 9 are captured in Figure 13. Enrollment trends indicated that White students were the majority population and the enrollment of White students slightly decreased each school year from 2015-2020 (55.2%, 54.47%, 53.04%, 51.43%, 50.64%;  $M=52.96\%$ ). Hispanic students were the second largest ethnic group among enrolled students; however, the enrollment percentages of Hispanic students slightly increased each school year from 2015-2020 (15.31%, 15.35%, 15.81%, 16.14%, 17.09%;  $M=15.94\%$ ). Asian students were the third largest population at the start of the 2017-2018 school year and the enrollment of Asian students slightly increased from 2015-2020 (10.8%, 11.37%, 12.69%, 13.98%, 13.66%;  $M=12.5\%$ ). Black students were the fourth largest population and the enrollment of Black students fluctuated from 2015-2020 (11.89%, 11.56%, 11.14%, 11.12%, 11.45%;  $M=11.43\%$ ).

**Figure 13***Percent of Student Enrollment by Ethnicity at High School 9*

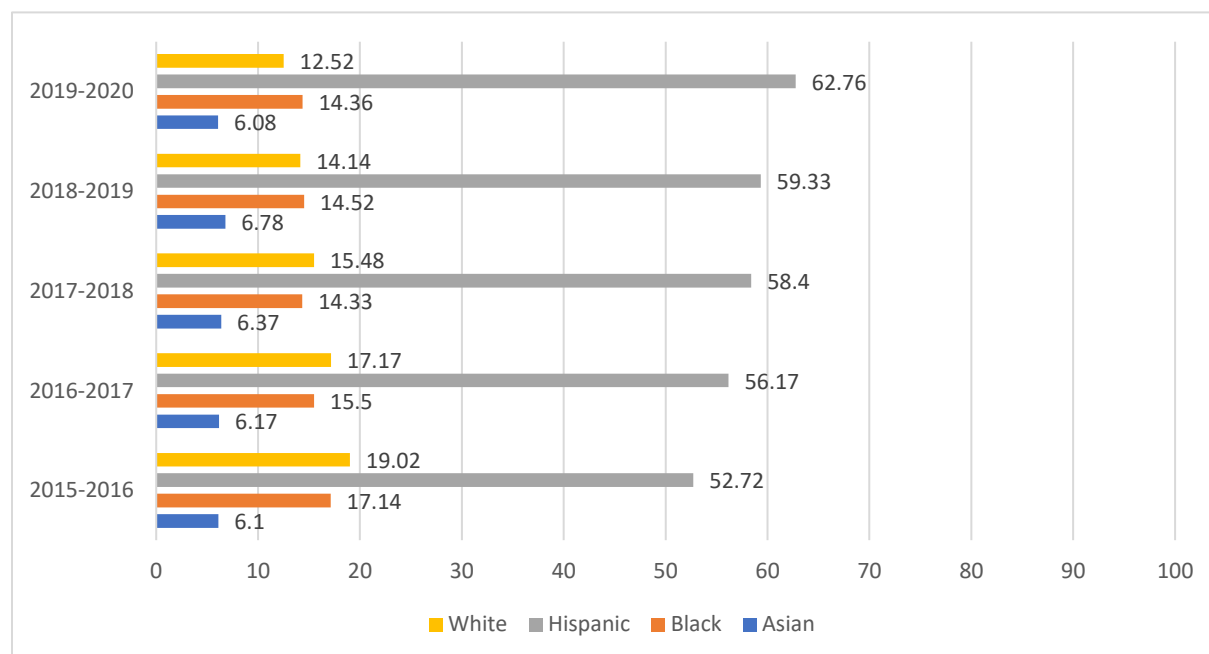
*Note.* Reported data represent the total student population for each ethnic group referenced.

The student enrollment percentages at High School 10 are captured in Figure 14. Enrollment trends indicated that Black students were the majority population, and the enrollment of Black students fluctuated each school year from 2015-2020 (52.61%, 49.45%, 50.59%, 48.95%, 47.21%;  $M=49.76\%$ ). Hispanic students were the second largest ethnic group among enrolled students; however, the enrollment percentages of Hispanic students consistently increased each school year from 2015-2020 (21.5%, 23.74%, 24.42%, 25.66%, 27.91%;  $M=24.65\%$ ). White students were the third largest population and the enrollment of White students slightly decreased from 2015-2020 (12.67%, 12.36%, 11.56%, 10.87%, 10.89%;  $M=11.67\%$ ). Asian students were the fourth largest population and the enrollment of Asian students slightly increased from 2015-2020 (7.19%, 8.31%, 8.21%, 8.71%, 8.73%;  $M=8.23\%$ ).

**Figure 14***Percent of Student Enrollment by Ethnicity at High School 10*

*Note.* Reported data represent the total student population for each ethnic group referenced.

The student enrollment percentages at High School 11 are captured in Figure 15. Enrollment trends indicated that Hispanic students were the majority population and the enrollment of Hispanic students consistently increased each school year from 2015-2020 (52.72%, 56.17%, 58.4%, 59.33%, 62.76%;  $M=57.88\%$ ). White students were the second largest ethnic group among enrolled students; however, the enrollment percentages of White students slightly decreased each school year from 2015-2020 (19.02%, 17.17%, 15.48%, 14.14%, 12.52%;  $M=15.67\%$ ). Black students were the third largest population, and the enrollment of Black students fluctuated each school year from 2015-2020 (17.14%, 15.5%, 14.33%, 14.52%, 14.36%;  $M=15.17\%$ ). It is important to note that Black students became the second largest enrolled student population from 2018-2020. Asian students were the fourth largest population and the enrollment of Asian students slightly increased from 2015-2020 (6.1%, 6.17%, 6.37%, 6.78%, 6.08%;  $M=6.3\%$ ).

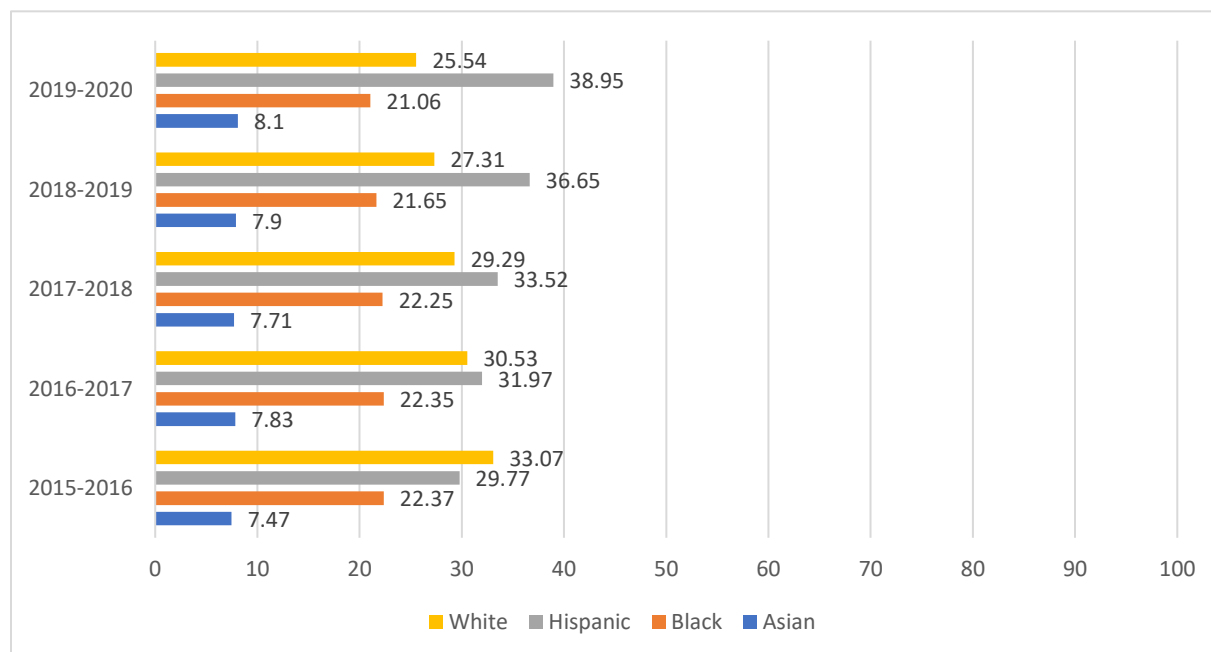
**Figure 15***Percent of Student Enrollment by Ethnicity at High School 11*

Note. Reported data represent the total student population for each ethnic group referenced.

The student enrollment percentages at High School 12 are captured in Figure 16. Enrollment trends indicated that Hispanic students were the majority population each year except the 2015-2016 school year in which White students were the majority population. The enrollment of Hispanic students consistently increased each school year from 2015-2020 (29.77%, 31.97%, 33.53%, 36.65%, 38.95%;  $M=34.17\%$ ). White students were the second largest ethnic group among enrolled students; however, the enrollment percentages of White students decreased from 2015-2020 (33.07%, 33.53%, 29.29%, 27.31%, 25.54%;  $M=29.75\%$ ). Black students were the third largest population and the enrollment of Black students slightly decreased each school year from 2015-2020 (22.37%, 22.35%, 22.25%, 21.65%, 21.06%;  $M=21.94\%$ ). Asian students were the fourth largest population and the enrollment of Asian students slightly increased from 2015-2020 (7.47%, 7.83%, 7.71%, 7.9%, 8.1%;  $M=7.8$

**Figure 16**

*Percent of Student Enrollment by Ethnicity at High School 12*



Note. Reported data represent the total student population for each ethnic group referenced.

### ***Analysis 2***

The researcher investigated advanced, AP, and IB English and Math course enrollment at each high school from 2015-2020 in School Division X. Enrollment percentages were analyzed to assess comparative enrollment percentages of students in advanced, AP, and IB English and Math courses within School Division X from 2015-2020.

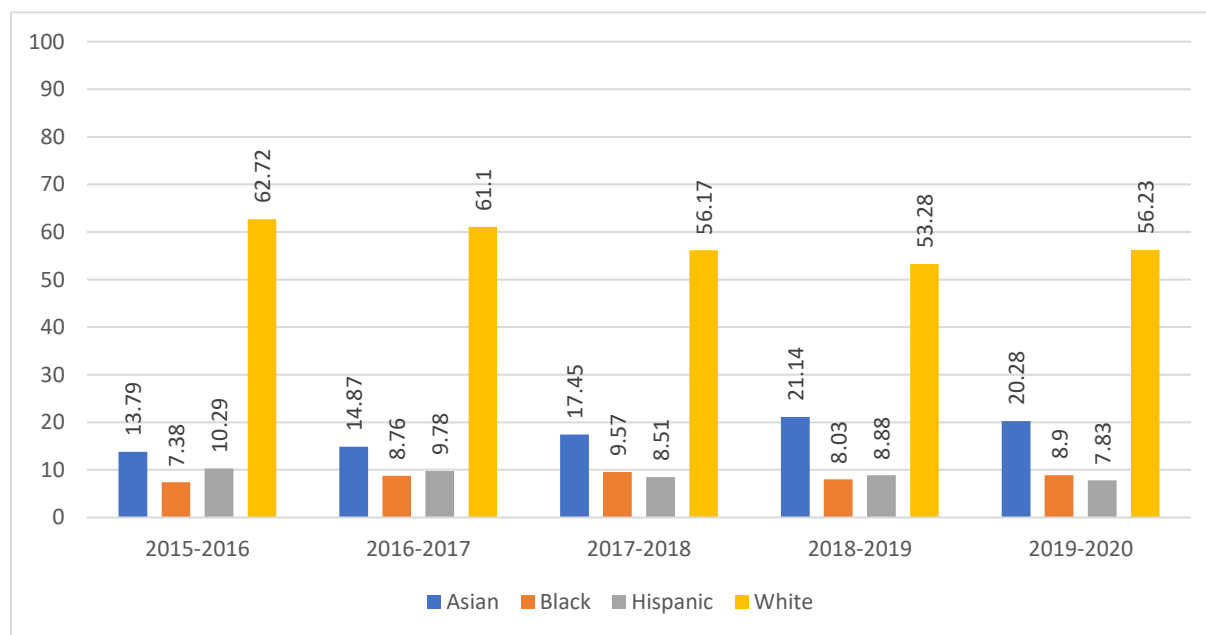
The advanced, AP, and IB English course enrollment percentages from 2015-2020 at High School 1 are captured in Figure 17. Enrollment trends indicated that White students were the most represented population each school year (62.72%, 61.10%, 56.17%, 53.28%, 56.23%;  $M=57.9\%$ ). Asian students were the second most represented population each year (13.79%, 14.87%, 17.45%, 21.14%, 20.28%;  $M=17.51\%$ ). The enrollment percentages of Black and Hispanic students fluctuated each year. Black student enrollment percentages were (7.38%, 8.76%, 9.57%, 8.03%, 8.90%;  $M=8.53\%$ ). Hispanic student enrollment percentages were (10.29%, 9.78%, 8.51%, 8.88%, 7.83%;  $M=9.06\%$ ). The null hypothesis was rejected as the mean percentage of student enrollment in advanced, AP, and IB English courses showed a significant gap between minority (Black & Hispanic students) and their Asian and White peers

from 2015-2020.

The advanced, AP, and IB Math course enrollment percentages from 2015-2020 at High School 1 are captured in Figure 18. Enrollment trends indicated that White students were the most represented population each school year (59.26%, 63.40%, 58.43%, 58.10%, 48.90%;  $M=57.62\%$ ). Asian students were the second most represented population each year (21.48%, 15.03%, 23.03%, 20.11%, 28.57%;  $M=21.64\%$ ). The enrollment percentages of Black and Hispanic students fluctuated each year. Black student enrollment percentages were (2.96%, 7.84%, 3.93%, 8.38%, 6.04%;  $M=5.83\%$ ). Hispanic students' enrollment percentages were (8.18%, 8.5%, 7.3%, 5.03%, 7.69%;  $M=7.33\%$ ). The null hypothesis was rejected as the mean percentage of student enrollment in advanced, AP, and IB Math courses showed a significant gap between minority (Black & Hispanic students) and their Asian and White peers from 2015-2020. Table 3 displays side-by-side comparisons of the total student enrollment data for the four student populations analyzed at High School 1.

**Figure 17**

*Percent of Students at High School 1 Enrolled in Advanced, AP, and IB English Courses*



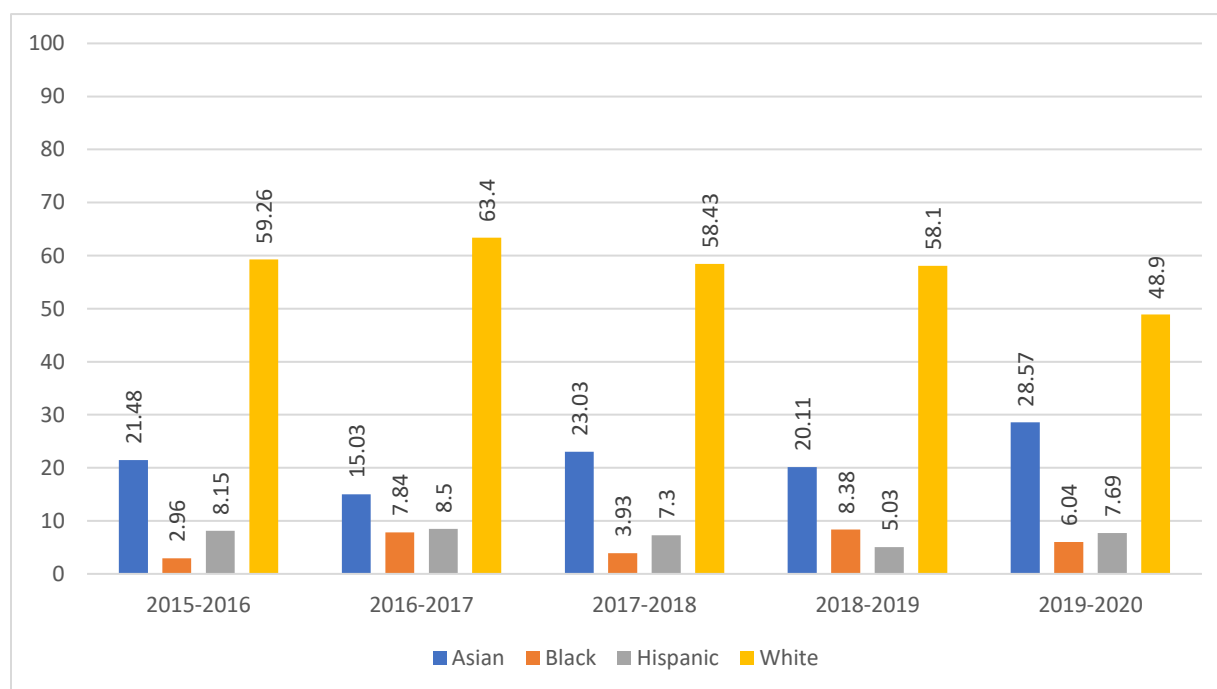
*Note.* AP = Advanced Placement; IB = International Baccalaureate. Reported data represent the total student population for each ethnic group referenced.

The advanced, AP, and IB English course enrollment percentages from 2015-2020 at High School 2 are captured in Figure 19. Enrollment trends indicated that White students were

the most represented population each school year (80.99%, 79.26%, 80.77%, 79.21%, 76.12%;  $M=79.27\%$ ). Hispanic students were the second most represented population each year (9.86%, 8.89%, 6.92%, 5.94%, 11.94%;  $M=8.71\%$ ). The enrollment percentages of Asian and Black students fluctuated each year. Asian student enrollment percentages were (4.23%, 4.44%, 3.85%, 4.95%, 4.48%;  $M=4.39\%$ ). Black student enrollment percentages were (0.7%, 0.74%, 3.85%, 4.95%, 2.99%;  $M=2.65\%$ ). The null hypothesis was rejected as the mean percentage of student enrollment in advanced, AP, and IB English courses showed a significant gap between minority (Black & Hispanic students) and their White peers from 2015-2020.

### Figure 18

*Percent of Students at High School 1 Enrolled in Advanced, AP, and IB Math Courses*



*Note.* AP = Advanced Placement; IB = International Baccalaureate. Reported data represent the total student population for each ethnic group referenced.

**Table 3***High School 1 Student Enrollment in Advanced, AP, & IB Courses by Subject*

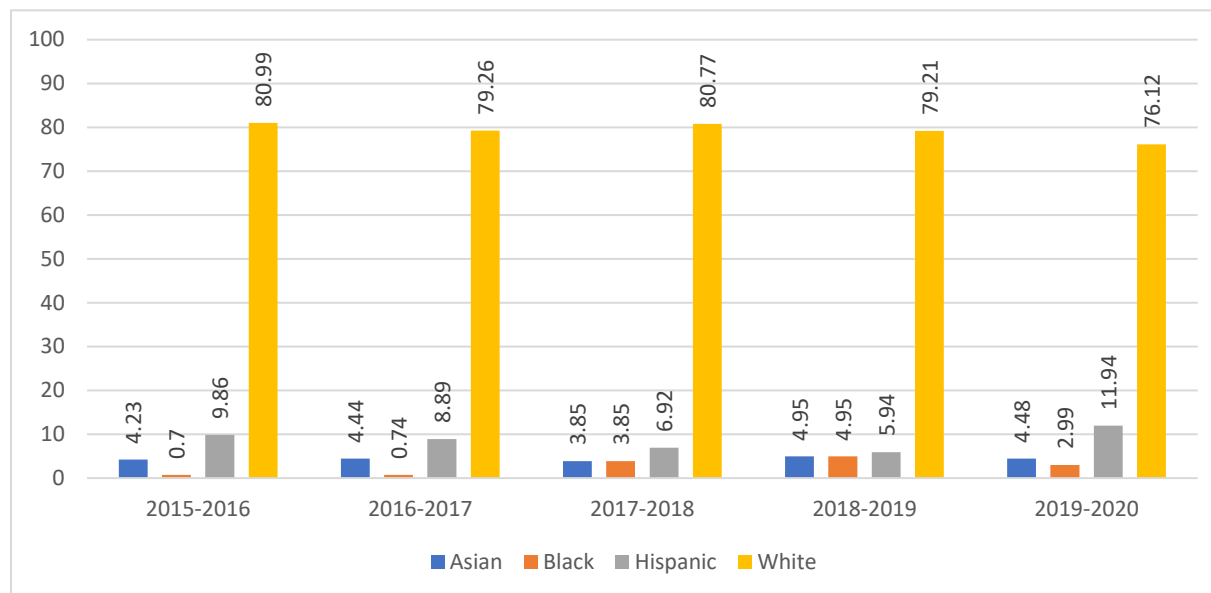
School Year	Students											
	Asian			Black			Hispanic			White		
	Enrollment	% English	% Math	Enrollment	% English	% Math	Enrollment	% English	% Math	Enrollment	% English	% Math
2015-2016	10.76%	13.79%	21.48%	8.49%	7.38%	2.96%	12.39%	10.29%	8.15%	60.65%	62.72%	59.26%
2016-2017	11%	14.87%	15.03%	9.12%	8.76%	7.84%	12.14%	9.78%	8.50%	59.28%	61.10%	63.40%
2017-2018	11.57%	17.45%	23.03%	9.16%	9.57%	3.93%	12.53%	8.51%	7.30%	58.85%	56.17%	58.43%
2018-2019	11.97%	21.14%	20.11%	9.53%	8.03%	8.38%	13.17%	8.88%	5.03%	57.33%	53.28%	58.10%
2019-2020	12.27%	20.28%	28.57%	9.55%	8.90%	6.04%	13.15%	7.83%	7.69%	57.05%	56.23%	48.90%

*Note.* AP = Advanced Placement; IB = International Baccalaureate. Reported data represent the total student population for each ethnic group referenced.



**Figure 19**

*Percent of Students at High School 2 Enrolled in Advanced, AP, and IB English Courses*

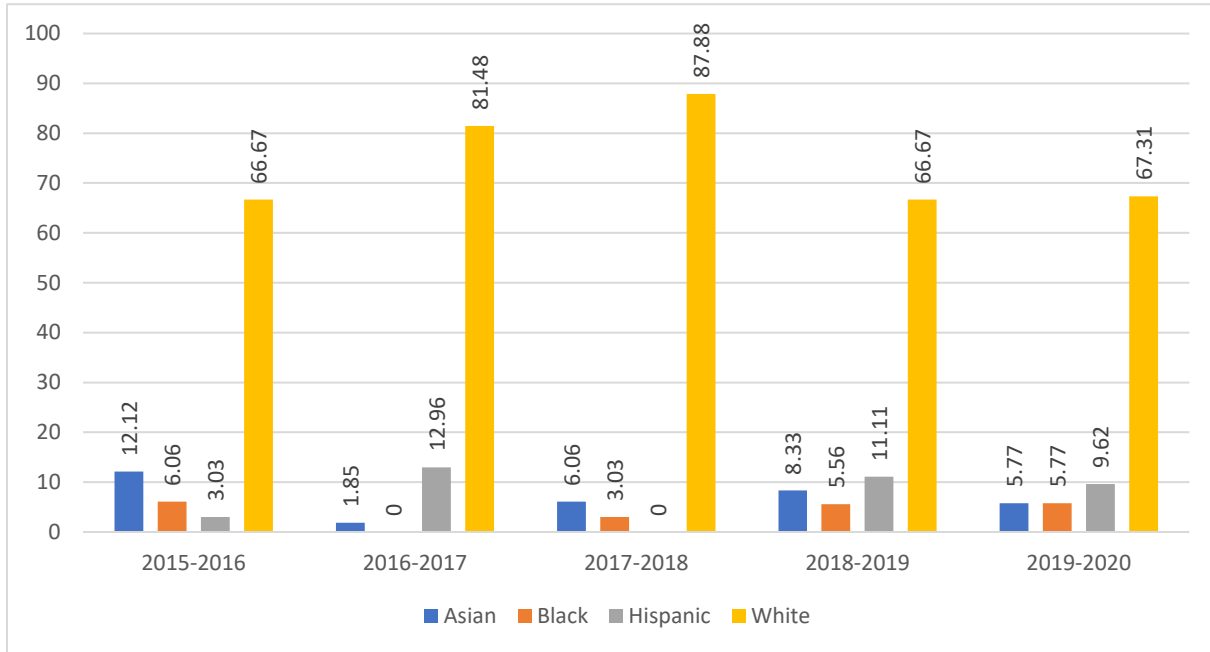


*Note.* AP = Advanced Placement; IB = International Baccalaureate. Reported data represent the total student population for each ethnic group referenced.

The advanced, AP, and IB Math course enrollment percentages from 2015-2020 at High School 2 are captured in Figure 20. Enrollment trends indicated that White students were the most represented population each school year (66.67%, 81.48%, 87.88%, 66.67%, 67.31%;  $M=74\%$ ). The enrollment percentages of Asian and Hispanic students fluctuated each year. Asian student enrollment percentages were (12.12%, 1.85%, 6.06%, 8.33%, 5.77%;  $M=6.83\%$ ). Hispanic students' enrollment percentages were (3.03%, 12.96%, 0%, 11.11%, 9.62%;  $M=7.34\%$ ). Black students were the least most represented population overall (6.06%, 0%, 3.03%, 5.56%, 5.77%;  $M=4.08\%$ ). The null hypothesis was rejected as the mean percentage of student enrollment in advanced, AP, and IB Math courses showed a significant gap between minority (Black & Hispanic students) and their White peers. Table 4 displays side-by-side comparisons of the total student enrollment data for the four student populations analyzed at High School 2.

**Figure 20**

*Percent of Students at High School 2 Enrolled in Advanced, AP, and IB Math Courses*



*Note.* AP = Advanced Placement; IB = International Baccalaureate. Reported data represent the total student population for each ethnic group referenced.

**Table 4***High School 2 Student Enrollment in Advanced, AP, & IB Courses by Subject*

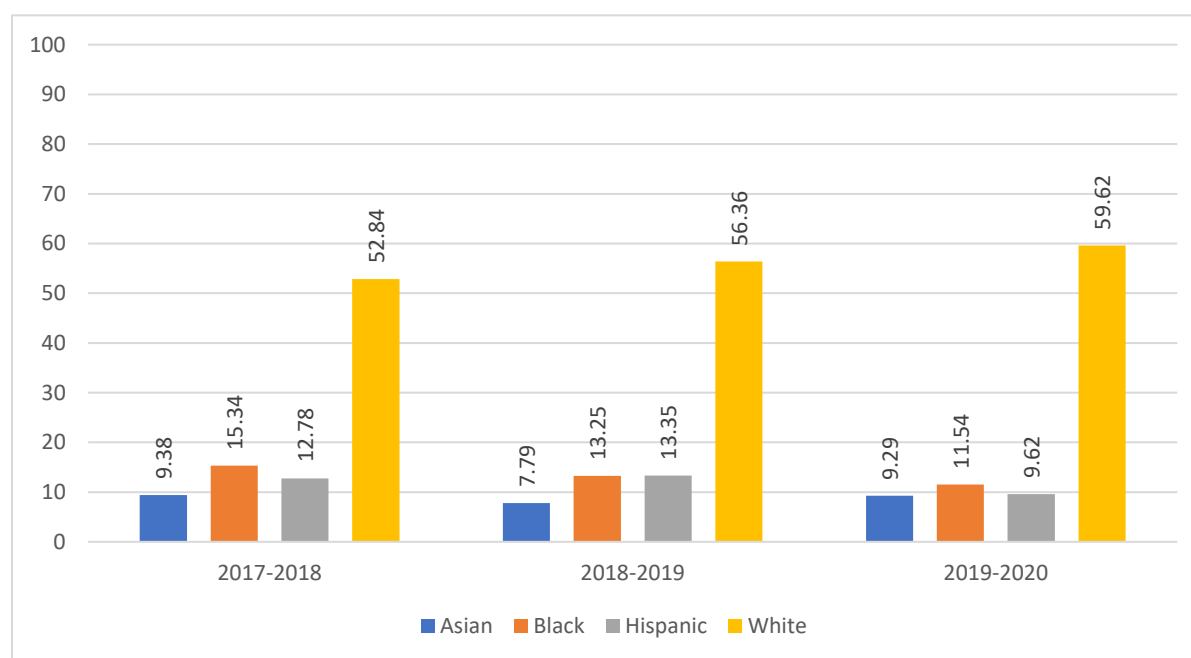
School Year	Students											
	Asian			Black			Hispanic			White		
	Enrollment	% English	% Math	Enrollment	% English	% Math	Enrollment	% English	% Math	Enrollment	% English	% Math
2015-2016	4.02%	4.23%	12.12%	4.11%	0.70%	6.06%	16.62%	9.86%	3.03%	73.13%	80.99%	66.67%
2016-2017	4.42%	4.44%	1.85%	3.73%	0.74%	0%	12.48%	8.89%	12.96%	73.77%	79.26%	81.48%
2017-2018	3.77%	3.85%	6.06%	4.07%	3.85%	3.03%	13.60%	6.92%	0%	72.19%	80.77%	87.88%
2018-2019	3.31%	4.95%	8.33%	4.81%	4.95%	5.56%	13.54%	5.94%	11.11%	72.22%	79.21%	66.67%
2019-2020	3.44%	4.48%	5.77%	4.80%	2.99%	5.77%	14.72%	11.94%	9.62%	71.50%	76.12%	67.31%

*Note.* AP = Advanced Placement; IB = International Baccalaureate. Reported data represent the total student population for each ethnic group referenced.

The advanced, AP, and IB English course enrollment percentages from 2017-2020 at High School 3 are captured in Figure 21. High School 3 did not open until the 2017-2018 school year. Enrollment trends indicated that White students were the most represented population each school year (52.84%, 56.36%, 59.62%;  $M=56.27\%$ ). Black students were the second most represented population each year (15.34%, 13.35%, 11.54%;  $M=13.41\%$ ). Hispanic students were the third most represented population each year (12.78%, 13.25%, 9.62%;  $M=11.88\%$ ). Asian students were the fourth most represented population each year (9.38%, 7.79%, 9.29%;  $M=8.82\%$ ). The null hypothesis was rejected as the mean percentage of student enrollment in advanced, AP, and IB English courses showed a significant gap between minority (Black & Hispanic students) and their White peers.

**Figure 21**

*Percent of Students at High School 3 Enrolled in Advanced, AP, & IB English Courses*



*Note.* AP = Advanced Placement; IB = International Baccalaureate. Reported data represent the total student population for each ethnic group referenced.

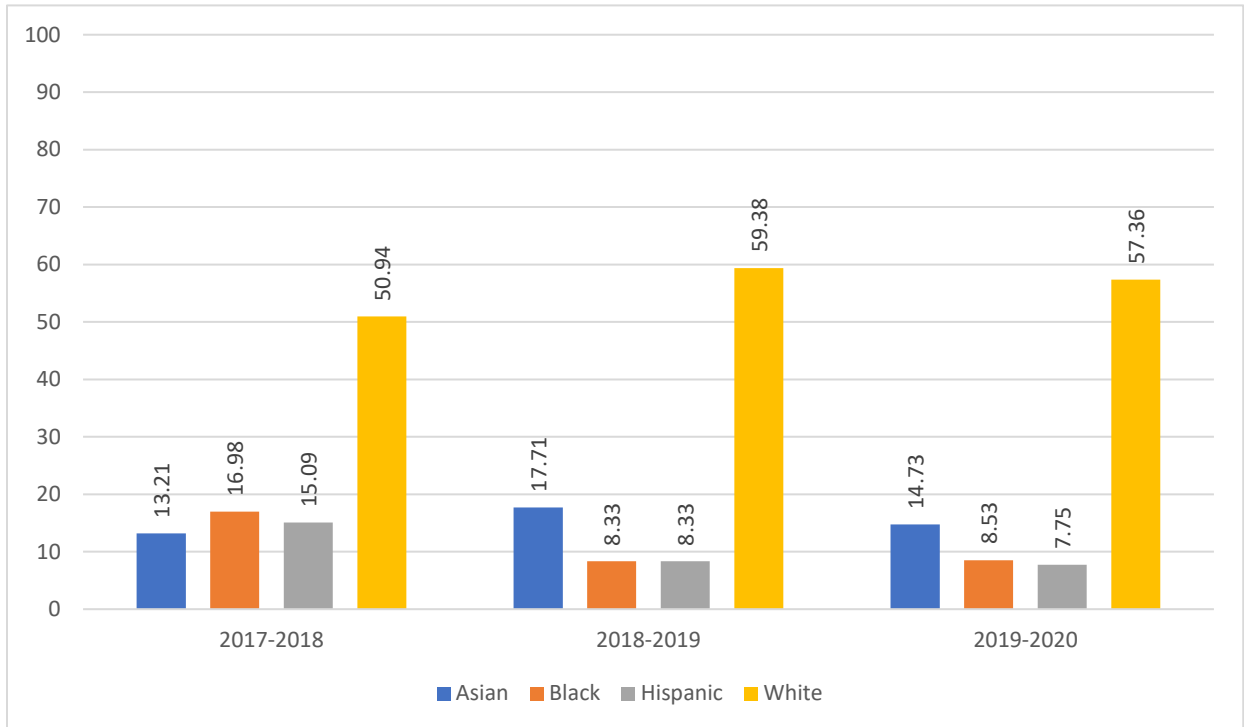
The advanced, AP, and IB Math course enrollment percentages from 2017-2020 at High School 3 are captured in Figure 22. Enrollment trends indicated that White students were the most represented population each school year (50.94%, 59.38%, 57.36%;  $M=55.89\%$ ). The enrollment percentages of Asian and Black students fluctuated each year. Asian student enrollment percentages were (13.21%, 17.71%, 14.73%;  $M=15.22\%$ ). Black student enrollment

percentages were (16.98%, 8.33%, 8.53%;  $M=11.28\%$ ). Hispanic students were the fourth most represented population overall (15.09%, 8.33%, 7.75%;  $M=10.39\%$ ). The null hypothesis was rejected as the mean percentage of student enrollment in advanced, AP, and IB Math courses showed a significant gap between minority (Black & Hispanic students) and their White peers. Table 5 displays side-by-side comparisons of the total student enrollment data for the four student populations analyzed at High School 3.

The advanced, AP, and IB English course enrollment percentages from 2015-2020 at High School 4 are captured in Figure 23 Enrollment trends indicated that White students were the most represented population each school year (50%, 50%, 52.23%, 46.67%, 38.93%;  $M=47.57\%$ ). Black students were the second most represented population (14.60%, 17.13%, 13.38%, 15.33%, 23.66%;  $M=16.82\%$ ). The enrollment percentages of Asian and Hispanic students fluctuated each year. Asian student enrollment percentages were (9.29%, 9.26%, 14.01%, 14%, 18.32%;  $M=12.98\%$ ). Hispanic student enrollment percentages were (11.06%, 10.65%, 12.1%, 15.33%, 12.98%;  $M=12.42\%$ ). The null hypothesis was rejected as the mean percentage of student enrollment in advanced, AP, and IB English courses showed a significant gap between minority (Black & Hispanic students) and their White peers.

**Figure 22**

*Percent of Students at High School 3 Enrolled in Advanced, AP, & IB Math Courses*



*Note.* AP = Advanced Placement; IB = International Baccalaureate. Reported data represent the total student population for each ethnic group referenced.

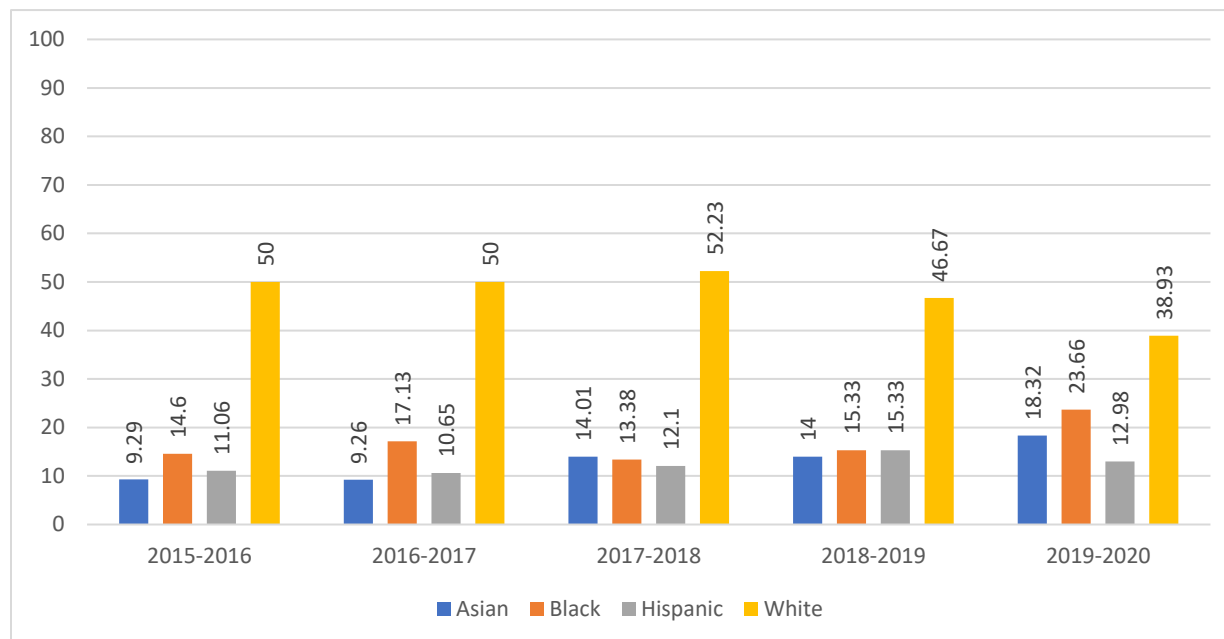
**Table 5***High School 3 Student Enrollment in Advanced, AP, & IB Courses by Subject*

School Year	Students											
	Asian			Black			Hispanic			White		
	Enrollment	% English	% Math	Enrollment	% English	% Math	Enrollment	% English	% Math	Enrollment	% English	% Math
2017-2018	7.01%	9.38%	13.21%	18.51%	15.34%	16.98%	17.89%	12.78%	15.09%	48.91%	52.84%	50.94%
2018-2019	7.37%	7.79%	17.71%	18.12%	13.25%	8.33%	18.47%	13.35%	8.33%	48.13%	56.36%	59.38%
2019-2020	7.96%	9.29%	14.73%	18.70%	11.54%	8.53%	17.99%	9.62%	7.75%	47.04%	59.62%	57.36%

*Note.* AP = Advanced Placement; IB = International Baccalaureate. Reported data represent the total student population for each ethnic group referenced.

**Figure 23**

*Percent of Students at High School 4 Enrolled in Advanced, AP, and IB English Courses*



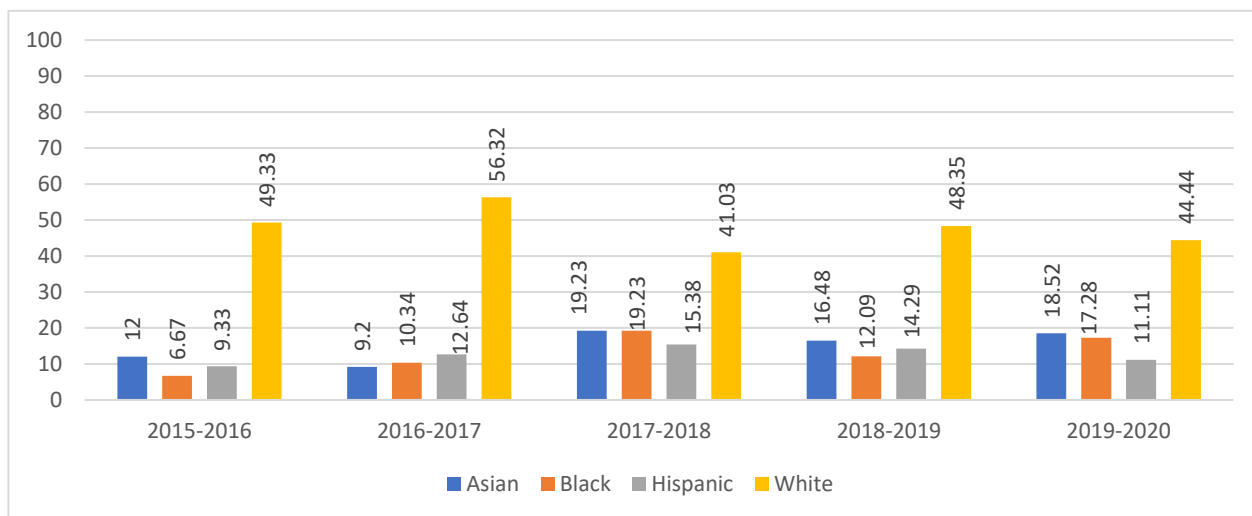
*Note.* AP = Advanced Placement; IB = International Baccalaureate. Reported data represent the total student population for each ethnic group referenced.

The advanced, AP, and IB Math course enrollment percentages from 2015-2020 at High School 4 are captured in Figure 24. Enrollment trends indicated that White students were the most represented population each school year (49.33%, 56.32%, 41.03%, 48.35%, 44.44%;  $M=47.89\%$ ). Asian students were the second most represented population (12%, 9.2%, 19.23%, 16.48%, 18.52%;  $M=15.09\%$ ). The enrollment percentages of Black and Hispanic students fluctuated each year. Black student enrollment percentages were (6.67%, 10.34%, 19.23%, 12.09%, 17.28%;  $M=13.12\%$ ). Hispanic student enrollment percentages were (9.33%, 12.64%, 15.38%, 14.29%, 11.11%;  $M=12.55\%$ ). The null hypothesis was rejected as the mean percentage of student enrollment in advanced, AP, and IB Math courses showed a significant gap between minority (Black & Hispanic students) and their White peers. Table 6 displays side-by-side comparisons of the total student enrollment data for the four student populations analyzed at High School 4.



**Figure 24**

*Percent of Students at High School 4 Enrolled in Advanced, AP, and IB Math Courses*



Note. AP = Advanced Placement; IB = International Baccalaureate. Reported data represent the total student population for each ethnic group referenced.

The advanced, AP, and IB English course enrollment percentages from 2015-2020 at High School 5 are captured in Figure 25. Enrollment trends indicated that Hispanic students were the most represented population each school year except the 2017-2018 (35.09%, 38.2%, 32.05%, 33.85%, 43.14%;  $M=36.47\%$ ). Black students were the second most represented population (35.09%, 29.21%, 38.46%, 29.23%, 31.37%;  $M=32.67\%$ ). Asian students were the third most represented population (14.04%, 12.36%, 12.82%, 20%, 15.69%;  $M=14.98\%$ ). White students were the least represented population (12.28%, 12.36%, 6.41%, 7.69%, 3.92%;  $M=8.53\%$ ). The null hypothesis was rejected as the mean percentage of student enrollment in advanced, AP, and IB English courses showed a significant gap between minority (Black & Hispanic students) and their Asian and White peers such that Black and Hispanic students accounted for the majority of advanced, AP, and IB English course enrollment.

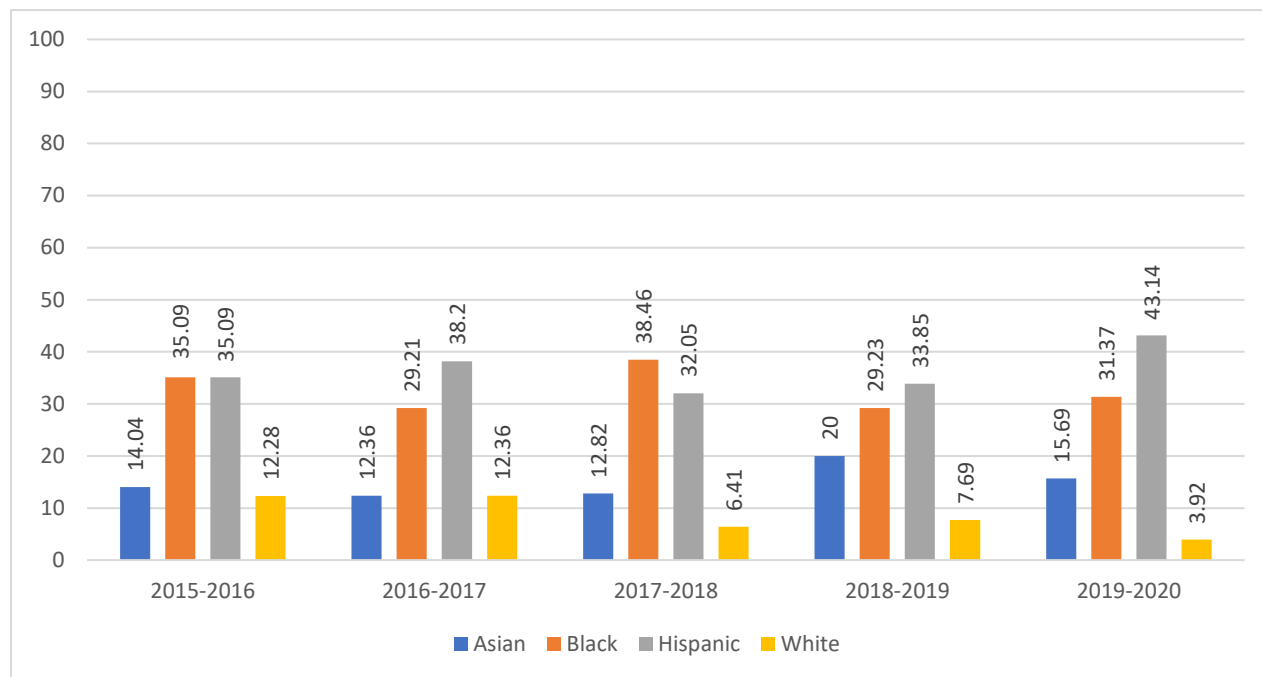
**Table 6***High School 4 Student Enrollment in Advanced, AP, & IB Courses by Subject*

School Year	Students											
	Asian			Black			Hispanic			White		
	Enrollment	% English	% Math	Enrollment	% English	% Math	Enrollment	% English	% Math	Enrollment	% English	% Math
2015-2016	7.02%	9.29%	12.00%	25.42%	14.60%	6.67%	19.27%	11.06%	9.33%	38.77%	50.00%	49.33%
2016-2017	7.30%	9.26%	9.20%	25.24%	17.13%	10.34%	19.96%	10.65%	12.64%	38.23%	50.00%	56.32%
2017-2018	8.22%	14.01%	19.23%	26.91%	13.38%	19.23%	20.81%	12.10%	15.38%	36.07%	52.23%	41.03%
2018-2019	9.10%	14.00%	16.48%	26.94%	15.33%	12.09%	22.22%	15.33%	14.29%	34.55%	46.67%	48.35%
2019-2020	9.54%	18.32%	18.52%	28.29%	23.66%	17.28%	24.48%	12.98%	11.11%	31.04%	38.93%	44.44%

*Note.* AP = Advanced Placement; IB = International Baccalaureate. Reported data represent the total student population for each ethnic group referenced.

**Figure 25**

*Percent of Students at High School 5 Enrolled in Advanced, AP, and IB English Courses*

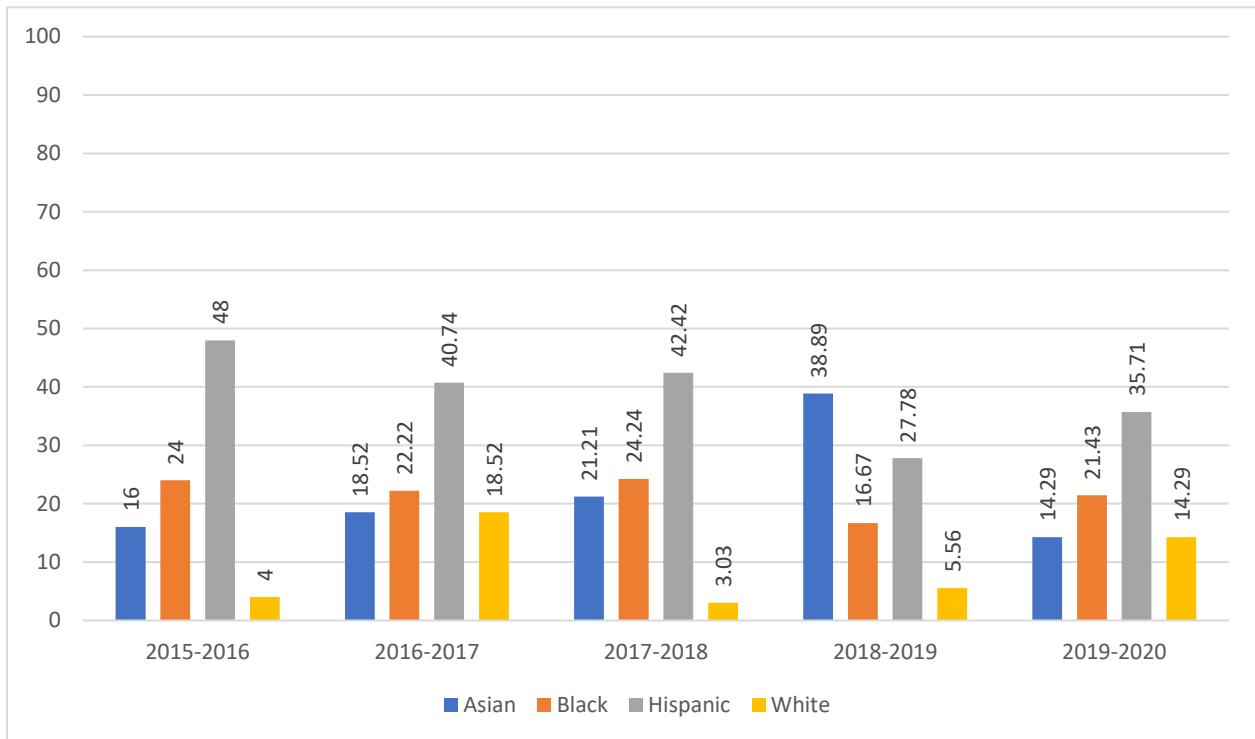


*Note.* AP = Advanced Placement; IB = International Baccalaureate. Reported data represent the total student population for each ethnic group referenced.

The advanced, AP, and IB Math course enrollment percentages from 2015-2020 at High School 5 are captured in Figure 26 Enrollment trends indicated that Hispanic students were the most represented population each school year (48%, 40.74%, 42.42%, 27.78%, 35.71%;  $M=38.93\%$ ). Asian students were the second most represented population (16%, 18.52%, 21.21%, 38.89%, 14.29%;  $M=21.78\%$ ). Black students were the third most represented population (24%, 22.22%, 24.24%, 16.67%, 21.43%;  $M=21.71\%$ ). White students were the least represented population (4%, 18.52%, 3.03%, 5.56%, 14.29%;  $M=9.08\%$ ). The null hypothesis was rejected as the mean percentage of student enrollment in advanced, AP, and IB Math courses showed a significant gap between minority (Black & Hispanic students) and their Asian and White peers such that Black and Hispanic students accounted for the majority of advanced, AP, and IB Math course enrollment each year except 2018-2019 in which Asian students were the most represented. Table 7 displays side-by-side comparisons of the total student enrollment data for the four student populations analyzed at High School 5.

**Figure 26**

*Percent of Students at High School 5 Enrolled in Advanced, AP, and IB Math Courses*



*Note.* AP = Advanced Placement; IB = International Baccalaureate. Reported data represent the total student population for each ethnic group referenced.

**Table 7***High School 5 Student Enrollment in Advanced, AP, & IB Courses by Subject*

School Year	Students											
	Asian			Black			Hispanic			White		
	Enrollment	% English	% Math	Enrollment	% English	% Math	Enrollment	% English	% Math	Enrollment	% English	% Math
2015-2016	5.86%	14.04%	16.00%	29.17%	35.09%	24.00%	53.48%	35.09%	48.005	7.48%	12.28%	4.00%
2016-2017	5.44%	12.36%	18.52%	29.13%	29.21%	22.22%	55.60%	38.20%	40.74%	6.34%	12.36%	18.52%
2017-2018	5.75%	12.82%	21.21%	29.02%	38.46%	24.24%	56.62%	32.05%	42.42%	5.11%	6.41%	3.03%
2018-2019	5.71%	20.00%	38.89%	27.47%	29.23%	16.67%	58.57%	33.85%	27.78%	4.62%	7.69%	5.56%
2019-2020	6.24%	15.69%	14.29%	24.86%	31.37%	21.43%	60.89%	43.14%	35.71%	4.51%	3.92%	14.29%

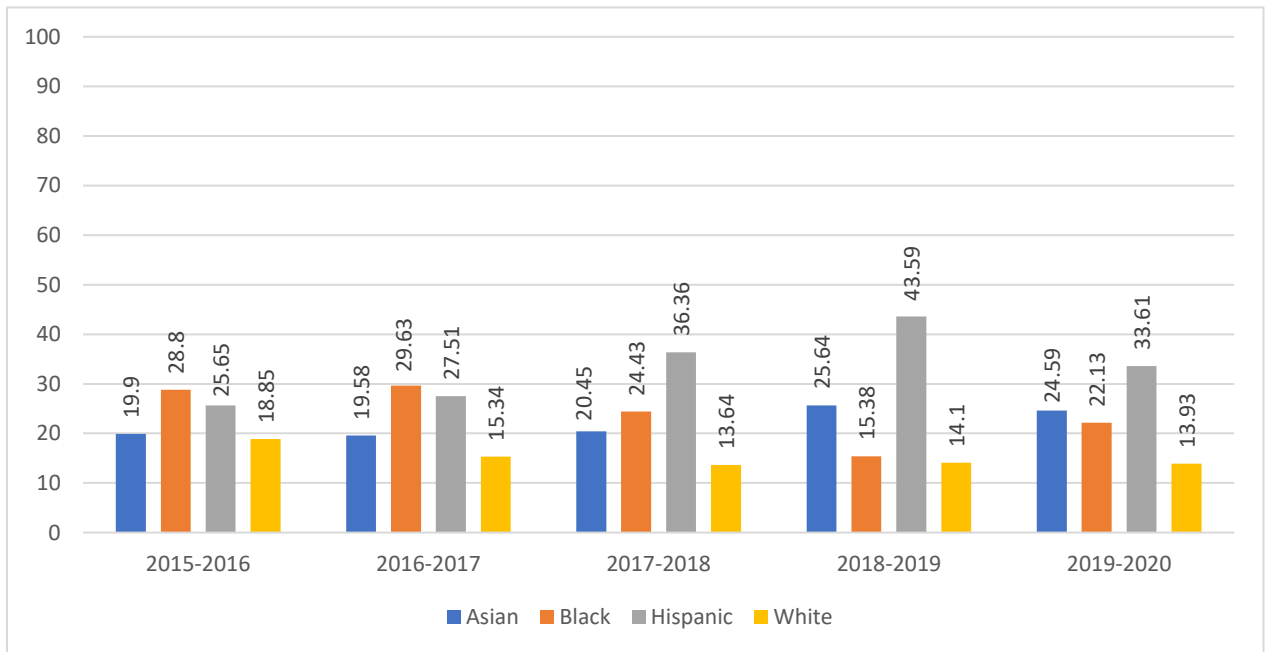
*Note.* AP = Advanced Placement; IB = International Baccalaureate. Reported data represent the total student population for each ethnic group referenced.

The advanced, AP, and IB English course enrollment percentages from 2015-2020 at High School 6 are captured in Figure 27. Enrollment trends indicated that Hispanic students were the most represented population each school year except from 2015-2017 (25.65%, 27.51%, 36.36%, 43.59%, 33.61%;  $M=33.34\%$ ). Black students were the second most represented population (28.8%, 29.63%, 24.43%, 15.38%, 22.13%;  $M=24.07\%$ ). Asian students were the third most represented population (19.9%, 19.58%, 20.45%, 25.64%, 24.59%;  $M=22.03\%$ ). White students were the least represented population (18.85%, 15.34%, 13.64%, 14.1%, 13.93%;  $M=15.17\%$ ). The null hypothesis was rejected as the mean percentage of student enrollment in advanced, AP, and IB English courses showed a significant gap between minority (Black & Hispanic students) and their Asian and White peers such that Black and Hispanic students accounted for the majority of advanced, AP, and IB English course enrollment each year except 2018-2020 in which Asian and Hispanic students were the most represented groups.

The advanced, AP & IB Math course enrollment percentages from 2015-2020 at High School 6 are captured in Figure 28. Enrollment trends indicated that Hispanic students were the most represented population each school year the 2015-2016 school year (22.48%, 26.71%, 34.88%, 40.32%, 43.33%;  $M=33.54\%$ ). Asian students were the second most represented population (26.36%, 25.34%, 27.13%, 33.06%, 24.17%;  $M=27.21\%$ ). Black students were the third most represented population (23.26%, 26.71%, 17.83%, 8.87%, 15.83%;  $M=18.5\%$ ). White students were the least represented population (19.38%, 15.07%, 13.95%, 14.52%, 12.5%;  $M=15.08\%$ ). The null hypothesis was rejected as the mean percentage of student enrollment in advanced, AP, and IB Math courses showed a significant gap between minority (Black & Hispanic students) and their Asian and White peers such that Asian and Hispanic students accounted for the majority of advanced, AP, and IB Math course enrollment. Table 11 displays side-by-side comparisons of the total student enrollment data for the four student populations analyzed at High School 6.

**Figure 27**

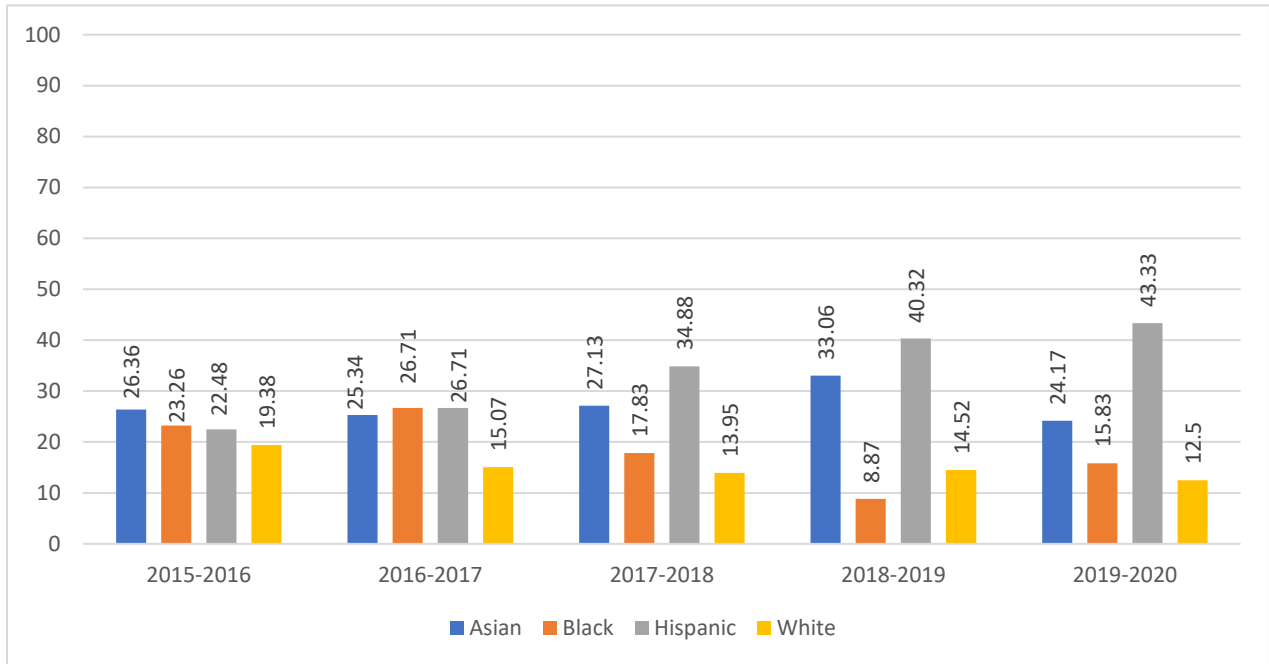
*Percent of Students at High School 6 Enrolled in Advanced, AP, and IB English Courses*



Note. AP = Advanced Placement; IB = International Baccalaureate. Reported data represent the total student population for each ethnic group referenced.

**Figure 28**

*Percent of Students at High School 6 Enrolled in Advanced, AP, and IB Math Courses*



*Note.* AP = Advanced Placement; IB = International Baccalaureate. Reported data represent the total student population for each ethnic group referenced.



**Table 8***High School 6 Student Enrollment in Advanced, AP, & IB Courses by Subject*

School Year	Students											
	Asian			Black			Hispanic			White		
	Enrollment	% English	% Math	Enrollment	% English	% Math	Enrollment	% English	% Math	Enrollment	% English	% Math
2015-2016	8.68%	19.90%	26.36%	24.43%	28.80%	23.26%	49.29%	25.65%	22.48%	12.09%	18.85%	19.38%
2016-2017	8.57%	19.58%	25.34%	23.21%	29.63%	26.71%	52.43%	27.51%	26.71%	11.13%	15.34%	15.07%
2017-2018	8.30%	20.45%	27.13%	21.64%	24.43%	17.83%	56.42%	36.36%	34.88%	9.84%	13.64%	13.95%
2018-2019	8.37%	25.64%	33.06%	20.46%	15.38%	8.87%	58.69%	43.59%	40.32%	8.67%	14.10%	14.52%
2019-2020	8.28%	24.59%	24.17%	20.75%	22.13%	15.83%	59.73%	33.61%	43.33%	7.42%	13.93%	12.50%

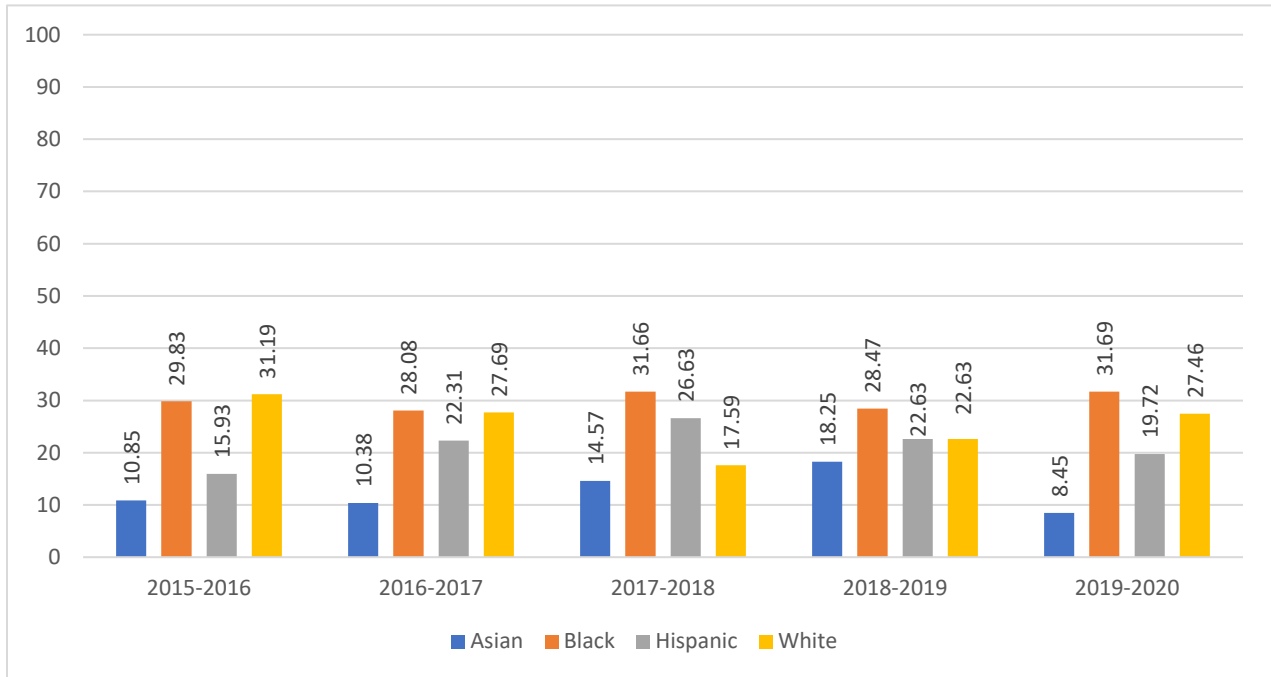
*Note.* AP = Advanced Placement; IB = International Baccalaureate. Reported data represent the total student population for each ethnic group referenced.

The advanced, AP, and IB English course enrollment percentages from 2015-2020 at High School 7 are captured in Figure 29. Enrollment trends indicated that Black students were the most represented population each school year except from 2015-2016 (29.83%, 28.08%, 31.66%, 28.47%, 31.69%;  $M=29.95\%$ ). White students were the second most represented population (31.19%, 27.69%, 17.59%, 22.63%, 27.46%;  $M=25.31\%$ ). Hispanic students were the third most represented population (15.93%, 22.31%, 26.63%, 22.63%, 19.72%;  $M=21.44\%$ ). Asian students were the least represented population (10.85%, 10.38%, 14.57%, 18.25%, 8.45%;  $M=12.5\%$ ). The null hypothesis was rejected as the mean percentage of student enrollment in advanced, AP, and IB English courses showed a significant gap between minority (Black & Hispanic students) and their White peers such that Black and White students accounted for the majority of advanced, AP, and IB English course enrollment each year except 2017-2018.

The advanced, AP, and IB Math course enrollment percentages from 2015-2020 at High School 7 are captured in Figure 30. Enrollment trends indicated that White students were the most represented population from 2015-2020 (37.04%, 33.93%, 26.92%, 17.5%, 29.17%;  $M=28.91\%$ ). Black students were the second most represented population (18.52%, 23.21%, 28.85%, 27.5%, 10.42%;  $M=21.7\%$ ). Hispanic students were the third most represented population (17.28%, 19.64%, 19.23%, 17.5%, 27.08%;  $M=20.15\%$ ). Asian students were the least represented population (14.81%, 12.5%, 21.15%, 30%, 27.08%;  $M=21.11\%$ ). The null hypothesis was rejected as the mean percentage of student enrollment in advanced, AP, and IB Math courses showed a significant gap between minority (Black & Hispanic students) and their White peers. Table 9 displays side-by-side comparisons of the total student enrollment data for the four student populations analyzed at High School 7.

**Figure 29**

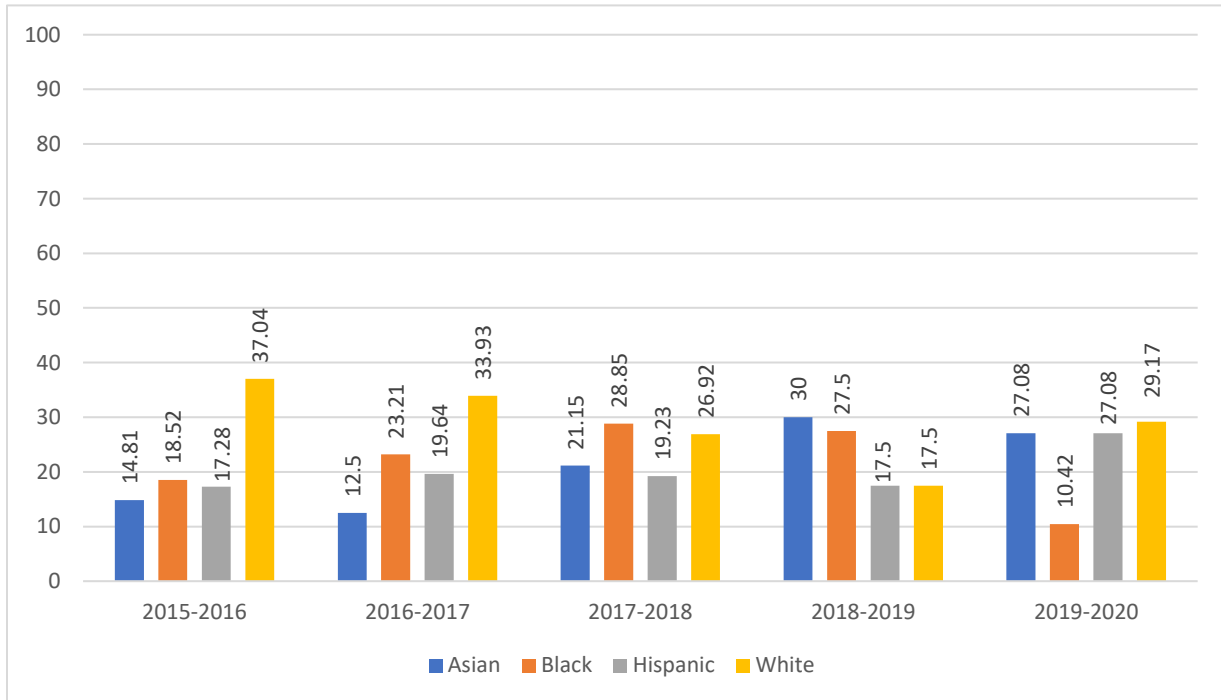
*Percent of Students at High School 7 Enrolled in Advanced, AP, and IB English Courses*



*Note.* AP = Advanced Placement; IB = International Baccalaureate. Reported data represent the total student population for each ethnic group referenced.

**Figure 30**

*Percent of Students at High School 7 Enrolled in Advanced, AP, and IB Math Courses*



*Note.* AP = Advanced Placement; IB = International Baccalaureate. Reported data represent the total student population for each ethnic group referenced.

**Table 9***High School 7 Student Enrollment in Advanced, AP, & IB Courses by Subject*

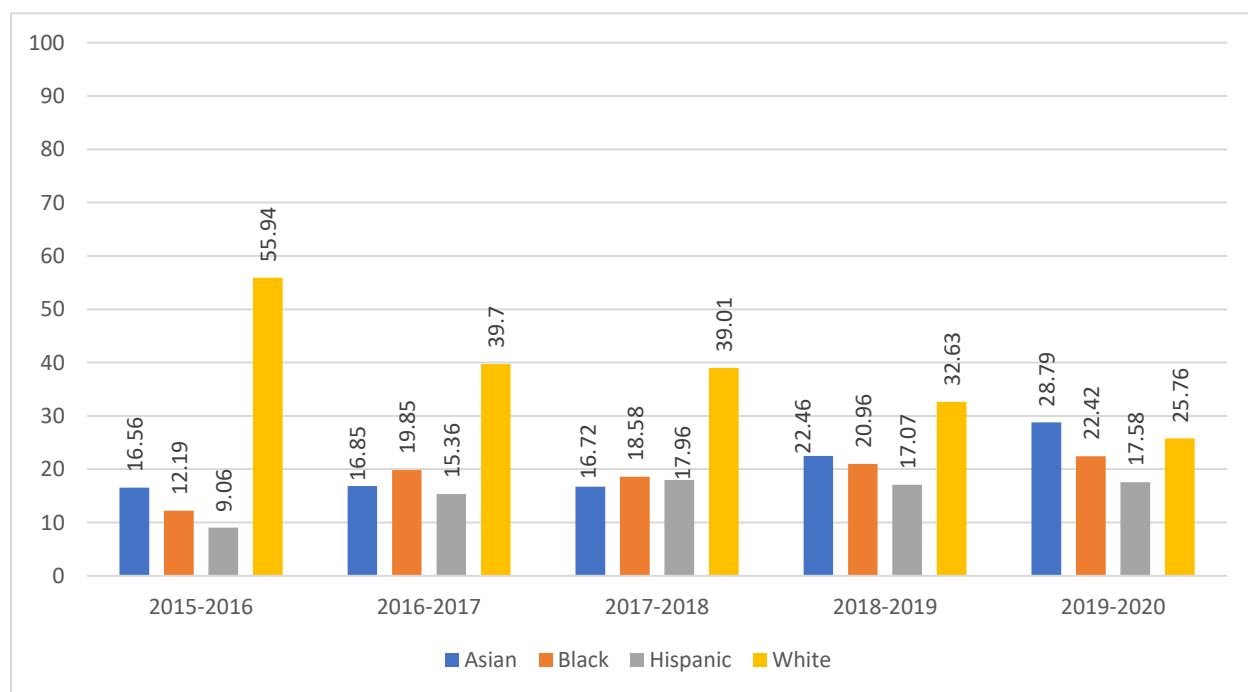
School Year	Students											
	Asian			Black			Hispanic			White		
	Enrollment	% English	% Math	Enrollment	% English	% Math	Enrollment	% English	% Math	Enrollment	% English	% Math
2015-2016	7.42%	10.85%	14.81%	29.59%	29.83%	18.52%	31.11%	15.93%	17.28%	23.20%	31.19%	37.04%
2016-2017	8.30%	10.38%	12.50%	27.46%	28.08%	23.21%	35.50%	22.31%	19.64%	20.61%	27.69%	33.93%
2017-2018	8.31%	14.57%	21.15%	27.18%	31.66%	28.85%	38.53%	26.63%	19.23%	18.91%	17.59%	26.92%
2018-2019	8.63%	18.25%	30.00%	26.63%	28.47%	27.50%	39.40%	22.63%	17.50%	18.14%	22.63%	17.50%
2019-2020	8.49%	8.45%	27.08%	25.44%	31.69%	10.42%	42.01%	19.72%	27.08%	17.68%	27.46%	29.17%

*Note.* AP = Advanced Placement; IB = International Baccalaureate. Reported data represent the total student population for each ethnic group referenced.

The advanced, AP, and IB English course enrollment percentages from 2015-2020 at High School 8 are captured in Figure 31. Enrollment trends indicated that White students were the most represented population each school year except from 2019-2020 (55.94%, 39.7%, 39.01%, 32.63%, 25.76%;  $M=38.61\%$ ). Asian students were the second most represented population (16.56%, 16.85%, 16.72%, 22.46%, 28.79%;  $M=20.28\%$ ). Black students were the third most represented population (12.19%, 19.85%, 18.58%, 20.96%, 22.42%;  $M=18.8\%$ ). Hispanic students were the least represented population (9.06%, 15.36%, 17.96%, 17.07%, 17.58%;  $M=15.41\%$ ). The null hypothesis was rejected as the mean percentage of student enrollment in advanced, AP, and IB English courses showed a significant gap between minority (Black & Hispanic students) and their White peers.

**Figure 31**

*Percent of Students at High School 8 Enrolled in Advanced, AP, and IB English Courses*



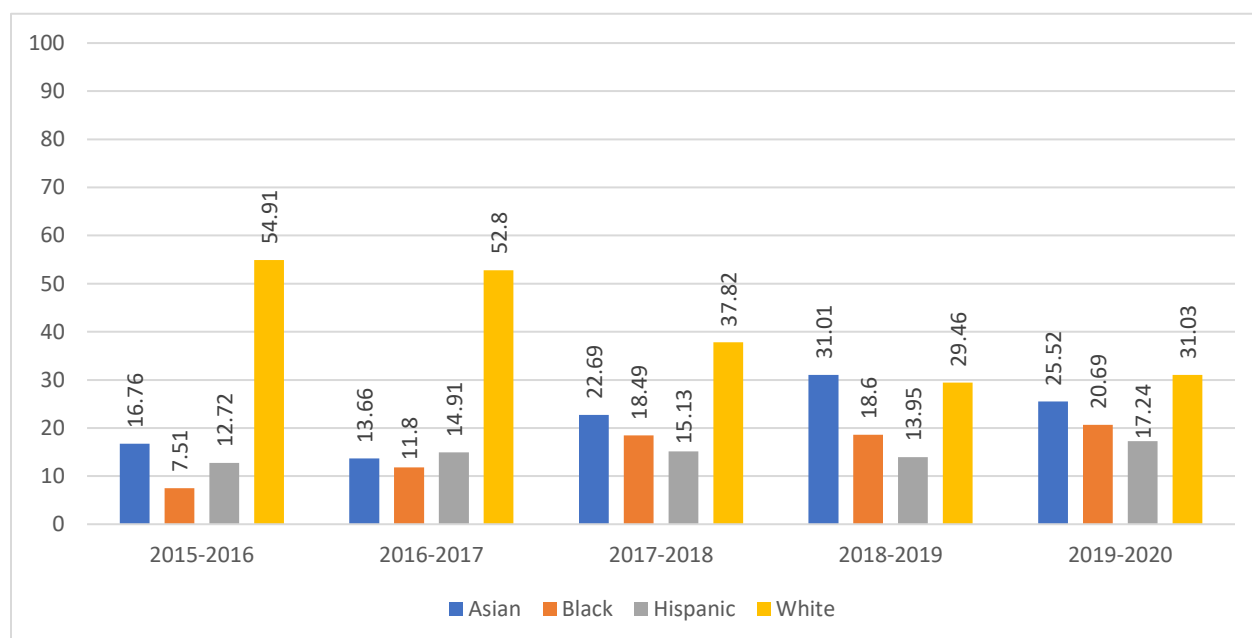
*Note.* AP = Advanced Placement; IB = International Baccalaureate. Reported data represent the total student population for each ethnic group referenced.

The advanced, AP, and IB Math course enrollment percentages from 2015-2020 at High School 8 are captured in Figure 32. Enrollment trends indicated that White students were the most represented population each school year except from 2018-2019 (54.91%, 52.8%, 37.82%, 29.46%, 31.03%;  $M=41.2\%$ ). Asian students were the second most represented population

(16.76%, 13.66%, 22.69%, 31.01%, 25.52%;  $M=21.93\%$ ). Black students were the third most represented population (7.51%, 11.8%, 18.49%, 18.6%, 20.69%;  $M=15.42\%$ ). Hispanic students were the least represented population (12.72%, 14.91%, 15.13%, 13.95%, 17.24%;  $M=14.79\%$ ). The null hypothesis was rejected as the mean percentage of student enrollment in advanced, AP, and IB Math courses showed a significant gap between minority (Black & Hispanic students) and their Asian and White peers. Table 13 displays side-by-side comparisons of the total student enrollment data for the four student populations analyzed at High School 8.

**Figure 32**

*Percent of Students at High School 8 Enrolled in Advanced, AP, and IB Math Courses*



*Note.* AP = Advanced Placement; IB = International Baccalaureate. Reported data represent the total student population for each ethnic group referenced.

**Table 10***High School 8 Student Enrollment in Advanced, AP, & IB Courses by Subject*

School Year	Students											
	Asian			Black			Hispanic			White		
	Enrollment	% English	% Math	Enrollment	% English	% Math	Enrollment	% English	% Math	Enrollment	% English	% Math
2015-2016	10.69%	16.56%	16.76%	15.02%	12.19%	7.51%	25.60%	9.06%	12.72%	42.31%	55.94%	54.91%
2016-2017	12.78%	16.85%	13.66%	15.09%	19.85%	11.80%	29.36%	15.36%	14.91%	36.45%	39.70%	52.80%
2017-2018	14.73%	16.72%	22.69%	16.64%	18.58%	18.49%	32.54%	17.96%	15.13%	30.11%	39.01%	37.82%
2018-2019	15.46%	22.46%	31.01%	16.62%	20.96%	18.60%	32.68%	17.07%	13.95%	29.94%	32.63%	29.46%
2019-2020	16.12%	28.79%	25.52%	17.79%	22.42%	20.69%	33.40%	17.58%	17.24%	27.155	25.76%	31.03%

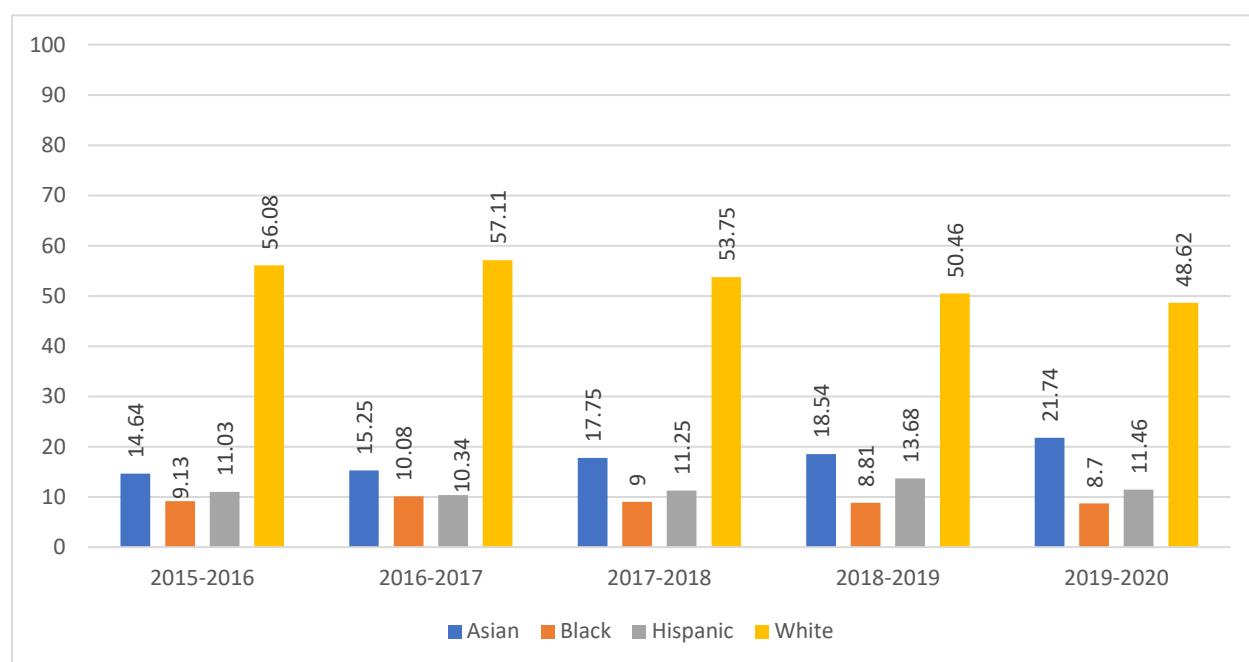
*Note.* AP = Advanced Placement; IB = International Baccalaureate. Reported data represent the total student population for each ethnic group referenced.



The advanced, AP, and IB English course enrollment percentages from 2015-2020 at High School 9 are captured in Figure 33. Enrollment trends indicated that White students were the most represented population each school year (56.08%, 57.11%, 53.75%, 50.46%, 48.62%;  $M=53.2\%$ ). Asian students were the second most represented population (14.64%, 15.25%, 17.75%, 18.54%, 21.74%;  $M=17.85\%$ ). Hispanic students were the third most represented population (11.03%, 10.34%, 11.25%, 13.68%, 11.46%;  $M=11.55\%$ ). Black students were the least represented population (9.13%, 10.08%, 9%, 8.81%, 8.7%;  $M=9.14\%$ ). The null hypothesis was rejected as the mean percentage of student enrollment in advanced, AP, and IB English courses showed a significant gap between minority (Black & Hispanic students) and their Asian and White peers.

**Figure 33**

*Percent of Students at High School 9 Enrolled in Advanced, AP, and IB English Courses*



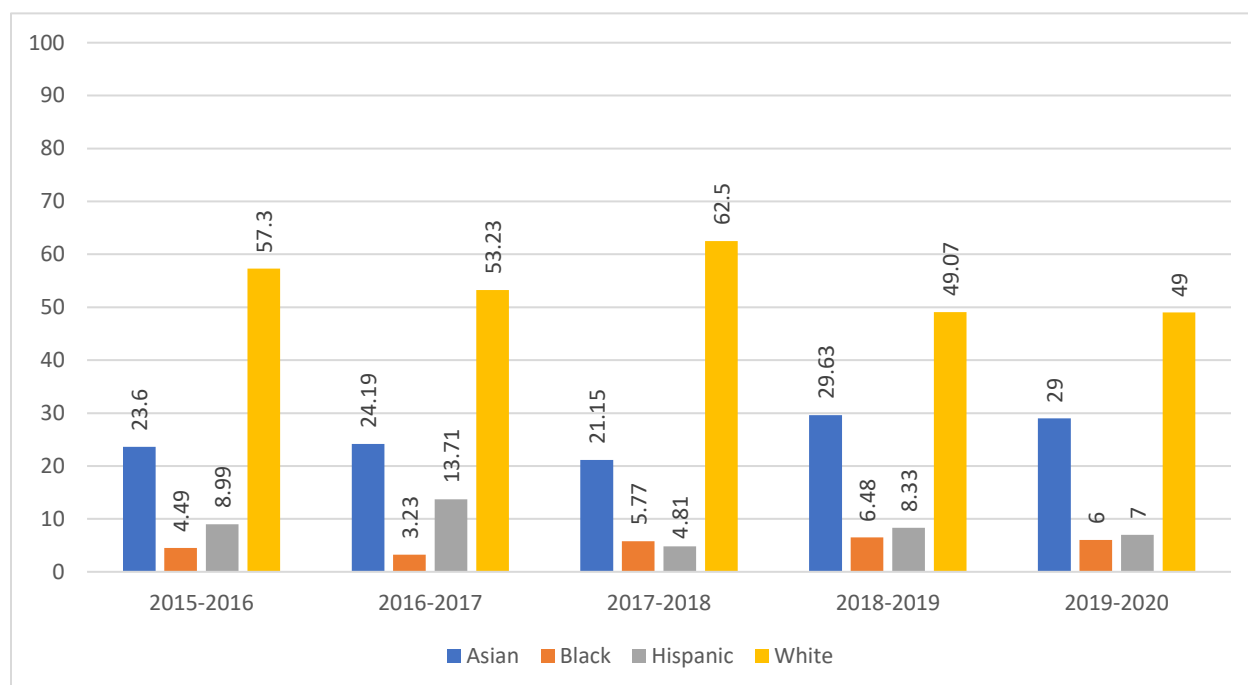
Note. AP = Advanced Placement; IB = International Baccalaureate. Reported data represent the total student population for each ethnic group referenced.

The advanced, AP, and IB Math course enrollment percentages from 2015-2020 at High School 9 are captured in Figure 34. Enrollment trends indicated that White students were the most represented population each school year (57.3%, 53.23%, 62.5%, 49.07%, 49%;  $M=54.22\%$ ). Asian students were the second most represented population (23.6%, 24.19%, 21.15%, 29.63%, 29%;  $M=25.51\%$ ). Hispanic students were the third most represented

population (8.99%, 13.71%, 4.81%, 8.33%, 7%;  $M=8.57\%$ ). Black students were the least represented population (4.49%, 3.23%, 5.77%, 6.48%, 6%;  $M=5.19\%$ ). The null hypothesis was rejected as the mean percentage of student enrollment in advanced, AP, and IB Math courses showed a significant gap between minority (Black & Hispanic students) and their Asian and White peers.

**Figure 34**

*Percent of Students at High School 9 Enrolled in Advanced, AP, and IB Math Courses*



*Note.* AP = Advanced Placement; IB = International Baccalaureate. Reported data represent the total student population for each ethnic group referenced.

**Table 11***High School 9 Student Enrollment in Advanced, AP, & IB Courses by Subject*

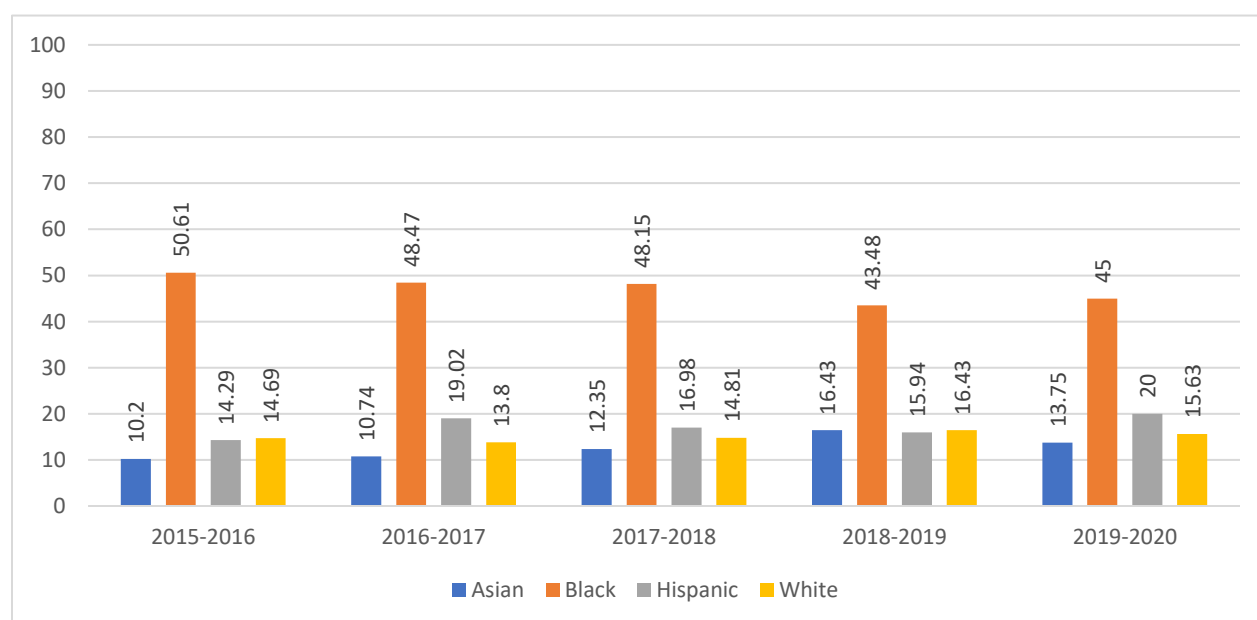
School Year	Students											
	Asian			Black			Hispanic			White		
	Enrollment	% English	% Math	Enrollment	% English	% Math	Enrollment	% English	% Math	Enrollment	% English	% Math
2015-2016	10.80%	14.64%	23.60%	11.89%	9.13%	4.49%	15.31%	11.03%	8.99%	55.20%	56.08%	57.30%
2016-2017	11.37%	15.25%	24.19%	11.56%	10.08%	3.23%	15.35%	10.34%	13.71%	54.47%	57.11%	53.23%
2017-2018	12.69%	17.75%	21.15%	11.14%	9.00%	5.77%	15.81%	11.25%	4.81%	53.04%	53.75%	62.50%
2018-2019	13.98%	18.54%	29.63%	11.12%	8.81%	6.48%	16.14%	13.68%	8.33%	51.43%	50.46%	49.07%
2019-2020	13.66%	21.74%	29.00%	11.45%	8.70%	6.00%	17.09%	11.46%	7.00%	50.64%	48.62%	49.00%

*Note.* AP = Advanced Placement; IB = International Baccalaureate. Reported data represent the total student population for each ethnic group referenced.

The advanced, AP, and IB English course enrollment percentages from 2015-2020 at High School 10 are captured in Figure 35. Enrollment trends indicated that Black students were the most represented population each school (50.61%, 48.47%, 48.15%, 43.48%, 45%;  $M=47.2\%$ ). Hispanic students were the second most represented population (14.29%, 19.02%, 16.98%, 15.94%, 20%;  $M=17.25\%$ ). White students were the third most represented population (14.69%, 13.8%, 14.81%, 16.43%, 15.63%;  $M=15.07\%$ ). Asian students were the least represented population (10.2%, 10.74%, 12.35%, 16.43%, 13.75%;  $M=12.69\%$ ). The null hypothesis was rejected as the mean percentage of student enrollment in advanced, AP, and IB English courses showed a significant gap between minority (Black & Hispanic students) and their Asian and White peers such that Black students accounted for the majority of advanced, AP, and IB English course enrollment.

**Figure 35**

*Percent of Students at High School 10 Enrolled in Advanced, AP, and IB English Courses*



*Note.* AP = Advanced Placement; IB = International Baccalaureate. Reported data represent the total student population for each ethnic group referenced.

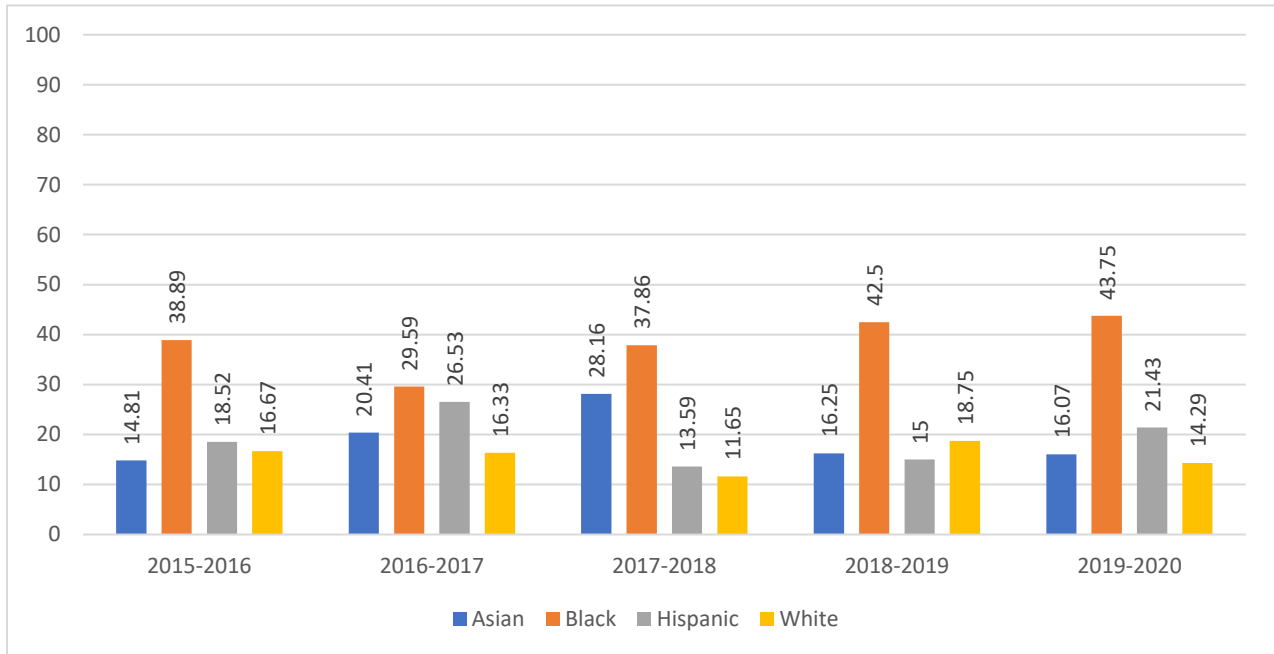
The advanced, AP, and IB Math course enrollment percentages from 2015-2020 at High School 10 are captured in Figure 36. Enrollment trends indicated that Black students were the most represented population each school year (38.89%, 29.59%, 37.86%, 42.5%, 43.75%;  $M=38.52\%$ ). Asian students were the second most represented population (14.81%, 20.41%,

28.16%, 16.25%, 16.07%;  $M=19.14%$ ). Hispanic students were the third most represented population (18.52%, 26.53%, 13.59%, 15%, 21.43%;  $M=19.01%$ ). White students were the least represented population (16.67%, 16.33%, 11.65%, 18.75%, 14.29%;  $M=15.54%$ ). The null hypothesis was rejected as the mean percentage of student enrollment in advanced, AP, and IB Math courses showed a significant gap between minority (Black & Hispanic students) and their Asian and White peers such that Black students accounted for the majority of advanced, AP, and IB Math course enrollment. Table 12 displays side-by-side comparisons of the total student enrollment data for the four student populations analyzed at High School 10.

The advanced, AP, and IB English course enrollment percentages from 2015-2020 at High School 11 are captured in Figure 37. Enrollment trends indicated that White students were the most represented population each school year (41%, 39.56%, 38%, 32.76%, 29.51%;  $M=36.17%$ ). Hispanic students were the second most represented population (24%, 25.27%, 22%, 25.86%, 27.87%;  $M=25%$ ). Black students were the third most represented population (18%, 16.48%, 18%, 18.1%, 16.39%;  $M=17.39%$ ). Asian students were the least represented population (13%, 13.19%, 13%, 16.38%, 19.67%;  $M=15.05%$ ). The null hypothesis was rejected as the mean percentage of student enrollment in advanced, AP, and IB English courses showed a significant gap between minority (Black & Hispanic students) and their White peers.

**Figure 36**

*Percent of Students at High School 10 Enrolled in Advanced, AP, and IB Math Courses*



*Note.* AP = Advanced Placement; IB = International Baccalaureate. Reported data represent the total student population for each ethnic group referenced.

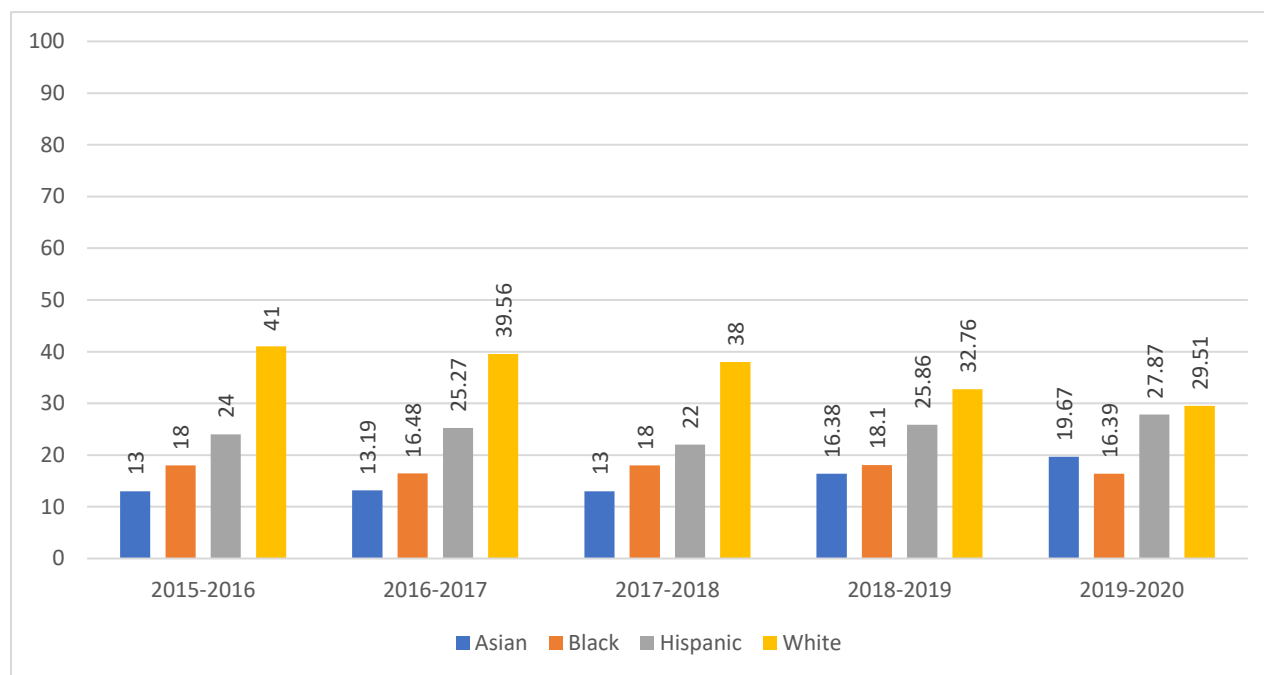
**Table 12***High School 10 Student Enrollment in Advanced, AP, & IB Courses by Subject*

School Year	Students											
	Asian			Black			Hispanic			White		
	Enrollment	% English	% Math	Enrollment	% English	% Math	Enrollment	% English	% Math	Enrollment	% English	% Math
2015-2016	7.19%	10.20%	14.81%	52.61%	50.61%	38.89%	21.50%	14.29%	18.52%	12.67%	14.69%	16.67%
2016-2017	8.31%	10.74%	20.41%	49.45%	48.47%	29.59%	23.74%	19.02%	26.53%	12.36%	13.80%	16.33%
2017-2018	8.21%	12.35%	28.16%	50.59%	48.15%	37.86%	24.42%	16.98%	13.59%	11.56%	14.81%	11.65%
2018-2019	8.71%	16.43%	16.25%	48.95%	43.48%	42.50%	25.66%	15.94%	15.00%	10.87%	16.43%	18.75%
2019-2020	8.73%	13.75%	16.07%	47.21%	45.00%	43.75%	27.91%	20.00%	21.43%	10.89%	15.63%	14.29%

*Note.* AP = Advanced Placement; IB = International Baccalaureate. Reported data represent the total student population for each ethnic group referenced.

**Figure 37**

*Percent of Students at High School 11 Enrolled in Advanced, AP, and IB English Courses*



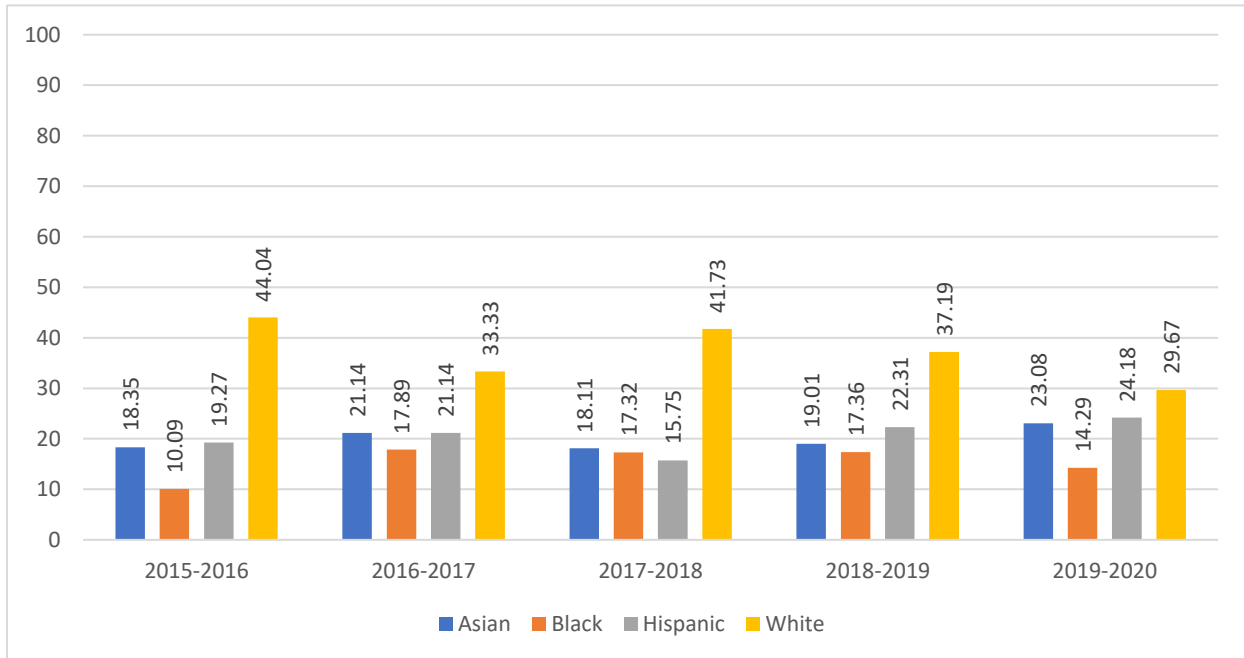
*Note.* AP = Advanced Placement; IB = International Baccalaureate. Reported data represent the total student population for each ethnic group referenced.

The advanced, AP, and IB Math course enrollment percentages from 2015-2020 at High School 11 are captured in Figure 38. Enrollment trends indicated that White students were the most represented population each school year (44.04%, 33.33%, 41.73%, 37.19%, 29.67%;  $M=37.19\%$ ). Hispanic students were the second most represented population (19.27%, 21.14%, 15.75%, 22.31%, 24.18%;  $M=20.53\%$ ). Asian students were the third most represented population (18.35%, 21.14%, 18.11%, 19.01%, 23.08%;  $M=19.94\%$ ). Black students were the least represented population (10.09%, 17.89%, 17.32%, 17.36%, 14.29%;  $M=15.39\%$ ). The null hypothesis was rejected as the mean percentage of student enrollment in advanced, AP, and IB Math courses showed a significant gap between minority (Black & Hispanic students) and their White peers. Table 13 displays side-by-side comparisons of the total student enrollment data for the four student populations analyzed at High School 11.



**Figure 38**

*Percent of Students at High School 11 Enrolled in Advanced, AP, and IB Math Courses*



*Note.* AP = Advanced Placement; IB = International Baccalaureate. Reported data represent the total student population for each ethnic group referenced.

**Table 13***High School 11 Student Enrollment in Advanced, AP, & IB Courses by Subject*

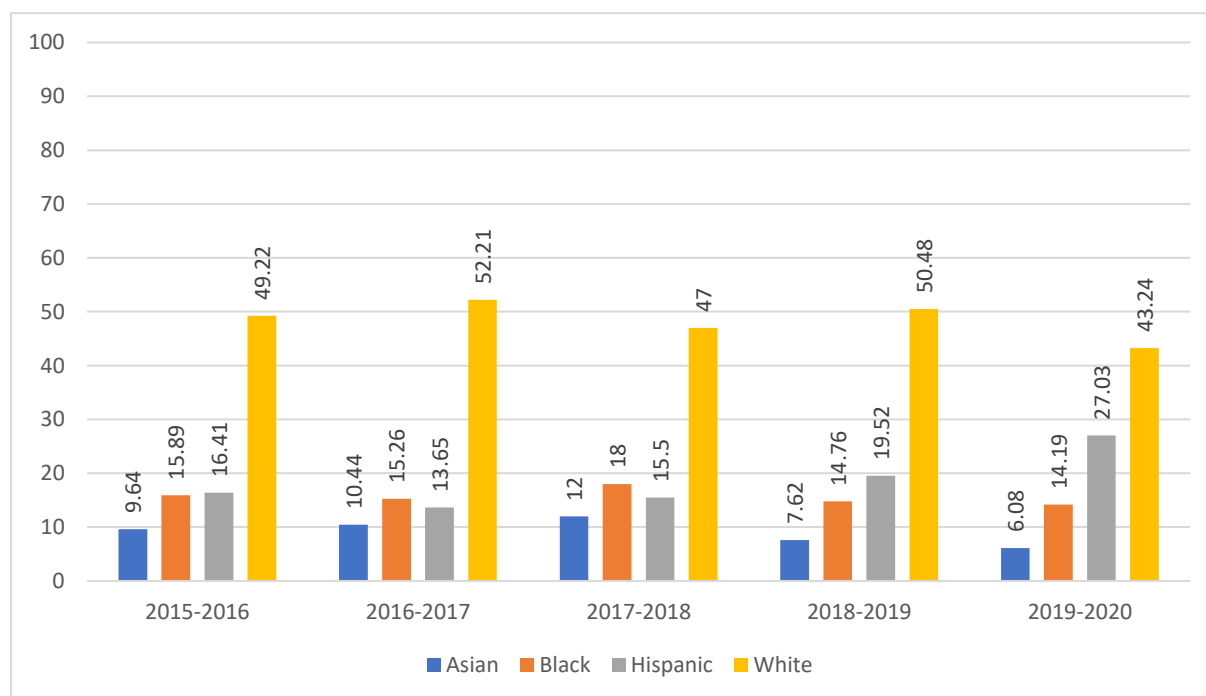
School Year	Students											
	Asian			Black			Hispanic			White		
	Enrollment	% English	% Math	Enrollment	% English	% Math	Enrollment	% English	% Math	Enrollment	% English	% Math
2015-2016	6.10%	13.00%	18.35%	17.14%	18.00%	10.09%	52.72%	24.00%	19.27%	19.02%	41.00%	44.04%
2016-2017	6.17%	13.19%	21.14%	15.50%	16.48%	17.89%	56.17%	25.27%	21.14%	17.17%	39.56%	33.33%
2017-2018	6.37%	13.00%	18.11%	14.33%	18.00%	17.32%	58.40%	22.00%	15.75%	15.48%	38.00%	41.73%
2018-2019	6.78%	16.38%	19.01%	14.52%	18.10%	17.36%	59.33%	25.86%	22.31%	14.14%	32.76%	37.19%
2019-2020	6.08%	19.67%	23.08%	14.36%	16.39%	14.29%	62.76%	27.87%	24.18%	12.52%	29.51%	29.67%

*Note.* AP = Advanced Placement; IB = International Baccalaureate. Reported data represent the total student population for each ethnic group referenced.

The advanced, AP, and IB English course enrollment percentages from 2015-2020 at High School 12 are captured in Figure 39. Enrollment trends indicated that White students were the most represented population each school year (49.22%, 52.21%, 47%, 50.48%, 43.24%;  $M=48.43\%$ ). Hispanic students were the second most represented population (16.41%, 13.65%, 15.5%, 19.52%, 27.03%;  $M=18.42\%$ ). Black students were the third most represented population (15.89%, 15.26%, 18%, 14.76, 14.19%;  $M=15.62\%$ ). Asian students were the least represented population (9.64%, 10.44%, 12%, 7.62%, 6.08%;  $M=9.16\%$ ). The null hypothesis was rejected as the mean percentage of student enrollment in advanced, AP, and IB English courses showed a significant gap between minority (Black & Hispanic students) and their White peers.

**Figure 39**

*Percent of Students at High School 12 Enrolled in Advanced, AP, and IB English Courses*



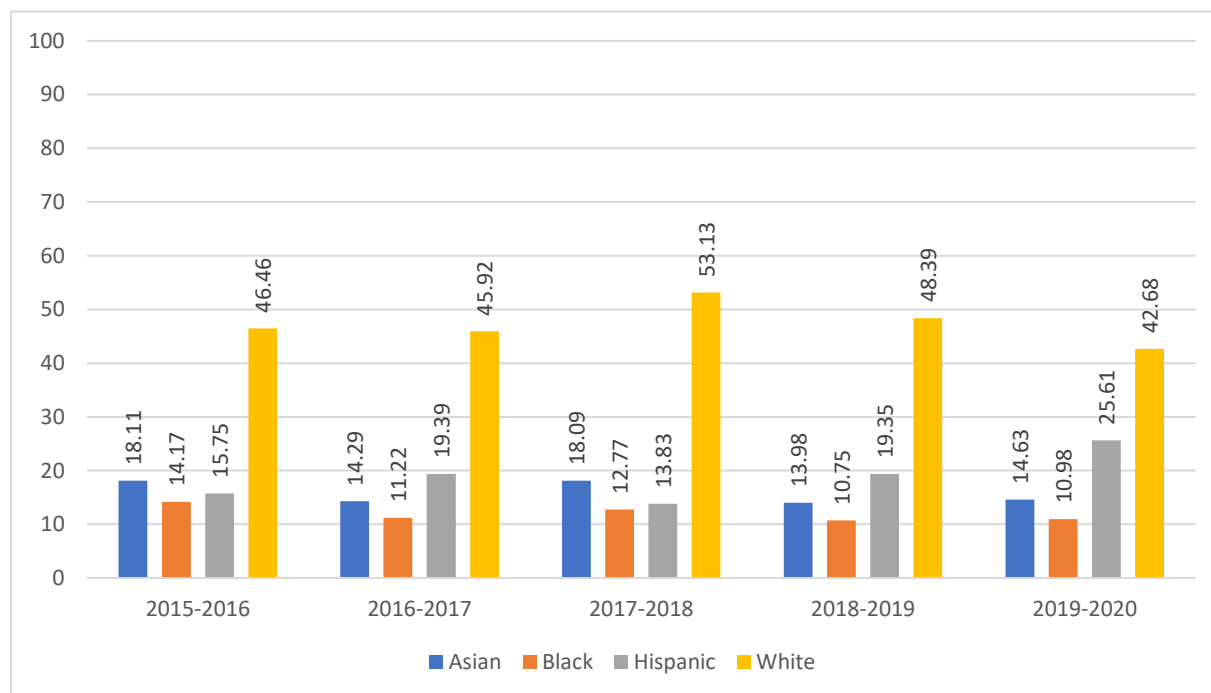
*Note.* AP = Advanced Placement; IB = International Baccalaureate. Reported data represent the total student population for each ethnic group referenced.

The advanced, AP, and IB Math course enrollment percentages from 2015-2020 at High School 12 are captured in Figure 40. Enrollment trends indicated that White students were the most represented population each school year (46.46%, 45.92%, 52.13%, 48.39%, 42.68%;  $M=47.12\%$ ). Hispanic students were the second most represented population (15.75%, 19.39%, 13.83%, 19.35%, 25.61%;  $M=18.79\%$ ). Asian students were the third most represented

population (18.11%, 14.29%, 18.09%, 13.98%, 14.63%;  $M=15.82\%$ ). Black students were the least represented population (14.17%, 11.22%, 12.77%, 10.75%, 10.98%;  $M=11.98\%$ ). The null hypothesis was rejected as the mean percentage of student enrollment in advanced, AP, and IB Math courses showed a significant gap between minority (Black & Hispanic students) and their White peers. Table 14 displays side-by-side comparisons of the total student enrollment data for the four student populations analyzed at High School 12.

**Figure 40**

*Percent of Students at High School 12 Enrolled in Advanced, AP, and IB Math Courses*



*Note.* AP = Advanced Placement; IB = International Baccalaureate. Reported data represent the total student population for each ethnic group referenced.

**Table 14***High School 12 Student Enrollment in Advanced, AP, & IB Courses by Subject*

School Year	Students											
	Asian			Black			Hispanic			White		
	Enrollment	% English	% Math	Enrollment	% English	% Math	Enrollment	% English	% Math	Enrollment	% English	% Math
2015-2016	7.47%	9.64%	18.11%	22.37%	15.89%	14.17%	29.77%	16.41%	15.75%	33.07%	49.22%	46.46%
2016-2017	7.83%	10.44%	14.29%	22.35%	15.26%	11.22%	31.97%	13.65%	19.39%	30.53%	52.21%	45.92%
2017-2018	7.71%	12.00%	18.09%	22.25%	18.00%	12.77%	33.52%	15.50%	13.83%	29.29%	47.00%	53.13%
2018-2019	7.90%	7.62%	13.98%	21.65%	14.76%	10.75%	36.65%	19.52%	19.35%	27.31%	50.48%	48.39%
2019-2020	8.10%	6.08%	14.63%	21.06%	14.19%	10.98%	38.95%	27.03%	25.61%	25.54%	43.24%	42.68%

*Note.* AP = Advanced Placement; IB = International Baccalaureate. Reported data represent the total student population for each ethnic group referenced.

### ***Research Question 2***

What are the comparative attendance and economically disadvantaged rates of Asian, Black, Hispanic, and White students in advanced, AP, and IB Math and English courses in School Division X High Schools from 2015-2020? This question was examined in three parts, investigating the percentage of student enrollment by ethnicity in advanced, AP, and IB English and Math courses, economically disadvantaged percentages, and absenteeism percentages each school year from 2015-2020. Student absenteeism percentages, student economic disadvantaged percentages, and change over time (2015-2020) were the three independent variables that were controlled when analyzing advanced, AP, and IB English and Math course enrollment data for Asian, Black, Hispanic, and White students.

A multiple linear regression analysis was executed in SPSS to predict Asian, Black, Hispanic, and White student enrollment in advanced, AP, and IB English courses when considering student absenteeism percentages, student economically disadvantaged percentages, and change over time (2015-2020) in school Division X. The null hypothesis was that there is no correlation among absenteeism percentages, economically disadvantaged percentages, and Asian, Black, Hispanic, and White student enrollment in advanced, AP, and IB English courses from 2015-2020 in School Division X. Any values  $p < .05$  would result in rejecting the null hypothesis.

The results revealed that 96.5% of the variance in the dependent variable (advanced, AP, & IB English course enrollment) is explained by the independent variables (absenteeism percentages, economically disadvantaged percentages, and change over time; see Table 15). The ANOVA is statistically significant at  $p < .05$ . A significant regression equation found ( $F(3,302) = 2767.444, p < .001$ ), with an  $R^2$  of .965. Students' predicted enrollment is equal to  $.008 + .077$  (economically disadvantaged percentages) advanced, AP, and IB English course enrollment when economically disadvantaged percentages are assessed. A 10% increase in the raw portion of economically disadvantaged students would be associated with a 0.77% increase in the portion of students in advanced, AP, and IB English courses when controlling past year enrollment and absenteeism. The effect would be half the size (-.025, .025) or nullified (0) if there was also an increase in 10% of absenteeism.

A significant regression equation also found ( $F(3,302) = 2767.444, p < .001$ ), with an  $R^2$  of .965. Students' predicted enrollment is equal to  $.008 + .944$  (change over time 2015-2020)

advanced, AP, and IB English course enrollment when multiple school year enrollment percentages are assessed. Students' advanced, AP, and IB English course enrollment increased .944 for each school year. Absenteeism percentages yielded no significant coefficient (-1, 1). This could indicate that there was not enough data or that absenteeism percentages negatively correlated with the changes of advanced, AP, and IP English course enrollment over time (see Table 15). The lag variable (advanced, AP, & IB English courses taken from 2015-2020) accounts for 94% and the rest accounts for random variance, student absenteeism, and economically disadvantaged students.

**Table 15**

*Summary of Multiple Regression Analysis for Advanced, AP, & IB English Courses, 2015-2020*

Variable	Unstandardized B	Coefficients Std. Error	Standardized Coefficients B	<i>t</i>	<i>p</i>
Constant	.008	.004		2.031	.043
abs	-.021	.016	-.014	-1.307	.192
ecodis	.077	.019	.048	4.031	<.001
lag_eng	.944	.011	.963	82.090	<.001
<i>R</i>	.982				
<i>R</i> <sup>2</sup>	.965				
<i>F</i>	2767.444				

*Note.* AP = Advanced Placement; IB = International Baccalaureate; abs = absenteeism percentages; ecodis=economically disadvantaged percentages; lag\_eng = English course enrollment percentages.

\**p* < .001

Further a multiple linear regression analysis was executed in SPSS to review to predict Asian, Black, Hispanic, and White student enrollment in advanced, AP, and IB Math courses when considering student absenteeism percentages and economically disadvantaged percentages, and change over time (2015-2020) of the students in school Division X. The null hypothesis was that there is no correlation among absenteeism percentages, economically disadvantaged percentages, and Asian, Black, Hispanic, and White student enrollment in advanced, AP, and IB Math courses from 2015-2020 in School Division X. Any values which are less than *p* < .05 would result in rejecting the null hypothesis.

The results revealed that 85.8% of the variance in the dependent variable (advanced, AP, & IB Math course enrollment) is explained by the independent variables (absenteeism percentages, economically disadvantaged percentages, and change over time; see Table 16 The

ANOVA is statistically significant because  $p < .05$ . A significant regression equation found ( $F(3,302) = 607.129, p < .001$ ), with an  $R^2$  of .858. Students' predicted enrollment is equal to  $.022 + .094$  (economically disadvantaged percentages) advanced, AP, and IB Math course enrollment when economically disadvantaged percentages are assessed. A 10% in the raw portion of economically disadvantaged students would be associated with a 0.94% increase in the portion of students in advanced, AP, and IB Math courses when controlling past year enrollment and absenteeism. The effect would be half the size ( $-.025, .025$ ) or nullified (0) if there was also an increase in 10% of absenteeism.

A significant regression equation also found ( $F(3,302) = 607.129, p < .001$ ), with an  $R^2$  of .858. Students' predicted enrollment is equal to  $.022 + .891$  (change over time) advanced, AP, and IB Math course enrollment when multiple school year enrollment percentages are assessed. Students' advanced, AP, and IB Math course enrollment increased .891 for each school year. Absenteeism percentages yielded no significant correlation ( $-1, 1$ ) detected. The constant and lag year variable are both significant (see Table 16). The lag variable accounts for 89% (advanced, AP, & IB Math courses taken from 2015-2020) and the rest accounts for random variance, student absenteeism, and economically disadvantaged students.

**Table 16**

*Summary of Multiple Regression Analysis for Advanced, AP, & IB Math Courses, 2015-2020*

Variable	Unstandardized B	Coefficients Std. Error	Standardized Coefficients B	t	p
Constant	.022	.008		2.721	.007
abs	-.040	.032	-.028	-1.238	.217
ecodis	.094	.038	.058	2.488	.013
lag_math	.891	.023	.904	39.133	<.001
<b>R</b>	.926				
<b>R squared</b>	.858				
<b>F</b>	607.129				

*Note.* AP = Advanced Placement; IB = International Baccalaureate; abs = absenteeism percentages; ecodis=economically disadvantaged percentages; lag\_eng = English course enrollment percentages.  
\* $p < .001$

Student absenteeism and economically disadvantaged students weighed each other out such that there is a 0.2% enrollment net decrease between the two variables. When one increases, and the other decreases it accounts for a predicted shift in advanced, AP, and IB English and



Math course enrollment. If both variables go in the same direction (increase or decrease), the predicted shift in advanced, AP, and IB English and Math course enrollment is lessened.

## **Emergent Themes**

### ***Theme 1***

***There was a consistent decrease in the enrollment of White students across all 12 high schools within School Division X from 2015-2020.*** Upon analyzing the data from Research Question 1 (What is the gap, if any, of minority student enrollment in advanced, AP, and IB Math and English courses in School Division X High Schools from 2015-2020?), I noticed a consistent decrease in the enrollment of White students across all 12 high schools within School Division X from 2015-2020. The enrollment of Asian students increased from 2015-2020. There were two high schools in which the enrollment of Asian students remained consistent from 2015-2020. There was one high school in which the enrollment of Asian students slightly decreased from 2015-2020. The enrollment of Black students remained consistent from 2015-2020. There were four high schools in which the enrollment of Black students decreased from 2015-2020. There were three high school in which the enrollment of Black students increased from 2015-2020. The enrollment of Hispanic students increased from 2015-2020. There were three high schools in which the enrollment of Hispanic students remained consistent from 2015-2020.

### ***Theme 2***

***White students were the most represented population in advanced, AP, and IB English courses from 2015-2020.*** The data from research question one also indicated that overall White students were the most represented population in advanced, AP, and IB English courses from 2015-2020. Black and Hispanic students were tied for the second most represented population in advanced, AP, and IB English courses from 2015-2020. The data from research question two also indicated that overall White students were the most represented population in advanced, AP, and IB Math courses from 2015-2020. Asian students were the second most represented population in advanced, AP, and IB Math courses from 2015-2020.

### **Theme 3**

***There is a significant gap of minority student enrollment in advanced, AP, and IB Math and English courses.*** The data from research question one also indicated that there is a significant gap of minority student enrollment in advanced, AP, and IB Math and English courses in School Division X High Schools from 2015-2020. Even with the consistent decrease in White student enrollment and consistent increase in Hispanic student enrollment from 2015-2020, White students account for most students enrolled in both advanced, AP, and IB English and Math courses. It is also worth noting that while Asian students are the least represented population of the four noted in School Division X, they account for the second largest represented group in advanced, AP, and IB Math courses. This magnifies the gap of minority (Black and Hispanic) student enrollment in advanced, AP, and IB Math and English courses in School Division X High Schools from 2015-2020.

### **Theme 4**

***Absenteeism is not correlated to enrollment in advanced, AP, and IB English and Math courses; however, economic status is.*** The data from Research Question 2 (What is the comparative attendance and economically disadvantaged rates of Asian, Black, Hispanic, and White students in correlation with advanced, AP, and IB Math and English course enrollment in School Division X High Schools from 2015-2020?) indicated that there was no significant correlation between student absenteeism percentages and enrollment in advanced, AP, and IB English and Math courses from 2015-2020 in School Division X. There was, however, a significant correlation between student economically disadvantaged percentages and enrollment in advanced, AP, and IB English and Math courses from 2015-2020.

### **Summary**

Overall, there was an increase of student enrollment in advanced, AP, and IB English and Math courses from 2015-2020, however the increased enrollment was not consistent from year to year for any student group when analyzing student ethnicity. A broad review of the research questions revealed that while minority student enrollment in advanced, AP, and IB English and Math courses has increased throughout School Division X, however there is still a significant gap of minority student representation in those same courses. There was also a shift in the

majority representation of student groups from 2015-2020 within some of the high schools. The consistent decrease of White student enrollment across all high schools within the school division is worth noting because the decrease did not significantly alter the White student majority enrollment trends in advanced, AP, and IB English and Math courses. Even with the shift in student group representation, the enrollment trends of student groups in advanced, AP, and IB English and Math courses remained generally consistent from 2015-2020.

Student absenteeism rates yielded no significant correlation to student enrollment in advanced, AP, and IB English and Math courses (refer to Tables 15 and 16). The data revealed that there was however a significant correlation between student economically disadvantaged rates and enrollment in advanced, AP, and IB English and Math courses (refer to Tables 15 and 15). The data also revealed a positive correlation between student enrollment in advanced, AP, and IB English and Math courses and change over time (2015-2020 school years).

## Chapter Five

### Summary

#### Discussion

The purpose of this study was to identify the gap if any of minority student enrollment in advanced, Advanced Placement (AP), and International Baccalaureate (IB) Math and English courses in School Division X. The researcher reviewed variables that are believed to have a correlation with student enrollment in advanced, AP, and IB English and Math courses in School Division X. The intended outcome was to identify if student attendance and economic status have a direct correlation with the enrollment gap of minority students in advanced, AP, and IB English and Math high school courses. The data collected were used to explore two research questions.

1. What is the gap, if any, of minority student enrollment in advanced, Advanced Placement (AP), and International Baccalaureate (IB) Math and English courses in School Division X High Schools from 2015-2020?
2. What is the comparative attendance and economically disadvantaged rates of Asian, Black, Hispanic, and White students in correlation with advanced, Advanced Placement (AP), and International Baccalaureate (IB) Math and English course enrollment in School Division X High Schools from 2015-2020?

The study indicated that there was a significant gap of minority student enrollment in advanced, AP, and IB English and Math courses in School Division X High Schools from 2015-2020. The advanced, AP, and IB English and Math course enrollment data from each high school within School Division X was disaggregated to include student enrollment trends. This information allowed the researcher to incorporate student population shifts from 2015-2020 in the data.

The study also indicated that there was a significant correlation between the economically disadvantaged percentages of students and student enrollment in advanced, AP, and IB English and Math courses in School Division X High Schools from 2015-2020. Student absenteeism percentages did not have a significant impact on student enrollment in advanced, AP, and IB English and Math courses in School Division X High Schools from 2015-2020.

## Summary of Findings

The major findings of the study were identified after the obtained data were analyzed. The findings along with supporting data and referenced research are listed below.

### *Finding 1*

***Asian, Black, and Hispanic students are underrepresented in advanced, AP, and IB English courses.*** The study indicated that White students were the most represented population each school year from 2015-2020 in advanced, AP, & IB English classes at High Schools 1, 2, 3, 4, 8, 9, 11, and 12 in School Division X. The average enrollment of White students in advanced, AP, and IB English courses at High School 1 was 57.9% as compared to Asian students (17.51%), Black students (8.53%), and Hispanic students (9.06%). The average enrollment of White students in advanced, AP, and IB English courses at High School 2 was 79.27% as compared to Asian students (4.39%), Black students (2.65%), and Hispanic students (8.71%). The average enrollment of White students in advanced, AP, and IB English courses at High School 3 was 56.27% as compared to Asian students (8.82%), Black students (13.41%), and Hispanic students (11.88%).

The average enrollment of White students in advanced, AP, and IB English courses at High School 4 was 47.57% as compared to Asian students (12.98%), Black students (16.82%), and Hispanic students (12.42%). The average enrollment of White students in advanced, AP, and IB English courses at High School 8 was 38.61% as compared to Asian students (20.28%), Black students (18.8%), and Hispanic students (15.41%). The average enrollment of White students in advanced, AP, and IB English courses at High School 9 was 53.2% as compared to Asian students (17.85%), Black students (9.14%), and Hispanic students (11.55%). The average enrollment of White students in advanced, AP, and IB English courses at High School 11 was 36.17% as compared to Asian students (15.05%), Black students (17.39%), and Hispanic students (25%). The average enrollment of White students in advanced, AP, and IB English courses at High School 12 was 49.43% as compared to Asian students (9.16%), Black students (15.62%), and Hispanic students (18.42%). For a summary of findings refer to Tables 3–6, 10, 11, 13, and 14.

The results from the study are supported by earlier findings. Hanson et al. (2017) noted significant gaps in Hispanic student enrollment in advanced English courses at the high school

level regardless of their English language learner status. Young (2016) reported that African American students often opt out of taking advanced English courses due to perceived level of rigor and the perception that lower track courses are easier. It was also reported that minority students enrolled in AP Math, Science, and English courses at lower rates when compared to White students (Garland & Rapaport, 2017; Klopfenstein, 2004).

Garland and Rapaport (2017) and Kolluri (2018) noted that almost three-quarters of minority students attend high schools offering between 19 and 27 advanced and AP courses yet minority students demonstrating comparably high abilities complete three or fewer AP courses during their high school career. Rich (2013) reported that every year, more than 600,000 academically promising high school students; most of them poor, Latino or Black fail to enroll in Advanced Placement courses. It is not uncommon to see an overrepresentation of White students and the absence of minority students in college preparatory/AP courses (Welton & Martinez, 2014). Kettler and Hurst (2017) revealed that for decades there has been inequitable participation across race and ethnic groups in advanced and AP courses. Ford (2010) noted that Black students are underrepresented by 48% in advanced settings in US schools.

Within School Division X, there were instances in which White students, were not the largest population represented in the high school, they accounted for most of the student population participating in advanced, AP, and IB English courses. This could be attributed to multiple factors, such as prior preparation for advanced coursework, parent advocacy, and teacher recommendations. In instances where White students represented less than 15% of the overall study population at a particular high school, their enrollment rates in advanced, AP, and IB English courses were comparative to their peers.

## ***Finding 2***

***Black and Hispanic students are underrepresented in advanced, AP, and IB Math courses.*** The study indicated that White students were the most represented population each school year from 2015-2020 in advanced, AP, and IB Math classes at High Schools 1, 2, 3, 4, 7, 8, 9, 11, and 12 in School Division X. Asian students were the second most represented population each school year from 2015-2020 in advanced, AP, & IB Math classes at High Schools 1, 3, 4, 5, 6, 8, 9, and 10 in School Division X. The average enrollment of White students (57.62%) and Asian students (21.64%) in advanced, AP, and IB Math courses at High

School 1 as compared to Black students (5.83%), and Hispanic students (7.33%) displays a significant gap. The average enrollment of White students in advanced, AP, and IB Math courses at High School 2 was 74% as compared to Black students (4.08%), and Hispanic students (7.34%). The average enrollment of White students (55.89%) and Asian students (15.22%) in advanced, AP, and IB Math courses at High School 3 as compared to Black students (11.28%), and Hispanic students (10.39%) displays a significant gap.

The average enrollment of White students (47.89%) and Asian students (15.09%) in advanced, AP, and IB Math courses at High School 4 as compared to Black students (13.12%), and Hispanic students (12.55%) displays a significant gap. The average enrollment of Asian students in advanced, AP, and IB Math courses at High School 5 was 21.78% as compared to Black students (21.71%). The average enrollment of Asian students in advanced, AP, and IB Math courses at High School 6 was 27.21% as compared to Black students (18.5%). The average enrollment of White students in advanced, AP, and IB Math courses at High School 7 was 28.91% as compared to Black students (21.7%) and Hispanic students (20.15%).

The average enrollment of White students (41.2%) and Asian students (21.93%) in advanced, AP, and IB Math courses at High School 8 as compared to Black students (15.42%), and Hispanic students (14.79%) displays a significant gap. The average enrollment of White students (54.22%) and Asian students (25.51%) in advanced, AP, and IB Math courses at High School 9 as compared to Black students (5.19%), and Hispanic students (8.57%) displays a significant gap. The average enrollment of Asian students in advanced, AP, and IB Math courses at High School 10 was 19.14% as compared to Hispanic students (19.01%). The average enrollment of White students in advanced, AP, and IB Math courses at High School 11 was 37.19% as compared to Black students (15.39%) and Hispanic students (20.53%). The average enrollment of White students in advanced, AP, and IB Math courses at High School 12 was 47.12% as compared to Black students (11.98%) and Hispanic students (18.79%). For a summary of findings refer to Tables 3–14

The results from the study are supported by earlier findings. It was reported that the rate Asian students enrolled in advanced math courses was 3 times that of Black or Hispanic students (Anderson & Chang, 2011). White students enrolled in advanced math coursework at a rate twice that of Black or Hispanic students (Anderson & Chang, 2011). It was also reported that minority students enrolled in AP Math, Science, and English courses at lower rates when compared to

White students (Garland & Rapaport, 2017; Klopfenstein, 2004). There are still significant gaps in academic achievement between Blacks and Latinos and their White counterparts regarding AP exam scores and class grades (College Board, 2014). Garland and Rapaport (2017) and Kolluri (2018) noted that almost three-quarters of minority students attend high schools offering between 19 and 27 advanced and AP courses yet minority students demonstrating comparably high abilities complete three or fewer AP courses during their high school career.

Barnard-Brak et al. (2011), Clark et al. (2012), Cha (2015), Garland and Rapaport (2017), and Kolluri (2018) reported that while there has been a significant increase in African American and Hispanic student enrollment in AP courses, these groups remain seriously underrepresented when compared to Asian students who continue to be overrepresented in AP courses. Many reforms have been put in place at the secondary level to increase minority student enrollment in advanced courses (Childs & Lofton, 2021; Schneider & Saw, 2016). Although efforts to increase minority enrollment in advanced and AP courses have been successful, a noticeable participation gap still exists between minority and White students (Kettler & Hurst, 2017; Kolluri, 2018; Rowland & Shircliffe, 2016).

It would be worth reviewing the designation of Black and Hispanic students in special education and low-level English Learner programs. The bulk of students enrolled in these programs often do not enroll in advanced level coursework and complete the minimum Math requirements to graduate. In the Commonwealth of Virginia, the minimum math requirements for graduation do not extend past Geometry or Algebraic Functions and Data Analysis. This factor could add the correlate with the underrepresentation in advanced math coursework along with other factors such as the lack of teacher recommendations or educational foundation in math skills.

### ***Finding 3***

***As there were more economically disadvantaged populations, there were also more enrollments in advanced, AP, and IB English and Math courses.*** Students' predicted enrollment is equal to  $.008 + .077$  (economically disadvantaged percentages) advanced, AP, and IB English course enrollment when economically disadvantaged percentages are assessed. A 10% increase in the raw portion of economically disadvantaged students would be associated with a 0.77% increase in the portion of students in advanced, AP, and IB English courses when



controlling past year enrollment and absenteeism. Students' predicted enrollment is equal to  $.022 + .094$  (economically disadvantaged percentages) advanced, AP, and IB Math course enrollment when economically disadvantaged percentages are assessed. A 10% in the raw portion of economically disadvantaged students would be associated with a 0.94% increase in the portion of students in advanced, AP, and IB Math courses when controlling past year enrollment and absenteeism. The effect would be half the size ( $-.025, .025$ ) or nullified (0) if there was also an increase in 10% of absenteeism.

The results from the study are supported by earlier research. A small number of low-income students are achieving at the highest levels (Gambrell, 2007; Gifted Child Today, 2008). Research also revealed that more than three million students from low-income backgrounds excel and learn at the highest levels; however, they slowly lose educational ground over time (Anderson & Chang, 2011; Conger et al. 2009). Barnard-Brak et al. (2011) reported updated federal funding policies that allot funds specifically to increase advanced math and science course participation for economically disadvantaged and minority students.

While students from all ethnic backgrounds comprise the economically disadvantaged student population, Black and Hispanic students accounted for much of the low-income population within School Division X. Federal funds than available grants for high schools are often used to provide additional resources and support for students and teachers to assist with student successful advanced course completion. These factors attribute to the positive correlation of economically disadvantaged student population in advanced, AP, and IB coursework.

#### ***Finding 4***

***Absenteeism percentages did not significantly correlate with advanced, AP, and IB English and Math course enrollment.*** Absenteeism percentages yielded no significant coefficient ( $-1, 1$ ). This could indicate that there was not enough data or that absenteeism percentages negatively correlated with the changes of advanced, AP, and IP English course enrollment over time (see Tables 15 and 16).

Previous research dictated that chronic absenteeism has been associated with low academic achievement, high school dropouts, and unfavorable outcomes post high school (VDOE, 2020a). Allen et al. (2018) reported that chronic absenteeism has immediate lasting effects that negatively impact academic performance and high school graduation rates. Garcia

and Weiss (2018) also reported that chronic absenteeism was linked with a significant reduction in academic performance. Balfanz and Byrnes (2012) reported that attendance strongly impacts graduation and dropout rates. It was further discovered that truancy was linked to grade retention and course selection across all grade levels (Gage et al., 2013).

A review of data indicated that most truant students enrolled in grade levels courses and did not enroll in advanced, AP, or IB level courses (Gage et al., 2013). Childs and Lofton (2021) reported that students who are chronically absent often do not benefit from the many robust educational reforms put in place by schools to support academic achievement and rigor. The research shows that students need to attend school daily to be academically successful (Balfanz & Byrnes, 2012).

The results indicate that more information is needed to execute an analysis of attendance rates and their impacts on student enrollment in advanced, AP, and IB English and Math courses within School Division X. Previous research offers compelling data on the effects of attendance and academic success as well as advanced course participation for all students. Minority students are often highly represented in chronic absentee data.

### ***Finding 5***

***If both student absenteeism and economically disadvantaged percentages increased, student enrollment in advanced, AP, and IB English and Math courses decreased.*** Student absenteeism and economically disadvantaged students weighed each other out such that there is a 0.2% enrollment net decrease between the two variables. If both variables go in the same direction (increase), the predicted shift in advanced, AP, and IB English and Math course enrollment is lessened. If both variables decrease, the predicted shift in advanced, AP, and IB English and Math course enrollment is increased.

The results from the study are supported by earlier research Kettler and Hurst (2017) indicated that the pertinent factors associated with Black-White and Hispanic-White participation gaps differ. A review of data indicated that most truant students enrolled in grade levels courses and did not enroll in advanced, AP, or IB level courses (Gage et al., 2013). Rich (2013) reported that every year, more than 600,000 academically promising high school students; most of them poor, Latino or Black fail to enroll in Advanced Placement courses.

Allen et al. (2018) reported that chronic absenteeism has immediate lasting effects that negatively impact academic performance and high school graduation rates. Garcia and Weiss (2018) also reported that chronic absenteeism was linked with a significant reduction in academic performance. Research also revealed that more than three million students from low-income backgrounds excel and learn at the highest levels; however, they slowly lose educational ground over time (Anderson & Chang, 2011; Conger et al. 2009).

Students that lack a strong educational foundation and are chronically absent will have often perform poorly academically. Poor academic performance lessens a student's opportunity to participate in advanced coursework. Educational reforms to reduce chronic absenteeism rate and implement academic resources give all students, especially minority students a chance to participate and be successful in advanced coursework. This is only the case if minority students take advantage of available resources and glean support from both educators and parents/guardians.

### **Implications of Findings**

There were several implications identified for school leaders once the findings of this study were reviewed. Each implication is listed below and accompanied with a brief explanation.

#### ***Implication 1***

***Educational Leaders should work collaboratively with teachers to put supports in place that foster an increase in minority student enrollment in advanced, AP, and IB English and Math courses.*** This implication is associated with findings 1 and 2. The study revealed that White students were the most represented in advanced English coursework even when they are not the majority population. Educators can review language barriers as a potential correlation to lessened Hispanic enrollment and implement initiatives that would afford students that do not speak English as a first language to be successful in advanced courses. The study also revealed that White students were the most represented in advanced Math coursework even when they are not the majority population. Asian students were the second most represented group in advanced Math coursework even when they are the least represented population. Applying for grants such as National Math & Science Initiative can assist with this initiative by supplying schools with funds to secure needed resources. Educators can work together to institute collaborative lesson

planning and learning walks with middle school math teachers and other high school math teachers to prepare students for the academic rigor of an advanced class would be influential.

### ***Implication 2***

***Educational Leaders should poll students anonymously to reveal reasons students do not enroll and/or complete advanced, AP, & IB English & Math courses.*** This implication is associated with findings 1 and 2. Schools can disaggregate collected data and review advanced, AP, & IB course enrollment trends from the beginning of the school year until the end to review the changed in student enrollment if any. Schools would be able to list reasons students do not enroll or complete advanced, AP, and IB English & Math courses and put supports in place to support successful course completion. Administrators can work collaboratively with teachers to put supports in place that will assist students that struggle academically with enrolling in and successfully completing at least one advanced English or Math course during high school.

### ***Implication 3***

***Educational Leaders should use data provided from diagnostic assessments like the PSAT to identify students that have the potential to be successful in an advanced, AP, or IB course.*** This implication is associated with findings 1, 2, and 3. Once students are identified, their course history should be reviewed by academic advisors. The academic advisors would compile a list of eligible advanced courses based upon graduation requirements that can be discussed with students and parents as viable options. Schools would also need to provide professional development opportunities to adequately prepare more teachers to teach advanced, AP, and IB courses in anticipation of increased student enrollment.

### **Suggestions for Future Research**

The purpose of this study was to identify the gap if any of minority student enrollment in advanced, AP, and IB Math and English courses in School Division X. The researcher also wanted to identify if student attendance and economic status have a direct correlation with the enrollment gap of minority students in advanced, AP, and IB Math and English high school courses. This study only incorporated data from one school division within Region IV in the Commonwealth of Virginia. Future studies should consider using data from all high schools in Region IV to compare advanced English and Math course enrollment trends. Future research

should expand the setting such that the same study is conducted using the advanced, AP, and IB English and Math enrollment data from all high schools in the Commonwealth of Virginia to obtain more generalized results.

Future studies should consider comparing minority student enrollment trends in advanced, AP, and IB English and Math courses pre, during, and post the COVID-19 pandemic. While this longitudinal study focused on data all pre pandemic, enrollment trends in advanced English and Math courses during and after the pandemic would provide insight as to whether the pandemic had a direct correlation with enrollment trends. This type of study would afford educational leaders the opportunity to decipher the correlation if any of the pandemic on advanced course enrollment and preparedness.

Furthermore, future research should consider introducing a qualitative portion of the study to include a student survey. The survey would capture student reasons for selecting or not selecting advanced courses. The survey would also capture reason students stayed in or dropped advanced courses. This would make the study mixed methods by design, however, would provide a deeper understanding of the minority student enrollment gap in advanced courses. It will also provide information to educators that is needed to implement effective academic supports.

## **Summary**

This chapter provided a discussion of the research findings, implications of the research findings, and suggestions for future research. In summary, the study indicated that the overall enrollment rates of Asian and Hispanic students increased while the enrollment rates of White students decreased from 2015-2020 in School Division X. This data displayed the shift in overall student enrollment over a 5-year span. The data from the study also indicated a significant enrollment gap of minority students when compared to Asian and White students in advanced, AP, and IB English and Math courses.

Proportionate comparisons of overall student enrollment in advanced, AP, and IB English courses indicated that White students are overrepresented and Asian, Black, and Hispanic students are underrepresented in School Division X. Also, proportionate comparisons of overall student enrollment in advanced, AP, and IB Math courses indicated that Asian and White

students are overrepresented and Black and Hispanic students are underrepresented in School Division X.

The study also indicated that student economically disadvantaged percentages significantly correlated with student enrollment in advanced, AP, and IB English and Math courses such that as student economically disadvantaged percentages increased; student course enrollment in advanced, AP, and IB courses slightly increased. This correlation is often supported by reforms and initiatives to increase economically disadvantages students' exposure to at least one advanced core course during high school. Student absenteeism and economically disadvantaged percentages also correlated with student enrollment in advanced, AP, and IB English and Math courses such that if both variables increase; student course enrollment is decreased.

### **Reflections**

The study went smoothly overall. The researcher was able to capture all data used seamlessly. All data used was pre-pandemic as the researcher wanted to gain the most accurate data while accounting for outside conditions. A tests of model effects was also executed to determine if each term in the model had any effect. Terms within the model containing significance values less than 0.05 are considered to have some discernible effect. All independent variables except for student absentee percentages had some discernible effect. The insignificance of student absentee percentage can be attributed to the need for more information.

The researcher was genuinely shocked by Finding 3. After delving into the resources available to high schools within School Division X, such as the NMSI grant, the researcher gained a better understanding for Finding 3. One of the initiatives for the NMSI grant is to assist high school with increasing advanced and rigorous coursework for economically disadvantaged students. The shift in student enrollment demographics within School Division X was significant such that in instances when Black and Hispanic students were the majority enrolled population, they were still underrepresented in advanced, AP, and IB English and Math courses. The goal of Educational Leaders would be to have the student body in advanced courses mirror the student body that walks the halls daily.

Equal access in education has proven to be less than sufficient over the years regarding academic success for all students. The technical functional theory states that technological

changes yield educational requirements that reflect demands for greater skills (Rodriguez & McGuire, 2019; Sakamoto et al., 2012). Educational Leaders and teachers must work to ensure students are equipped with the greater skills needed to meet employment demands. The business community and community partnerships can foster an external support system for minority students participating in advanced and AP level courses (DeVance Taliaferro & DeCuir-Gunby, 2008). Students can benefit from both internal (school) and external (community) supports towards academic success. Overall conducting this research study was a positive experience and afforded me the opportunity to grow professionally and improve my scholarly writing. The research also provided pertinent information educators can use to support the increase of minority students in advanced courses.

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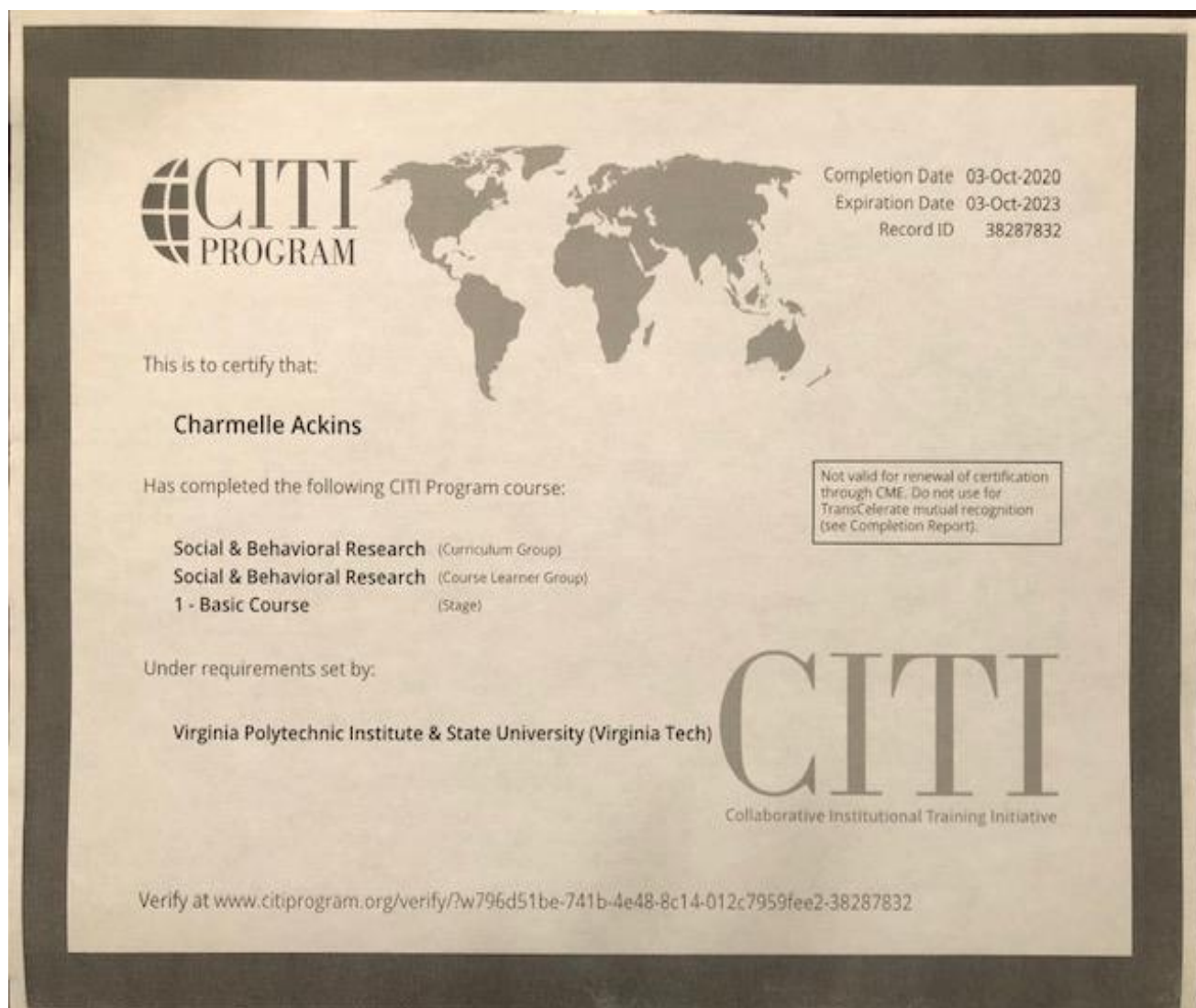
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**Appendix A**  
**Social & Behavioral Research Training Certificate**



## Appendix B

### VT IRB-21-549 Approval Letter



Division of Scholarly Integrity and  
Research Compliance  
Institutional Review Board  
North End Center, Suite 4120 (MC 0497)  
300 Turner Street NW  
Blacksburg, Virginia 24061  
540/231-3732  
irb@vt.edu  
<http://www.research.vt.edu/sirc/hrpp>

#### MEMORANDUM

**DATE:** June 17, 2021  
**TO:** Carol S Cash, Charmelle Justine Ackins  
**FROM:** Virginia Tech Institutional Review Board (FWA00000572)  
**PROTOCOL TITLE:** Equity in Opportunity: Minority Student Enrollment in Advanced, Advanced Placement, and International Baccalaureate English & Mathematics Courses at the High School Level  
**IRB NUMBER:** 21-549

Based on the submitted project description and items listed in the Special Instructions section found on Page 2, the Virginia Tech Human Research Protection Program (HRPP) has determined that the proposed activity is not research involving human subjects as defined by HHS and FDA regulations.

Further review and approval by the Virginia Tech Human Research Protection Program (HRPP) is not required because this is not human research. This determination applies only to the activities described in the submitted project description and does not apply should any changes be made. If changes are made you must immediately submit an Amendment to the HRPP for a new determination. Your amendment must include a description of the changes and you must upload all revised documents. At that time, the HRPP will review the submission activities to confirm the original "Not Human Subjects Research" decision or to advise if a new application must be made.

If there are additional undisclosed components that you feel merit a change in this initial determination, please contact our office for a consultation.

Please be aware that receiving a "Not Human Subjects Research" Determination is not the same as IRB review and approval of the activity. You are NOT to use IRB consent forms or templates for these activities. If you have any questions, please contact the Virginia Tech HRPP office at 540-231-3732 or [irb@vt.edu](mailto:irb@vt.edu).

#### PROTOCOL INFORMATION:

Determined As: **Not Human Subjects Research**  
 Protocol Determination Date: **June 17, 2021**

#### ASSOCIATED FUNDING:

The table on the following page indicates whether grant proposals are related to this protocol, and which of the listed proposals, if any, have been compared to this protocol, if required.

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