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EXAMINING STUDENT ACHIEVEMENT FACTORS AND POST-SECONDARY
READINESS

by

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ABSTRACT

EXAMINING STUDENT ACHEIVEMENT FACTORS AND POST-SECONDARY
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University of Houston-Clear Lake, 2021

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The purpose of this sequential mixed methods study was to examine the relationship among student achievement factors, gifted and talented status and post-secondary readiness. The study included a review of archived data obtained from a large district in the southeastern region of Texas consisting of a purposeful sample of AP students' who took an Advanced Placement exam in AP English and/or AP Calculus AB in the spring of 2019. A purposeful sample of 10 AP teachers were also interviewed in an attempt to provide a more in-depth understanding of the impact student achievement factors, gifted and talented status had on post-secondary readiness. Results indicated that there was a positive correlation between: (a) overall high school GPA and post-secondary readiness, (b) PSAT scores in reading and mathematics and post-secondary readiness, (c) STAAR EOC scores in English II and Algebra I and post-secondary readiness, and (d) gifted and talented status and post-secondary readiness in English. On the other hand, the results did not indicate a positive correlation between gifted and talented status and post-secondary

readiness in mathematics. Although, the majority of AP teachers agreed student achievement factors could be good indicators of students' ability to grasp the content there was no agreement on which factors provided the best indication. The majority of AP teachers agreed GPA showed a students' grit and self-regulation but could be misinterpreted due to weighted GPA. On the other hand, the majority of AP teachers did not support the use of standardized test scores as a valid indicator for post-secondary readiness. AP teachers also expressed mixed feelings about gifted and talented status and post-secondary readiness which was mainly due to GT students' lack of motivation and lack of reevaluation process.

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CHAPTER I: INTRODUCTION

In recent years there has been an ongoing effort at the national and state level to increase the enrollment of high school students in Advanced Placement (AP) courses and have them take the corresponding AP exams (Kolluri, 2018). AP courses offer students the ability to participate in first-year college level curriculum and gain college credit while still in high school (College Board, 2014). Students who are able to complete an AP courses and pass the corresponding AP exams are typically considered to have skills needed for post-secondary coursework (Kolluri, 2018). According to the College Board (2014), in 2003 over 1.3 million students took an AP exam and in 2013 that number increased to over 3.1 million. The number of students scoring a 3 or higher grew from approximately 806,000 in 2003 to over 1.8 million in 2013 (College Board, 2014). The AP exam score range is 1 to 5 and a score of 3 or better is generally considered passing (College Board, 2014). Although this is a significant increase, in 2013 there were still approximately 300,000 students with the academic ability to be successful on AP exams who did not enroll in any AP course (College Board, 2014). There have been numerous studies conducted in an effort to understand the benefits of taking AP courses (Warne, 2017), but far less research focusing on student achievement factors and successful performance on AP exams.

The Research Problem

Although the enrollment in AP courses has significantly increased over the years, there are still many students who do not take advantage of AP courses offered, especially students who are minority and/or economically disadvantaged (College Board, 2014). According to Roegman, Allen and Hatch (2019), African American and Hispanics students take the AP exams at half the rate of White students. In 2013, the College Board

reported African American students made up over 15.3% of the graduating classes in the United States, yet only a little over 6% took an AP exam (Roegman, Allen & Hatch, 2019). The statistics are similar for Hispanic students, with a graduating class make up of almost 18% but less than 14% took an AP exam (Roegman, Allen & Hatch, 2019). Economically disadvantaged students account for half of the student population across the US, however, only 25% participate in AP exams (Gagnon & Mattingly, 2016). When it comes to gender, female students are more likely to take AP courses and pass AP exams than male students (Graefe & Ritchotte, 2019). This is also true for African American and Hispanic female students, but participation is still well below White female students' participation (Graefe & Ritchotte, 2019).

There are several barriers that can affect the participation of minority and economically disadvantaged students in AP courses (Evans, 2019). Barriers that can effect students' choice in course selection included factors such as course availability along with home and community factors and academic background (Gagnon and Mattingly, 2016). Kerr (2014), reported many minority and economically disadvantaged students view AP courses as courses designed for White students.

One factor that influence students to enroll in AP courses is grade point average (GPA). Many high schools use weighted GPA allowing courses with a higher level of rigorous coursework to have higher GPA points (Hansen, Sadler & Sonnert, 2019). A student's GPA is used to determine the student's class rank and is a factor in college admissions (Roegman, Allen & Hatch, 2019). Students' grade in an AP course determines the GPA points earned regardless of whether or not they pass the corresponding AP exam (Roegman, Allen & Hatch, 2019). This leads to many students taking AP courses to boost GPA rather than taking and passing the AP exam (Roegman, Allen & Hatch, 2019). Although scores on the AP exam do not have any effect on the

GPA awarded, they can impact college admission decisions. (Westrick, Le, Robbins, Radunzel & Schmidt, 2015).

Students may also be influenced to enroll in AP courses based on their overall feelings about the teacher or teacher recommendation (Judson, Bowers, & Glassmeyer, 2019; b, 2002). If students have previously taken another course by the same teacher they are more likely to enroll in the AP course (Judson, Bowers & Glassmeyer, 2019). Teachers who have a reputation for high passing AP exam rates often see an increased enrollment in those classes (Judson, Bowers & Glassmeyer, 2019).

In addition, at the high school level students who are labeled as gifted and talented are serviced through advanced courses (Judson, Bowers & Glassmeyer, 2019). In order to receive the rigor of coursework often needed for the intellect level of gifted and talented students they are steered towards enrollment in AP courses (Graefe & Ritchotte, 2019). This allows gifted and talented students to be with students with the same level of ability and teachers, they feel, respect and understand their needs (Graefe & Ritchotte, 2019).

The majority of factors influencing students to enroll in AP courses are often based on a student's drive for increased GPA and class ranking that are likely to increase chances of college admission, and less on academic aptitude for the courses. One tool currently available for schools to target students with the academic ability to potentially be successful in AP courses is the Preliminary Scholastic Aptitude Test (PSAT) (Richardson et al., 2016). Studies have shown that PSAT scores may be a good indicator of student success in certain AP courses (Richardson et al., 2016). In addition to the PSAT and teacher recommendation, schools need additional tools to identify students with the academic ability to be successful in advanced courses. Less utilized student

achievement factors to identify students at the high school level are student GPA and standardized test scores, such as the end-of-course exams (Gaertner & McClarty, 2015).

Student GPAs have been widely used by college admission professionals to predict students' future academic success (Galla, et al., 2019). Multiple studies show that GPA is one of the best indicators for predicting students' academic achievement (Galla, et al., 2019; Volperhorst, Lutz, de Kleijn & van Tartwijk, 2018; Westrick et al., 2015). According to Galla et al., (2019), GPA represents a student's ability for self-regulation since GPA is accumulated over time. The skills acquired through self-regulation are skills needed to be successful in advanced level work. Students with higher GPAs typically have developed better study habits, attendance, and grit (Galla et al., 2019) than those with lower GPAs. Based on an accumulation of studies, GPA shows promise as a good indicator for targeting students for AP course enrollment.

Colleges and universities have long been using standardized tests, including the students' Scholastic Aptitude Test (SAT) and the American College Test (ACT) scores as an indicator for the future academic success of students (Koretz, et al., 2016). The SAT and ACT are standardized tests that can predict how well a student will perform in other educational settings, and are designed to align with effective instructional strategies needed for student achievement (Koretz, et al., 2016). According to Koretz et al., (2016), the national standardized test, (SAT/ACT) and state-mandated standardized test possess similar indicators for student academic success. This data suggests the use of state-mandated standardized tests may be a viable methodology by which to identify students with the academic ability to be successful on AP exams (Koretz et al., 2016).

AP course enrollment has steadily increased over the last several years (Gagnon & Mattingly, 2016), yet there remain many students with the academic ability to be successful in advanced courses that are not being reached (College Board, 2014). Based

on previous research, there is a need for a deeper look into student achievement factors used to target students for AP courses with the potential to be successful in those courses. Understanding the relationship that exists among varieties of student achievement factors may lead to the development of additional strategies for targeting students for AP courses. If the number of students taking AP courses can be increased there would, potentially, be more students exposed to higher level curricula and more prepared for post-secondary coursework (Richardson et al., 2016).

Significance of the Study

The research shows that students who enroll in AP courses and pass AP exams are better prepared for rigorous post-secondary coursework, and are more likely to graduate within five years of entering college (Dougherty, Mellor & Jian, 2006; Kolluri, 2018). The purpose of this study is to investigate student achievement factors and ability to be successful in AP courses and AP exams. A comparison of student achievement factors including students' overall high school GPA, state standardized test scores (STAAR EOC), Preliminary Scholastic Aptitude Test (PSAT) scores and gifted and talented status with scores on AP Calculus AB (first semester of college level Calculus) and/or AP English exams (first-year of college level English) will be conducted to elicit student achievement factors and the relationship to successful performance in first-year college level course work. Identification of student achievement factors and relationship to successful performance on AP exams will allow schools to identify more students to enroll. This would allow more students exposed to rigorous college level coursework and post-secondary readiness. The more prepared students are leaving high school increases the likelihood of success in college or the workforce.

Research Purpose and Questions

The purpose of this research study was to examine the relationship among student achievement, gifted and talented status, and post-secondary readiness. The research questions that guided this study were:

1. Is there a statistically significant relationship between a student's overall high school GPA and post-secondary readiness?
2. Is there a statistically significant relationship between a student's PSAT scores and post-secondary readiness?
3. Is there a statistically significant relationship between a student's STAAR EOC scores and post-secondary readiness?
4. Is there a statistically significant mean difference in post-secondary readiness between gifted and talented and non-gifted and talented students?
5. What are AP teachers' perceptions of the impact of student achievement on post-secondary readiness?
6. What are AP teachers' perceptions of the impact of being identified as gifted and talented on post-secondary readiness?

Definitions of Key Terms

The following are the key terms used throughout this dissertation.

Advanced Placement (AP) – College level courses offered in a variety of subject areas that help prepare students for college coursework (College Board, 2014).

Gifted and Talented – Individuals that perform at a higher level than their peers in the areas of creativity, artistic ability, and/or intellectually (TEA, 2019).

Grade Point Average (GPA) – Is a measure of academic achievement that correlates with a student's grades earned in coursework (Gall et al., 2019).

Preliminary Scholastic Aptitude Test (PSAT) – Measures a student’s skills in verbal reasoning, critical reading, mathematics problem-solving and writing (Richardson et al., 2016).

Standardized Test – an assessment that is administrated and scored in a preset, standard manner (ASCD, 2020).

Post-Secondary Readiness – is a measure of preparedness for college level coursework (TEA, 2018).

State of Texas Assessments of Academic Readiness (STAAR)- Standardized test based on the Texas Essential Knowledge and Skills and measures knowledge and skills based on specific content areas along with career and college readiness standards (TEA, 2018).

Student Achievement – For the purpose of this study, student performance is identified as student’s grade point average (GPA), performance on PSAT exams and STAAR EOC exams (TEA, 2019).

Conclusion

The chapter provides an overview of the importance of the study, significance of the problem, research purpose and questions, and key definitions pertaining to this study. The study will be a contribution of previous research seeking to understand student achievement factors and post-secondary readiness in an effort to increase student enrollment in AP courses. The next chapter will consist of a literature review of the major topics that will be covered in this study.

CHAPTER II: REVIEW OF LITERATURE

Throughout the extensive research associated with Advanced Placement courses, there is a persistent trend that students who completed AP courses and passed AP exams have increased exposure to more rigorous course work than students in general high school course work and are better prepared for post-secondary coursework (Evans, 2019; Kolluti, 2018). The purpose of this research study is to examine the relationship between student achievement (overall GPA, PSAT scores and STAAR scores) factors and student post-secondary readiness. Post-secondary readiness is students' ability to be successful in college-level coursework (Richardson et al., 2016). According to Kolluri (2018), AP courses are comprised of college-level coursework where students are able to earn college credit by passing the corresponding AP exam with a score of 3 or higher. The more students identified with the academic ability to be successful in AP courses and passing AP exams would demonstrate post-secondary readiness. This literature review will focus on: (a) student achievement factors, (b) gifted and talented students, and (c) post-secondary readiness.

Student Achievement Factors

Overall Student GPA

Colleges and universities have long been using students' grade point averages (GPA) as predictors of student achievement in the admissions process, and these measures may also provide insight into a student's readiness and academic ability for AP courses. Galla et al. (2019), argued grade point average serves as a better predictor of student performance than standardized testing. Although both GPA and standardized test scores measure a student's knowledge and skills, maintaining a high GPA requires

students have self-regulation abilities and grit. Standardized test performance is based on a student's cognitive abilities (Galla et al., 2019).

The participant archived data for the study were collected from Common App and National Student Clearinghouse (NSC) for students applying for college admission in 2008/2009 for the first time and had available high school GPA data (Galla et al., 2019). The sample group consisted of 47,303 students of which 43.9% were male and 56.1% were female. Of the reported race, 49.1% identified as White, 10.5% Asian, 9.0% Hispanic, 6.1% African American/Black and 9.0% other. The data were analyzed using Mplus Version 7.2 structural equation model. To allow for path comparisons, the high school GPA and standardized test scores were z-score standardized (Galla et al., 2019). College graduation information were regressed on the high school GPA and standardized test scores and the Wald test was applied to analyze the strengths of the relationships from high school GPA and standardized test scores to college graduation (Galla et al., 2019).

The findings of the study suggested a student's high school GPA is a better predictor of college-level coursework performance than standardized test scores (Galla et al., 2019). This led the researcher to believe a higher GPA is a result of student self-regulation as it pertains to homework completion, studying, class attendance which are necessary skills for post-secondary success (Galla et al., 2019). Based on the research findings, a student's GPA should be highly considered when placing students in AP courses or in college admissions.

A 2015 study by Westrick, Le, Robbins, Radunzel, and Schmidt focused on determining the best selection method to identify high school students with potential to be successful in college-level courses. The study focused on a student's high school GPA, standardized test scores and socioeconomic status to predict his or her academic

success and stamina (Westrick et al., 2015). The sample data for the study consisted of 189,612 students who had completed the ACT Composite test and enrolled in a four-year university as first year students. In total there were approximately 50 institutions where students enrolled for a minimum of three continuous terms (Westrick et al., 2015). The data analysis for the study used psychometric meta-analytic techniques. This allowed for the adjustments of range restrictions and to make generalizations regarding student performance and retention from multiple institutions (Westrick et al., 2015).

The findings of the study support previous studies that revealed standardized test scores and high school GPA are good indicators of future academic performance and are valid university admittance selection criteria. The study supported standardized test scores and GPA are a better indicator of student success than their socioeconomic status. Student retention to degree completion was also closely associated with 1st and 2nd year academic performance. This also supports previous research that a student's GPA is a good predictor of academic success since it is typically associated with increased attendance, grit and motivation (Westrick et al., 2015).

A 2018 study conducted by Vulperhorst, Lutz, de Kleijn, and van Tartwijk explored the relationship between a student's high school GPA and his or her academic performance during post-secondary education. The researchers compared students' high school GPA with GPA after the completion of the first year in college and then again to their final GPA. Secondly, the authors analyzed the type of diploma earned in high school with first year GPA and final GPA of college students. The archived data for the study were retrieved from University College in the Netherlands (UC) database with 427 students. Of the 427 students, 314 had received a Dutch pre-university secondary education diploma (VWO), and 113 students had received an International Baccalaureate diploma (IB). Students' high school GPA was calculated using high school transcripts to

determine overall GPA and GPA of core subjects (Vulperhorst, Lutz, de Kleijn, and van Tartwijk, 2018).

To determine whether high school GPA is a good predictor of a student's first university year GPA and final GPA, descriptive statistics were used for all grades and compared using independent t-test between VWO and IB students along with path models in Mplus 7.2 (Vulperhorst, Lutz, de Kleijn, and van Tartwijk, 2018). The findings suggested overall high school GPA is a better indicator of student performance on first year university GPA and final GPA than core subject (mathematics, language arts, science and social sciences courses) grades for students with VWO diplomas. In comparison to students with IB diplomas where core subjects (mathematics, language arts, science and social sciences courses) were a better indicator for first year GPA, but showed no advantage in predicting final GPA (Vulperhorst, Lutz, de Kleijn, and van Tartwijk, 2018). The implications of the authors' findings point to the importance of students' previous GPA as a good predictor of future academic achievement (Vulperhorst, Lutz, de Kleijn, and van Tartwijk, 2018).

In an effort to analyze the relationship between students' high school GPA, standardized test score and the number of college advanced courses completed, Shewach, McNeal, Kuncel, and Sackett (2019) studied freshman cohorts enrolling in 62 colleges between 2006 and 2009 with a total student population of 188,985. The archived data were collected from The College Board and included SAT scores, high school GPA, student demographic data, degree pursuit, and AP course credits (Shewach, McNeal, Kuncel, & Sackett, 2019). Pearson correlation coefficients were used to standardize variables within schools. In addition, linear regression was used to analyze each student major across schools and to predict students' advanced coursework, compared to other

students based on high school GPA, SAT score, AP credits, gender, race and socioeconomic status (Shewach, McNeal, Kuncel, & Sackett, 2019).

The research findings suggested that a student's SAT score and high school GPA were viable predictors of the student's college advanced coursework. The study showed variation in SAT score and high school GPA predicting advanced coursework based on major, for example, for STEM (Science, Technology, Engineering and Mathematics) majors the SAT showed a stronger predication and high school GPA was a stronger predictor for Education majors when taking advanced courses. In addition, females took more advanced placement courses than males in all majors except for STEM, and socioeconomic status did not predict advanced coursework enrollment with any significance (Shewach, McNeal, Kuncel, & Sachett, 2019).

In an effort to analyze the impact high school GPA has on college completion, French, Homer, Popovici, and Robins (2015) utilized data from Add Heath to study student behaviors and their consequences in early adulthood. The initial sample consisted of 20,745 students from 80 high schools and 52 middle schools in the United States. The study was conducted in four Waves: (1) home interviews with all students, (2) interviews with students still attending school approximately one year later, (3) follow-up interview with students from Wave 1 that the researchers were able to contact, and (4) final interview of students from ages 24 to 34. All students' high school transcripts were requested for Wave 3 participants (80% received). Data analysis used descriptive statistics for all variables (French, Homer, Popovici, & Robins, 2015).

An analysis of the study suggested students with a high school GPA with a one point increase almost doubles the likelihood of college completion among both genders, and increases yearly earning potentials approximately 12% for males and 14% for females. In addition, African American students with higher high school GPAs are

typically more apt to finish college and earn an advanced degree (French, Homer, Popovici, & Robins, 2015). As past and current research consistently shows, high school GPA is a good predictor of students' academic achievement with a positive correlation to increased college first-year GPA and degree attainment. Considering this assertion, it may be important to analyze a student's academic readiness for AP course in high school based on GPA.

Standardized Testing

The use of standardized test scores for college admission purposes is also useful as a predictor for student achievement in postsecondary studies. In a 2018 study, Koretz and Langi investigated the validity of students' GPA and standardized test scores within and between high schools to predict students' first-year college GPA. The researchers used a two-level mixed regression model to determine the correlation between students' GPA, standardized test scores and first-year college GPA within the same school and across schools. The study population consisted of students who graduated from public schools in New York City (NYC) in 2010 and enrolled in a Comprehensive College or City University of New York (CUNY) system in 2010, 2011, or 2012. Any student missing standardized test data or high schools where less than five students attended CUNY were removed from the study decreasing the sample size to 9,075 students (Koretz & Langi, 2018).

The findings suggested high school GPA and standardized test scores, when viewed independently, showed stronger predictability between schools than within schools. High school GPA when combined with other predictors showed a larger discrepancy between schools. The differences are speculated to arise from differences in grading policies among schools. The data also suggested standardized test scores had less variance between schools as a predictor for first-year college GPA (Koretz & Langi,

2018). The data supports standardized testing is a good predictor of student achievement during the first-year of college and is more reliable than high school GPA due to variations of grading between schools.

There has been ongoing debate about the fairness and predictability of standardized tests for college admissions, especially among minority groups. In a 2017 study, Shu, Kuncel, and Sackett explored SAT scores and high school GPA of American Indians and college admissions. The study comprised data retrieved from the College Board for students entering college in 2006-2010 and involved 232 colleges and universities. Once the data were vetted for American Indians with reported SAT scores and first-year college GPA and schools that reported less than 10 American Indian students were excluded, the sample size reduced to 3,954 from 95 schools (Shu, Kuncel, & Sackett, 2017). Linear regression analysis was used to explore the relationship between first-year college GPA, SAT scores and high school GPA.

The findings reinforced SAT scores as a valid predictor of students' college performance, but not to the degree reported in previous studies. Additionally, high school GPA was shown to be a better predictor of students' first-year college GPA. This is attributed to student characteristics needed to maintain higher GPAs such as grit, motivation, and other academic habits needed to be successful in college level work (Shu, Kuncel, & Sackett, 2017).

Many students take the Preliminary SAT (PSAT) as early as 8th grade and continue testing each year through 11th grade. The PSAT is closely aligned to the SAT without an essay portion (Richardson et al., 2016). Gonzalez (2017) explored student performance in AP courses where the AP Potential data showed the students' likelihood of academic success in certain subject areas. The researcher surveyed all students in Oakland Unified School District in northern California for the 2008-2009 and 2014-2015

school year. The focus of the study was restricted to 10th graders who took the PSAT and met the AP Potential requirements and those students enrolled in AP courses during 11th grade year (Gonzalez, 2017). Based on data, approximately 18% of 10th grade students met the AP Potential criteria. The amount of 10th grade students enrolled in AP courses during 11th or 12th grade year was 37% (Gonzalez, 2017).

The survey was designed using the Bayesian Learning Framework, and a regression discontinuity design was used to analyze the survey data (Gonzales, 2017). The findings of the study showed that when provided AP Potential data, student enrollment in AP courses and success performance on at least one AP exam increased by 49% among students surveyed (Gonzalez, 2017). The findings of the study supported previous research on the validity of using standardized testing as a measure of student academic ability and the identification of students with the aptitude to be successful in AP courses.

In an attempt to increase high school students' exposure to rigorous curriculum and development of academic and non-academic skills needed for college readiness, Richardson et al. (2016) examined the effectiveness of the PSAT in predicting students' AP exam performance, especially in minority and socioeconomic populations. The researchers used purposive sampling of high school students with PSAT scores who had taken AP Calculus, AP Biology and/or AP U.S. History. Data were collected from two diverse districts in the Southeastern United States. The population of district one consisted of 38,250 students where 25.4% were economically disadvantaged and 17.9% were Hispanic and 8.5% African American. The second district had a total population of 21,097. The population included 54.7% Hispanic and 16.5% African American and 65.4% were economically disadvantaged (Richardson et al., 2016). Student archived data were collected from each district and were analyzed using non-experimental regression-

based research design. SPSS software was used for data analysis, and three multiple regression analyses were conducted to examine scores in the three areas of the PSAT; mathematics, writing and critical reading along with analyses of race, socioeconomic status and AP exam performance (Richardson et al., 2016).

The findings supported PSAT mathematics and critical reading scores as strong predictors of successful performance on the AP Biology exam. Neither the writing scores, nor race and socioeconomic status showed any significant effect on students' performance outcomes. Critical reading, mathematics and socioeconomic status showed a strong relationship to AP U.S. History exam performance where writing and race had little impact. Lastly, AP Calculus exam performance had significant correlation with mathematics, critical reading, writing and race. Students' socioeconomic status showed no significant effect on AP Calculus exam performance (Richardson et al., 2016).

In addition to college admission standardized tests such as the SAT and ACT along with PSAT during high school, students are also subjected to state standardized tests designed to test their college and career readiness. In a 2016 study, Koretz et al., examined the predictability of students' first-year college GPA based on students' performance on high school state standardized tests and college admissions tests. The first sample population for the study consisted of two cohorts of students graduating in 2010 and enrolled in the City University of New York (CUNY) in 2010, 2011, or 2012, and students graduating in 2011 and entering college in 2011 or 2012. After eliminating students with missing data, approximately 88% of the 2010 cohort and 86% of the 2011 cohort remained. The second sample population consisted of students who had graduated and enrolled in college during 2011 or 2012 within the Kentucky school system. Once students were eliminated for missing data, approximately 96% of the cohort remained (Koretz et al., 2016).

The study analysis used a series of single-level ordinary least squares regression models to predict first-year college GPA based upon students' high school GPA, college admission test scores, and state standardized test scores independently and in specific combinations (Koretz et al., 2016). The findings of the study showed little additional predictability of first-year college GPA when adding state standardized test scores to high school GPA and college admissions test scores. In addition, when all four subjects of the state standardized test were added there was a positive correlation when included with high school GPA (Koretz et al., 2016).

As portrayed in the above studies, high school standardized test scores are positively associated with student academic achievement in first-year college courses as well as successful performance on AP exams. It is critical to explore all standardized testing, such as state standardized tests to determine whether the same pattern of student success exists. This approach has the potential to identify viable predictors for successful performance on AP exams.

Gifted and talented Students

Gifted and talented students comprise between 6 to 10% of the student population within the United States (US) (Welsch & Zimmer, 2018). A student identified as gifted and talented possesses characteristics such as overall intellectual ability, academic aptitude in specific areas, creativity and productive thinking skills, leadership, aptitude in visual and performing arts and psychomotor ability (Smith, 2018). At the high school level, gifted and talented students are normally serviced through AP courses. In a 2018 study, Welsch and Zimmer explored the effectiveness of gifted and talented programs and later success for gifted and talented students, including college graduation and employment. Using data from the National Research Center on the Gifted and Talented,

the researcher determined approximately 75% of high schools in the US offer gifted and talented programs with 91% in the form of AP courses (Welsch & Zimmer, 2018).

The data for the study were retrieved from the 1997 National Longitudinal Survey of Youth for students between the ages of 12 and 16 by the beginning of 1997. Once participants were eliminated from the study, due to missing data, there were a total of 2,773 participants remaining (Welsch & Zimmer, 2018). Based on school transcripts approximately 17% of the 2,773 students participated in a gifted and talented program. All participants were interviewed each year of the study to determine the status of college graduation, employment and income in 2013 (Welsch & Zimmer, 2018).

Data were analyzed using a linear regression to determine the correlation between participation in a gifted and talented program and later success, such as college graduation, employment and income levels (Welsch & Zimmer, 2018). The findings of the study suggested a positive relationship between participation in a gifted and talented program and later success in life, especially with regard to income. This result could be contributed to other factors, such as family traits, or high-achieving students drawn to gifted and talented programs. It is likely these factors would also contribute to student success later in life (Welsch & Zimmer, 2018).

There is an ongoing concern regarding minority participation in gifted and talented programs and advanced courses. Kettler and Hurst (2017) conducted a study to explore the gaps in minority students participating in advanced courses such as AP and IB. The researchers acknowledge AP and IB courses are typically utilized to service gifted and talented students in high school, and provide the rigor needed for students to be successful in college level courses. Data for the study was collected from 117 high schools in Texas and involved 79 public school districts from the Texas Education Agency. Student demographic and achievement data for 2001 and 2011 were used, and

schools missing data for either cohort were dropped from the study as well as any school with less than 5% population in Black, White or Hispanic ethnicity groups (Kettler & Hurst, 2018).

Data analysis for the study utilized multiple regression analysis to determine the extent of the race gap in advanced course participation. The findings of the study confirmed previous research showing Black and Hispanic students participate in advanced courses at a lower rate than White students (Kettler & Hurst, 2018). Since gifted and talented students are typically serviced through advanced courses at the high school level many minority gifted and talented students are not receiving the rigorous coursework for their academic ability. This may have additional implications for college readiness and likelihood of degree attainment in college for minority gifted and talented students (Kettler & Hurst, 2018).

An additional study by Graefe and Ritchotte (2019) investigated the participation of Hispanic gifted and talented students in AP courses. The focus of the study was to determine the performance of Hispanic students on AP exams and identify any indicators to predict AP success by Hispanic students (Graefe & Ritchotte, 2019). The study was conducted within one high school using archived data to examine indicators of AP exam performance. The archived data included student demographic data and AP exam scores. The student population consisted of Hispanic and gifted and talented students from 9th to 12th grade who took a minimum of one AP exam. Approximately 152 students labeled as gifted and talented took at least one exam and the number of Hispanic gifted and talented students who completed a minimum of one exam was 52 (Graefe & Ritchotte, 2019).

The data were analyzed using correlation analyses to evaluate bivariate relationships. Since the data were determined not to be normally distributed, a chi-square test of independence was utilized for the relationship between gifted and talented status

and AP exam performance. Logistic regression was also used to examine the indicators that predict Hispanic student success on AP exams (Graefe & Ritchotte, 2019). Unlike many previous studies, the findings did not show a lower AP exam performance rate among socioeconomic status, English Language Learners, or Hispanic ethnicity for students identified as gifted and talented. There was no overall noteworthy difference regarding the performance on AP exams between White and Hispanic students, and Hispanic gifted and talented students were nearly 3 times more likely to have successful AP exam performance than non-gifted and talented Hispanic students (Graefe & Ritchotte, 2019).

Although AP courses are not specifically designed as a gifted and talented program, it is typically the avenue used to support gifted and talented students at the high school level. A 2019 study by Judson, Bowers, and Glassmeyer examined classroom dynamics that serve to encourage students to enroll in mathematics and science AP courses, including gifted and talented students. The researchers prepared and sent an online survey request to all public mathematics and science teachers with a public email address. A total of 143 AP mathematics and science teachers responded to the survey. The survey focused on two areas, 1) how teachers with multiple teaching preparations approached AP mathematics and science courses compared to honors or regular courses, 2) how teachers recruit students to enroll in mathematics and science AP courses and complete AP exams (Judson, Bowers, & Glassmeyer, 2019).

Analysis of the data occurred via general comparisons of teacher responses and the Mann-Whitney U test was utilized for nonparametric data (Judson, Bowers, & Glassmeyer, 2019). The findings suggested teachers focus more on abstract goals, such as college-level experience and confidence building rather than earning college credit or passing AP exams. The most common recruitment method utilized by school

professionals is talking directly to students participating in non-AP courses and/or counselor recommendation to certain AP courses. Teachers also stated they strongly encourage students take the AP exam and often use incentives such as waiving the course final exam if students complete the corresponding AP exam (Judson, Bowers, & Glassmeyer, 2019).

A study conducted by Vu, Harshbarger, Crow and Henderson (2019) examined the extent to which gifted and talented students pursue STEM courses and careers. Students, including gifted and talented students, who acquire specific academic and nonacademic skills such as motivation and ability to reason are more likely to choose a STEM field. Many of the needed skills are typically provided through participation in AP courses throughout high school. The researchers' focus for this study, involved exploring if STEM majors are predominately selected by gifted and talented students and factors that may affect selecting a major (Vu, Harshbarger, Crow, & Henderson, 2019).

Research data was collected from all students in Nebraska who scored a perfect score on the SAT or ACT between 2011 and 2016. The sample consisted of 109 gifted and talented students who had a perfect score on the SAT or ACT from five majors. SPSS was utilized for factor analysis to determine which factor played a role in major selection. The factors included gender, race, public/private school, and living location (Vu, Harshbarger, Crow, & Henderson, 2019). The study findings suggested STEM majors were chosen predominately by gifted and talented students with high academic achievement in high school STEM-related advanced courses. Additionally, gender showed to be the only factor that contributed to a student's college major choice (Vu, Harshbarger, Crow, & Henderson, 2019).

A study conducted by Young, Young and Ford (2017) further explored gifted and talented students and STEM courses. The primary purpose of their study was to

investigate the identification of Black girls and overall achievement in STEM courses (Young, Young & Ford, 2017). Black females are an underrepresented group in both STEM courses and gifted and talented identification (Young, Young & Ford, 2017). Students often pursue STEM courses when they are academically prepared in mathematics and the sciences, and if students are not prepared they tend to lose interest as they enter secondary school from elementary (Young, Young & Ford, 2017). This is especially true for Black females who take less STEM advanced courses than White male and female students, but often show strong interest towards STEM early on (Young, Young & Ford, 2017). Girls in general can lose confidence in their abilities during the progression of their academic career so it is vital to identify these students before reaching middle school (Young, Young & Ford, 2017).

The study focused on Black females in the fourth grade between 2009 and 2010 who were identified as gifted in mathematics and science on the NAEP exam (Young, Young & Ford, 2017). The researchers used a descriptive reach design to analyze data of 168,000 students in mathematics and 156,500 in science. The sample consisted of over 43% female students and approximately 42% were Black. The participants were narrowed down to only female White and Black students. The final number of participants was 13,868 with 10,839 White female students and 3,029 Black female students (Young, Young & Ford, 2017). In addition, over 60% of gifted instruction was received by White females (Young, Young & Ford, 2017). The researchers created comparison groups between GT Black females and non-GT Black females as well as GT and non-GT White females (Young, Young & Ford, 2017). The independent variables were GT participation and ethnicity and the dependent variable was mean scale score on the mathematics and science sections of the NAEP (Young, Young & Ford, 2017). Data

analysis was done by entering the data into Exploratory Software for confidence Intervals© (ESCI) and Microsoft Excel©.

The findings of the study show that Black females who receive gifted instruction outperform Black females who do not receive gifted instruction (Young, Young & Ford, 2017). This was also true for White females. With regard to mathematics, Black females participating in gifted instruction outperform Black females without gifted instruction by twice as much compared to their White counterparts (Young, Young & Ford, 2017). The same results were also seen with regard to science (Young, Young & Ford, 2017). This suggests it is crucial to identify gifted students, especially students who are economically disadvantaged at an early age to prevent disinterest in STEM related courses (Young, Young & Ford, 2017).

A study conducted by Siegle, Rubenstein and McCoach (2019) examined the motivation and achievement of gifted and talented students. The researchers used the Achievement Orientation Model which states there are three factors that have an influence on students' academic performance and achievement (Siegle, Rubenstein & McCoach, 2019). These three factors are: (a) self-efficacy, (b) goal valuation, and (c) environmental perception (Siegle, Rubenstein & McCoach, 2019). According to Siegle, Rubenstein and McCoach (2019) if these factors are met then gifted and talented students are able to self-regulate and are motivated to achieve. Participants in the study consisted of teachers solicited from various means, such as conferences, and mailing databases (Siegle, Rubenstein & McCoach, 2019). Once teachers were identified and obtained permission from their school administration to participate in the study, they were able to identify gifted and talented students who met the criteria for underachieving (Siegle, Rubenstein & McCoach, 2019). In order for a students to qualify as gifted and talented they had to have a minimum IQ score of 120 since the age of 6 years old or score in the

90th percentile of composite standardized achievement tests (Siegle, Rubenstein & McCoach, 2019). The requirements for underachievement consisted of grades in the bottom half of their class or having an average of C or below and be labeled as high underachiever by their teacher, gifted specialist or counselor (Siegle, Rubenstein & McCoach, 2019).

There were 272 parents who signed and returned the permission forms to participate in the study, but only 172 across 95 schools and 30 states completed the SAAS-R survey based on the AOM. Descriptive analysis was used to analyze the data for patterns of correlations and inconsistencies among participants (Siegle, Rubenstein & McCoach, 2019). The findings of the study suggested students' goal valuation is more closely aligned to self-regulation than to self-efficacy (Siegle, Rubenstein & McCoach, 2019). In addition, if teachers are able to assist students in seeing the meaning in their coursework they are more likely to overcome underachievement (Siegle, Rubenstein & McCoach, 2019). Female underachieving students tend to have less overall confidence in their ability than their male counterparts, but females do show higher levels of self-regulation than males (Siegle, Rubenstein & McCoach, 2019).

Post-Secondary Readiness

There is a substantial amount of evidence supporting the relationship between a student's high school course work and post-secondary readiness. Woods, Park, Hu and Jones (2018) conducted a study to assess the impact of students' high school course performance on their success in first year college courses for English and mathematics. The authors used data from the Florida Department of Education Data Warehouse consisting of student data from across the state. The population for the study included students enrolled in their first-year of college across 28 schools. The study was limited to students enrolled in first-year college level English and mathematics courses with

complete high school records. The total sample for the study consisted of 27,702 participants; of those students, 36% were Hispanic, 19.8% were African American/Black, 38.6% were White and 6.0% were made up of another races. Additionally, 50% were identified as low-income (Woods, Park, Hu & Jones, 2018).

The data were analyzed using a logistic regression analyses to predict a student's performance in first-year college level English and mathematics courses based on his or her high school coursework. The authors also created student profiles with predicted probabilities to show how different variations of high school coursework were able to be used as a predictor for success in college courses (Woods, Park, Hu, and Jones, 2018).

The findings of the study indicated that students who successfully completed advanced coursework in high school had a higher passing rate in first-year college coursework; for example, almost 80% of students who passed college level English had AP English credit. In mathematics, approximately 67% of students who completed advanced mathematics in high school passed first-year college mathematics. This supports the need to review students' high school coursework, among other indicators, to inform student placement in first-year college courses (Woods, Park, Hu and Jones, 2018).

In 2015, a study by Warne, Larsen, Anderson and Odasso explored the impact of participating in AP courses and taking the AP exams. The researchers used data from the Utah State Office of Education (USOE). The study consisted of students from two cohorts from 2010 and 2011. The 2010 cohort was made up of 45,448 students who had been enrolled in Utah public schools at some point between 9th through 12th grade, and there were 44,596 students from the 2011 cohort. Each cohort consisted of four subgroups: (a) student who did not participate in an AP English course or AP Calculus course; (b) students who participated in an AP English or AP Calculus course but did not

take the AP exam; (c) students who participated in an AP English or AP Calculus course but did not pass the AP exam; and, (d) students who participated in an AP English or AP Calculus course and passed the corresponding AP exam with a score of 3, 4 or 5. Students' academic achievement and post-secondary readiness were analyzed using ACT scores. The researchers decided to use propensity score analysis, since taking AP courses is self-selection by students and typically highly motivated students are drawn to these courses (Warne, Larsen, Anderson and Odasso, 2015).

The study's findings indicated students who take AP English and AP Calculus and pass the AP exam with a 3, 4 or 5 have the greatest benefit and score higher on the ACT (Warne, Larsen, Anderson and Odasso, 2015). Students who take the AP course and do not pass the exam showed slightly higher scores on the ACT. Additionally, students who took the AP course but did not take the AP exam showed no significant benefit on their ACT scores (Warne, Larsen, Anderson and Odasso, 2015).

In 2016, Atuahene and Russell conducted a study that examined the college readiness of first-year, full-time students at a public university in mathematics based on SAT scores. The study examined students taking rigorous mathematics courses in high school and their scores on the mathematical portion of the SAT. Student data were retrieved from the Office of Institutional Research for students who completed a minimum of one mathematics course, including remedial mathematics, introductory mathematics, calculus, algebra and trigonometry, college algebra and introduction to statistics (Atuahene and Russell, 2016).

The total number of students' data analyzed in the study were 1,315 with 45% male and 55% female. The ethnicity make up consisted of 80% White and 20% from minority groups. The students' level of mathematics course placement were determined by their score on the mathematics portion of the SAT. Students scoring below 480 were

placed in remedial mathematics their first year in college. Students scoring between 480 and 580 were placed in an introductory mathematics course and students scoring 590 and higher were placed in Calculus I (Atuahene and Russell, 2016). The researchers analyzed the data using multiple linear regression to determine if a student's SAT scores were a good predictor of college-level mathematics placement. Three different models were analyzed to determine which would best predict student success in college-level mathematics, including Akaike Information Criterion (AIC), Bayesian Information Criterion (BIC) and Schwarz Bayesian Criteria (SBC) based on SAT-mathematics, gender, race and admission group (Atuahene and Russell, 2016). It was determined that a linear combination of SAT scores in mathematics, race and gender predicted the best performance. Student placement, gender and race were then compared to student achievement in the mathematics courses based on student's final grade in the class (Atuahene and Russell, 2016).

The findings of the study showed approximately 76% of the 1,315 students were ready for college level mathematics courses, and of the 76% of students 23% of students were academically ready for Calculus I (Atuahene and Russell, 2016). The study also showed over 60% of African American students and approximately 42% Hispanic students were placed in a remedial course compared to less than 9% of White students. Over 91% of students placed in college-level mathematics course were White, and 9% were minorities (Atuahene and Russell, 2016). The data suggests, based on successful performance in college-level mathematics courses that female students are better prepared than male students in the areas of algebra, trigonometry and statistics. Many of the students qualifying, based on SAT scores, for college-level mathematics earned a "C" or lower suggesting SAT Mathematics scores may not be a good indicator of college readiness in mathematics courses (Atuahene and Russell, 2016).

Student preparation plays a key role in post-secondary readiness and the amount of time for four-year degree completion. A study by Beard, Hsu and Ewing (2019) explored the impact the number of AP courses taken and students' performance on AP exams had on college success. The researchers used a sample group that consisted of high school graduates from 2009, 2011 and 2012, in which over 50% of the students had taken between one and six AP exams and approximately 10% had taken seven exams or more (Beard, Hsu, and Ewing, 2019). The total sample size was over 400,000 students. Student data were retrieved from the College Board, including student demographics, SAT scores, AP exam scores and college transcripts from four-year universities. The two variables used to determine college success were first-year GPA and degree completion within four years (Beard, Hsu, and Ewing, 2019). The data analysis were completed by using multiple linear regression for first-year GPA and multiple logistics regression for degree completion. Students' background factors were included in the regression models to account for high school GPA, SAT scores, race, gender, parent education level, graduation year and AP course count (Beard, Hsu, and Ewing, 2019).

The findings of the study show a positive correlation between students' participation in AP courses and performance on AP exams with successful performance in the first-year of college and the likelihood of earning a degree with four years (Beard, Hsu, and Ewing, 2019). The study also found that students who participated and passed their first and second AP exams with a score of 3 or higher had the greatest increase in their first-year GPA and degree completion rates (Beard, Hsu, and Ewing, 2019). Student benefits to first-year GPA begin to level off with passing three AP exams or more, and for degree completion rates the benefits level off at five AP exams (Beard, Hsu, and Ewing, 2019). The findings of this study supports previous research that AP performance has an impact on students' college readiness and timely completion of a four year degree,

but passing four exams or more does not provide students with additional benefits to their GPA or degree completion (Beard, Hsu, & Ewing, 2019).

A 2016 study conducted by Terry, de La Harpe and Kontur explored the impact of course prerequisites and student achievement for Physics II. The researchers used a sample group of students from the United States Air Force Academy (USAFA) who were enrolled in Physics II during the spring of 2011 to the fall of 2013 (Terry, de La Harpe & Kontur, 2016). A majority of the students in the study had strong academic background and were at the top of their high school class along with high SAT and ACT math scores (Terry, de La Harpe & Kontur, 2016). The Physics II course required prerequisites in both math and physics courses (Terry, de La Harpe & Kontur, 2016). On average between 800 and 1100 students enrolled in the Physics II course between the spring and fall semesters (Terry, de La Harpe & Kontur, 2016). Student performance was measured by using the students' average scores on four exams given to students during the semester consisting of three unit exams and one cumulative final exam (Terry, de La Harpe & Kontur, 2016). Each of the exams consisted of multiple choice conceptual material and open-ended questions (Terry, de La Harpe & Kontur, 2016). Prior to the study, in 2009 both the spring and fall exam scores and scores on the Conceptual Survey in Electricity and Magnetism (CSEM) showed a coefficient of determination of $r^2 = 34\%$ and $r^2 = 51\%$, respectively, suggesting the exams provided a good measure of understanding of the conceptual concepts (Terry, de La Harpe & Kontur, 2016). In addition to the four exam grades, Terry, de La Harpe and Kontur (2016) also included students' course grades in all prerequisite courses, except in the event they were not available to students receiving AP course credit prior to enrollment. If a student's prerequisite was waived due to AP course credit a grade of A was given for those courses (Terry, de La Harpe & Kontur, 2016).

The study reviewed both honor and regular Physics II courses (Terry, de La Harpe & Kontur, 2016). Student placement in honors or regular Physics II was based on the prerequisite math courses (Terry, de La Harpe & Kontur, 2016). The honor course was made up of 5% to 10% of students and the rest of the students were enrolled in a regular course (Terry, de La Harpe & Kontur, 2016). Although the honors and regular Physics II course used slightly different exams, they shared from 60% to 100% of the same multiple-choice questions (Terry, de La Harpe & Kontur, 2016). Only questions used in both courses were used in the study (Terry, de La Harpe & Kontur, 2016).

The findings of the study, showed students who do not have strong key skills often have an increased difficulty building new knowledge (Terry, de La Harpe & Kontur, 2016). In order for students to learn new information or skills they must be able to draw on previous knowledge learned, incorporate the new knowledge being learned and make the connections between the two along with understanding the problem or question at hand (Terry, de La Harpe & Kontur, 2016). To keep from creating information overload in students, chunking of information is used (Terry, de La Harpe & Kontur, 2016). Students who do not have the proper foundation have less schemas and their schemas are often likely to be incomplete or false (Terry, de La Harpe & Kontur, 2016). These students have a difficult time making connections between previously learned information and new knowledge (Terry, de La Harpe & Kontur, 2016). Students who possess a good foundation of knowledge and skills use their schemas to process new information and problem-solve (Terry, de La Harpe & Kontur, 2016). Students who are successful and perform well in prerequisite courses are more likely to have the knowledge and skills for the courses next in sequence to be completed (Terry, de La Harpe & Kontur, 2016).

Summary of Findings

Post-secondary readiness among high school students is concerning with only approximately 60% of freshman entering college persisting to graduate within six years (NCES, 2018). In response to the growing concern, the U.S. Department of Education and many states have focused on the development of college and career readiness standards and more rigorous standardized tests that directly assess the curriculum standards (Gaertner & McClarty, 2015). One consistency throughout the research is participation in AP courses and performance on AP exams can have a significant positive effect on students' post-secondary readiness (Warne, Larsen, Anderson, & Odasso, 2015).

Although student enrollment in AP courses and taking AP exams has dramatically increased over the last decades, there are still a significant number of students with the academic ability to succeed in AP courses who opt out of taking advantage of AP courses, especially lower income and minority students (Beard, Hsu, & Ewing, 2019). One way to increase AP participation especially in lower income areas, is to increase the access to AP courses within those area schools (Gagnon & Mattingly, 2016). Secondly, many students who are academically capable and have access are still not choosing to participate in AP courses. The key is identifying these students and educating them on the benefits of AP courses (College Board, 2014).

Theoretical Framework

According to Holden and Biddle (2017), the attainment of education is personal gain to the person receiving it and is, therefore, human capital. The foundation for this research is provided by Schultz's human capital theory. Based on Schultz's theory, education is an investment in human capital and promotes economic growth (Holden & Biddle, 2017). Education provides students the knowledge and skills to increase

employment opportunities and earning potential. In a study conducted by Rouse (2017), there is substantial evidence to support the notion that a person's income is closely related to his or her level of educational attainment. Employers often view employees who have obtained higher levels of education as more productive and desirable for hire. Employers are typically more likely to pay higher wages and provide better benefits and flexibility in work schedules (Rouse, 2017) to employees with higher education levels. In addition, a study by Bhuller, Mogstad, and Salvanes (2017) supports the idea that a person's level of education has direct impact on his or her yearly income.

Human capital theory began in the field of economics before transitioning to education (Holden and Biddle, 2017). It was Theodore Schultz who expanded human capital to identify areas of economic growth and saw education as an investment in human capital (Schultz, 1972). In the late 1950s and early 1960s Walter Heller, based on Schultz's work, brought the idea of human capital into educational policies. This led to the idea that the federal government should be responsible for providing funding in education, since students' productivity increases their attainment of education leading to economic growth (Holden and Biddle, 2017). According to Choo (2018), human capital theory lays the groundwork for schools to provide students with the necessary skills and knowledge to be successful in postsecondary studies and for global market competitiveness.

Conclusion

This chapter presents a review of relevant literature relating to the purpose of this study, which is to examine student achievement factors, gifted and talented status and a student's post-secondary readiness. Key areas discussed consist of the impact of students' overall GPA, standardized testing scores, and gifted and talented placement on students' post-secondary readiness. In Chapter III, methodological aspects of this dissertation will

be detailed to include the operationalization of theoretical constructs, research purpose and questions, research design, population and sampling selection, data collection procedures, data analysis techniques, privacy and ethical considerations, and the research design limitations of the study.

CHAPTER III: METHODOLOGY

The purpose of this research study was to examine the relationship between student achievement, gifted and talented status, and post-secondary readiness. This study included a review of archived data of students that participated in AP Calculus AB and/or AP English exams from three high schools in a large suburban school district located in southeast Texas. Additionally, a purposeful sample of high school AP teachers were interviewed in an attempt to provide a more in-depth understanding of teacher perception of student achievement factors, gifted and talented status and post-secondary readiness. Quantitative data were analyzed using Pearson's Product Moment Correlations (r). The qualitative data were analyzed using inductive coding process of the data obtained from interview transcripts. This chapter presented an overview of the research problem, operationalization of theoretical constructs, research purpose and questions, research design, population and sampling selection, instrumentation used, data collection procedures, data analysis, privacy and ethical considerations, and the research design limitations of the study.

Overview of the Research Problem

In spite of the increased efforts at both the state and federal level there is still an ongoing issue with identifying all students with the academic ability to be successful in AP courses and on AP exams (College Board, 2014). According to College Board (2014), in 2013 over 300,000 students possessed the academic ability to successfully complete an AP course and pass the AP exam, but did not enroll in an AP courses or the corresponding exams. The challenge is getting more students, who have the academic ability, to enroll in AP courses during their high school coursework (College Board, 2014). The most common reason for taking AP courses were students seeking higher

GPA, teacher recommendation or students overall feeling towards the teacher of the course (Richardson et al., 2016). Although studies have been conducted on the benefits of AP courses and increasing enrollment, especially in GT minorities (Kerr, 2014; Warne, 2017), there is much needed research on student achievement factors and their relationship to post-secondary success.

Operationalization of Theoretical Constructs

This study consisted of the following constructs: (a) student achievement, (b) gifted and talented (GT) status, and (c) post-secondary readiness. Student achievement was defined as the amount of academic content obtained during secondary education. Student achievement was measured by the students' overall GPA, level of proficiency obtained on the *Preliminary Scholastic Aptitude Test* (PSAT), and level of proficiency obtained on the State of Texas Assessment of Academic Readiness (STAAR) Algebra I End-of-Course (EOC) and English II End-of-Course. Gifted and talented status was defined as being identified as a student performing at a higher level than their peers in the areas of creativity, artistic ability and/or intellectually (TEA, 2019) and measured by whether the student qualified to be GT. Post-secondary readiness was defined as student success on AP exams with a score of 3 or higher. Student post-secondary readiness was measured using AP exams for Calculus AB and English.

Research Purpose, Questions, and Hypothesis

The purpose of this research study was to examine the relationship among student achievement (overall GPA, PSAT scores and STAAR scores), and gifted and talented status, and a student's post-secondary readiness. The research questions that guided this study were:

1. Is there a statistically significant relationship between a student's overall GPA and post-secondary readiness?

Ha: There is a statistically significant relationship between a student's overall GPA and post-secondary readiness.

2. Is there a statistically significant relationship between a student's PSAT scores and post-secondary readiness?

Ha: There is a statistically significant relationship between a student's PSAT scores and post-secondary readiness.

3. Is there a statistically significant relationship between a student's STAAR scores and post-secondary readiness?

Ha: There is a statistically significant relationship between a student's STAAR scores and post-secondary readiness.

4. Is there a statistically significant mean difference in post-secondary readiness between gifted and talented and non-gifted and talented students?

Ha: There is a statistically significant mean difference in post-secondary readiness between gifted and talented and non-gifted and talented students.

5. What are AP teachers' perceptions of the impact of student achievement on post-secondary readiness?

6. What are AP teachers' perceptions of the impact of being identified as gifted and talented on post-secondary readiness?

Research Design

For the purpose of this study, the researcher used a sequential mixed-methods design (QUAN→qual). This design consisted of two phases: first, a quantitative phase and second, a qualitative phase. The advantage of implementing this design was to allow for a more thorough and in-depth exploration of the quantitative results by following up with a qualitative phase. A purposeful sample of AP students from a large suburban school district in the southeast region of Texas were used to examine the influence of

student achievement on post-secondary readiness using archived GPA, PSAT and STAAR data collected from district records. Demographic descriptors, (a) race/ethnicity, (b) gender, (c) English Language Learner, and (d) economically disadvantaged status, and (e) gifted and talented status, were analyzed using descriptive statistics, Pearson's Product Moment Correlations (r), and independent t-tests. Additionally, a purposeful sample of AP high school teachers were solicited to participate in the interviews. For qualitative analysis, data obtained from the high school AP teachers' interviews, were analyzed using an inductive coding process.

Population and Sample

The population of this study consisted of a large suburban school district in southeast Texas. This school district was composed of 30 campuses (three high schools, one academic alternative school, one behavior alternative school, seven junior high schools, and 18 elementary schools), employs 1,700 teachers. At the time of the study, the district had a student population of 25,732 (TEA, 2019). Table 3.1 provides the student race/ethnicity and gender demographics for the district. The student population consisted of 51.7% identified as economically disadvantaged, 16.3% of the population identified as English Language Learner (ELL), 45.8% of the population identified as at-risk, and 10.3% of the population identified as receiving special education services. Table 3.2 shows the teacher race/ethnicity and gender demographic data for the district.

The average years of teaching experience was 10.4 years and 29.2% held a master's degree or higher. The average class size per teacher was 15.1 (TEA, 2018). The three high schools within this study were comprehensive grade 9-12 campuses with student enrollment ranged from 1,784 to 2,690. Each campus had only one principal, one associate principal and most have six full-time assistant principals. One of the high

school campuses had only five full-time assistant principals. Overall, the district served 7,040 students between the three high school campuses.

Table 3.3 shows the enrollment of students in ninth grade ranged from 508 to 772, tenth grades ranged from 472 to 737, eleventh grade enrollment ranged from 458 to 630 students, and twelfth grade enrollment ranged from 346 to 551. In high schools across the district the average percentage of students per teacher was 17.8% and the percentage of students per teacher range from 15.6% to 24.7%. Table 3.4 presents the student demographics for each high school campus. The district served a diverse population between the three high schools. The district's student population had access to a variety of AP courses at each high school. Table 3.4 presented a purposeful sample of 11th and 12th grade students' enrollment in at least one AP course.

Table 3.1

District Student Demographic Data

	Frequency (n)	Percentage (%)
African American	5,465	21.2
Hispanic	10,289	40.0
White	6,752	26.2
American Indian	105	0.4
Asian	2,439	9.6
Pacific Islander	22	0.1
Two or More Races	669	2.6
Economically Disadvantaged	13,292	51.7
English Language Learners	4,201	16.3
At-Risk	11,973	45.8
Special Education	2,652	10.3

Table 3.2

District Teacher Demographic Data

	Frequency (n)	Percentage (%)
African American	300	17.7
Hispanic	318	18.7
White	984	57.9
American Indian	3	0.2
Asian	50	3.0
Pacific Islander	0	0.0
Two or More Races	45	2.6
Male	370	22.6
Female	1,263	77.4

Table 3.3

Student Enrollment for the High Schools

	District	A	B	C
9 th grade	2,028	772	508	748
10 th grade	1,889	737	472	680
11 th grade	1,717	630	458	629
12 th grade	1,406	551	346	509
Student Total (n)	7,040	2,690	1,784	2,566

Table 3.4

Student Demographics of District and High Schools

	District	A	B	C
	(%)	(%)	(%)	(%)
African American	22.2	3.5	32.7	40.4
Hispanic	40.0	54.2	37.9	24.8
White	26.2	38.1	22.4	12.2
American Indian	0.4	0.3	0.8	0.2
Asian	9.6	1.6	4.1	19.8
Pacific Islander	0.1	0.0	0.1	0.1
Two or more races	2.6	2.3	1.8	2.4
Economically Disadvantaged	51.7	56.2	54.8	38.2
English Language Learners	16.3	8.1	8.9	5.0
At-risk	45.8	52.0	48.3	32.7
Special Education	10.3	12.6	11.5	7.9

Table 3.5

Student Demographics and Advanced Placement Enrollment of District and High Schools

	District	A	B	C
	(%)	(%)	(%)	(%)
All Students	21.3	17.5	18.7	31.4
African American	16.1	9.3	14.6	18.3
Hispanic	15.9	15.0	16.5	19.9
White	22.0	21.0	21.0	40.8
American Indian	20.0	N/A	18.2	N/A
Asian	60.0	22.7	53.8	65.8
Pacific Islander	N/A	N/A	N/A	N/A
Two or more races	27.9	25.0	25.0	41.7

Participant Selection

The participants for the qualitative portion of the study were selected from AP teachers from all three high school campuses. A total of 10 AP teachers were selected to participate in individual interviews. The selection of the participants was based on simulating the distribution of teachers throughout the district. Male participants comprised 30.0% (n = 3), while female participants comprised 70.0% (n = 7) of the sample. The race/ethnicity of the interviews was African American 17.7% (n = 2), Hispanic 18.7% (n = 2), and White 57.9% (n = 6).

Instrumentation**State of Texas Academic Readiness (STAAR) Test**

The State of Texas Assessments of Academic Readiness (STAAR) was put into place in the spring of 2012, to assess and track student's academic performance from elementary to high school. Students would undergo STAAR testing in reading and mathematics in grades 3-8, writing in grades 4 and 7, science in 5 and 8, and social

studies in grade 8. High school students were required to take and pass five end-of-course exams in English I, English II, Algebra I, Biology and U.S. History to graduate from high school (TEA, 2018). The STAAR exam was a rigorous assessment aligned to the Texas Essential Knowledge and Skills (TEKS) curriculum standards and assessed the amount of knowledge and skills gained by a student in each subject area. For the purpose of this study, only the end-of-course exams for Algebra I and English II were analyzed. The performance standards for the two EOCs were outline in Table 3.6. Students' scores were categorized into approaching grade level, meets grade level and masters grade level to be considered as satisfactory performance (TEA, 2018).

Table 3.6

STAAR EOC Performance Standards Scores

Subject	Approach Grade Level	Number of Questions Correct*	Meets Grade Level	Number of Questions Correct*	Masters Grade Level	Number of Questions Correct*
English II	3,775	42-46	4,000	47-60	4,831	61-68
Algebra I	3,550	21-32	4,000	33-40	4,333	41-54

*Algebra I and English II consists of 54 questions

Reliability for the STAAR EOC was based on repeated administration of the same test to create consistent results. Two types of internal consistency measurements were used to determine the reliability of the test. Kuder-Richardson 20 (KR₂₀) was used to measure the reliability of multiple-choice and gridded-response questions. Open-ended response questions were measured by using stratified coefficient alpha. The reliability of the 2018-2019 STAAR EOC exams were determined to be between 0.87 and 0.94. A reliability score of 0.90 and higher was considered to be excellent, 0.80 to 0.89 was considered to be good and 0.70 to 0.79 was considered adequate (TEA, 2016).

Preliminary Scholastic Aptitude Test (PSAT)

The PSAT was a standardized test that provided student's with feedback on their academic strengths and weaknesses in the areas needed to be successful in college level coursework (Richardson et al., 2016). The test had two sections; (a) evidence-based reading and writing (EBRW) and (b) a math section (College Board, 2012). The PSAT also served as practice for the SAT (Richardson et al., 2016). It measured skills in verbal reasoning, critical thinking, problem solving and writing (Richardson et al., 2016). Scoring ranged from 320 to 1,520 in 10-point increments where the EBRW section counts for half of the score and the math section counts for half of the score (College Board, 2012). Students were able to see where they compare to other students, in the same grade, that took the PSAT (College Board, 2012).

In addition, the PSAT could serve as a predictor for student success in AP courses (Richardson et al., 2016). Based on student performance, the College Board provided the AP Potential which was a list of students that could potentially score a passing score of 3 or higher on a given AP exam (College Board, 2012). The internal reliability of the PSAT was estimated for each portion by the College Board with 0.84 to 0.87 on the mathematics portion, 0.84 to 0.89 on the writing portion and 0.86 to 0.88 on the critical reading portion. Experts in the field had confirmed the validity of the content and construct (Richardson et al., 2016).

Advanced Placement Exams

Advanced Placement exams allow high school students the opportunity to college credit while in high school (Arce-Trigatti, 2017). The score range for AP exams were from 1 to 5 with a score of 3 or better was generally considered passing by most colleges and universities (College Board, 2014). There were 38 AP exams available for students to take in the areas of math, science, social science and history, language and culture,

computer science, the arts and English (College Board, 2020). For the purpose of this study, the focus was on Calculus AB and English exams. The AP exam was made up of two parts; multiple choice section and the free-response section (College Board, 2020).

According to the College Board (2020), AP exam questions were developed by the Development Committee consisting of college and university faculty members and AP teachers. The questions for the multiple-choice portion of the exam were created by college professors and content experts (College Board, 2020). Each question was reviewed for quality and fairness, level of difficulty appropriateness for intended test taker, and ability to distinguish knowledge and skill level of the students (College Board, 2020). A percentage of the questions, for the multiple choice, were reused each year to ensure the statistical reliability of each AP exam (College Board, 2020). The free-response questions for the exam were created by college faculty and they were only used once (College Board, 2020). Once a question was chosen to be included on the exam it was vetted through multiple reviews and revisions by the committee and this process can take up to two years (College Board, 2020).

Data Collection Procedures

Quantitative

Prior to data collection, the researcher gained approval from the University of Houston-Clear Lake's (UHCL's) Committee for Protection of Human Subjects (CPHS) and the school district in which the study took place. Secondly, archived student data from the district were obtained on the previous year's student AP exam scores along with overall GPA, EOC exam scores, and PSAT exam scores. Upon receipt of the data, the data were entered into quantitative research IBM Statistical Package for the Social Science (SPSS) for further analysis.

Qualitative

High school AP teacher perception on student achievement factors and post-secondary readiness were further examined using individual interview protocol as developed to measure teacher individual perceptions of their role in AP course recruitment and enrollment. The interview protocol was designed with overarching open-ended questions that focused on two areas of inquiry including teacher attitude towards the use of student achievement factors and gifted and talented status as indicators for post-secondary readiness. Prior to conducting interviews, a panel of experts in the field of qualitative research examined the interview protocol for alignment goals to better support the validity of the study. The researcher conducted the individual interview session with participants and posed questions using the *Interview Protocol*. The researcher assigned code names to the participants' responses to protect their identity.

A purposeful sample of AP teachers, that currently taught one or more AP courses, were solicited from the participating high schools to participate in a 25-30-minute interview. Then the AP teachers were contacted via phone and/or email soliciting their participation in the interview process. Those teachers that volunteered to participate in the interview process were asked to consent to the interview prior to data collection. The consent form detailed the purpose of the study; stated that their participation was voluntary; assured them that their identities would remain confidential; and provided details of the interview process (see Appendix A).

The interview questions asked the teachers to discuss their perceptions concerning the impact of student achievement factors on post-secondary readiness as well as their insights regarding the impact of GT status on post-secondary readiness. Appendix B provided the Interview Protocol listing the interview questions. All sessions were audio-taped and transcribed. All data were secured in a password-protected folder on the

researcher's computer and in the researcher's office within a locked file cabinet at all times. At the end of the study, the data will be maintained by the researcher for five years, which is the time required by CPHS and district guidelines. The researcher will destroy the contents of the file once the deadline expires.

Data Analysis

Quantitative

To analyze the data IBM SPSS was used to answer research questions 1-3. A Pearson's Product Moment Correlation (r) was conducted to determine if there was a relationship between students' (a) overall GPA and post-secondary readiness, (b) PSAT exam scores and post-secondary readiness, and (c) STAAR EOC exam scores and post-secondary readiness. All variables were continuous in measurement. The STAAR EOC, PSAT and AP exam data were collected as percent correct scores for each student participant in the study. Effect size was measured using the coefficient of determination (r^2).

To answer question 4, an independent t-test was conducted to determine if there was a statistically significant mean difference in post-secondary readiness between gifted and talented and non-gifted and talented students. The independent variable, gifted and talented status, was divided into two categorical groups: (a) gifted and talented, and (b) non-gifted and talented. The dependent variable or outcome measure, post-secondary readiness, was a continuous variable. Cohen's d and coefficient of determination (r^2) were utilized to calculate effect size. A significance value of .05 was used for this study.

Qualitative

Following the analysis of the quantitative data, the findings were utilized to develop the teacher interview questions in an attempt to provide more in-depth understanding of the relationship between teacher perception of student achievement factors and post-secondary readiness. To answer research questions 5-6, the researcher used an inductive coding process. This approach allowed for themes to emerge from the data (Lichtman, 2010). Data from the interviews were examined to generate themes and analyzed using a constant-comparative method of coding to allow for the identification of particular themes. The themes lend to theoretical explanations of high school AP teachers' perception on student achievement factors and post-secondary readiness.

The use of coding process allowed the researcher to identify and interpret the data. The constant-comparative coding method had three steps: (a) open coding; (b) axial coding; and (c) selective coding (Lichtman, 2010). In open coding specific relevant topics were able to be identified. During axial coding, the topics were grouped into themes or categories. Lastly, selective coding was used for a central category emerges and is related to other categories (Lichtman, 2010). In addition, the open-ended questions were aimed at providing an in-depth understanding of the general pattern that emerged from the quantitative portion of the study. The coding process began by recognizing in-vivo codes. Once the categories were established, codes were organized into subcategories and findings recorded.

Qualitative Validity

The qualitative analysis process entailed validation by using triangulation of individual AP teacher responses by campus. In order to ensure validity, data obtained from the interviews were cross-checked and compared amongst participants. The data collected during the interview sessions were subject to member-checking by having AP

teacher and counselor participants review the preliminary results and transcripts in order to enhance the validity of the responses provided. The questions and results were peer reviewed by experienced educators including district level administrators, in order to ensure questions were valid. The peer reviews served the purpose of obtaining feedback related to questions posed to teachers regarding their perceptions on AP course recruitment and enrollment. Member checking was used to ensure the voices of participants were accurately captured and thus increasing the validity of the findings.

Privacy and Ethical Considerations

Prior to the collection of any data, the researcher gained approval from the UHCL's CPHS and the school district in which the study took place. All participants were provided with detailed information related to the purpose of the study. Participant's informed consent forms were collected from participants prior to conducting interviews. The data collected remained securely locked in a cabinet and pin drive in the researcher's office. The researcher maintained the data for 5 years as required by the CPHS and school district guidelines. After the deadline has passed the researcher will destroy all data files associated with the study.

Research Design Limitations

The research design consisted of several limitations. First, the study was limited to AP students and teachers in one district. This potentially impacted the validity of the responses since the findings were limited. Second, the study was limited to AP exams for English and Calculus AB. Third, only students that participated in an AP exam were utilized for the study. In addition, the level of honesty of the participants was based on their personally connected to the AP courses may have been skewed. One must assume participants were completely honest when providing responses to the interview questions. The validity of the findings would be jeopardized if the participants were dishonest.

Finally, given the small sample size of the AP teachers interviewed, broad generalizations should be interpreted with caution.

Conclusion

The purpose of this research study was to examine student achievement factors, gifted and talented status and post-secondary readiness. This chapter identified the need to further examine the relationship amongst the constructs. In order to better understand the relationship between student achievement factors, including overall GPA, PSAT scores and EOC scores, gifted and talented status and teacher perception of factors as it pertains to post-secondary success both the quantitative and qualitative findings were essential to the study. In Chapter IV, interviews, and student achievement data were analyzed and discussed in further detail.

CHAPTER IV:

RESULTS

This study examined the relationship between student achievement (overall GPA, PSAT scores and STAAR scores), gifted and talented status, and a student's post-secondary readiness. The purpose of this chapter was to present the results of the quantitative and qualitative data analysis of this study. This chapter presents a detailed description of the participants' demographics and the data analysis related to each of the six research questions. It concludes with a summary of the findings.

Participant Demographics

Utilizing archived data from a large school district in the southeast region of Texas, a purposeful sample of 307 11th and 12th grade high school students who took the AP English and/or AP Calculus AB exam in the spring of 2019 were identified for participation in this study. Male participants comprised 45.9% ($n = 141$) of the sample, while females were in the majority with 54.1% ($n = 166$). Table 4.1 provides the following demographic data: 21.5% ($n = 66$) of the participants were economically disadvantaged and 2% English Language Learners ($n = 6$). Race/ethnicity of the sample consisted of 24.8% Hispanic ($n = 76$), 18.9% African American ($n = 58$), 22.5% White ($n = 69$), 31.9% Asian ($n = 98$), and 2.0% Two or more races ($n = 6$). Table 4.2 shows the student demographic breakdown for students that participated on the AP English exam. Table 4.3 shows the student demographic breakdown of those who took the AP Calculus AB exam. The student demographics for GT students are provided in Table 4.4, and Table 4.5 displays the student demographics for non-GT students who took AP English and/or AP Calculus AB. Table 4.6 displays the AP teacher demographics that participated in the teacher interviews.

Table 4.1

Student Participant Demographics (n = 307)

	Frequency (n)	Percentage (%)
Male	141	45.9
Female	166	54.1
African American	58	18.9
Asian	98	31.9
Hispanic	76	24.8
Two or More Races	6	2.0
White	69	22.5
Economically Disadvantaged	66	21.5
English Language Learner	6	2.0

Table 4.2

Student Participant Demographics for AP English Exam (n = 277)

	Frequency (n)	Percentage (%)
Male	127	45.8
Female	150	54.2
African American	52	18.8
Asian	85	30.7
Hispanic	74	26.7
Two or More Races	4	1.4
White	62	22.4
Economically Disadvantaged	65	23.5
English Language Learner	6	2.2

Table 4.3

Student Participant Demographics for AP Calculus AB Exam (n = 84)

	Frequency (n)	Percentage (%)
Male	46	54.8
Female	38	45.2
African American	7	8.3
Asian	41	48.8
Hispanic	11	13.1
Two or More Races	3	3.6
White	22	26.2
Economically Disadvantaged	4	4.8
English Language Learner	0	0.0

Table 4.4

Participant Demographics for GT Students (n = 110)

	Frequency (n)	Percentage (%)
Male	54	49.1
Female	56	50.9
African American	10	9.1
Asian	33	30.0
Hispanic	27	24.5
Two or More Races	3	2.7
White	37	33.6
Economically Disadvantaged	18	16.4
English Language Learner	0	0.0

Table 4.5

Participant Demographics for non-GT Students (n = 197)

	Frequency (n)	Percentage (%)
Male	87	44.2
Female	110	55.8
African American	48	24.4
Asian	65	33.0
Hispanic	49	24.9
Two or More Races	3	1.5
White	32	16.2
Economically Disadvantaged	48	24.4
English Language Learner	6	3.0

Table 4.6

Descriptive Statistics for Interview Participants (n = 10)

	Frequency (n)	Percentage (%)
Male	3	30.0
Female	7	70.0
African American	2	20.0
Hispanic	2	20.0
White	6	60.0

Research Question One

Research question one, Is there a statistically significant relationship between a student's overall high school GPA and his or her post-secondary readiness?, was answered by conducting Pearson's product moment correlations (r) between students' overall high school GPA and their score on the AP English and/or AP Calculus AB exam.

Results of the Pearson's product-moment correlation indicated a statistically significant positive relationship between a student's overall high school GPA and his or her post-secondary readiness, $r = .672$, $r^2 = .452$, $p < .001$ (AP English), and $r = .364$, $r^2 = .132$, $p = .001$ (AP Calculus AB). As the student's overall GPA increased, so did his or hers score on the AP English and AP Calculus AB exams. The proportion of variation in AP English and AP Calculus AB scores attributed to overall GPA varied between 45.2% and 13.2%, respectively.

Additional analysis was conducted on subgroups including the following: gender, race/ethnicity, and economic status. With regard to AP English, in both male and female students, results of the Pearson's product-moment correlation indicated a statistically significant relationship between his or her GPA and post-secondary readiness, $r = .616$, $r^2 = .379$, $p < .001$ (males) and $r = .727$, $r^2 = .528$, $p < .001$ (females). The higher the overall GPA for male and female students the higher the score on the AP English exam. The proportion of variation in AP English scores attributed to overall GPA in male and female students varied between 37.9% and 52.8%, respectively.

Furthermore, the results of the Pearson's product-moment correlation showed a statistically significant relationship among Hispanic, African American, White, Asian and students of two or more races' GPA and his or her post-secondary readiness, $r = .584$, $r^2 = .341$, $p < .001$ (Hispanic), $r = .612$, $r^2 = .374$, $p < .001$ (African American), $r = .587$, $r^2 = .344$, $p < .001$ (White), $r = .729$, $r^2 = .531$, $p < .001$ (Asian), and $r = .990$, $r^2 = .980$, $p = .010$ (Two or more races). As Hispanic, African American, White, Asian and students of two or more races' overall GPA increased, so did his or her score on the AP English exam. The proportion of variation in AP English scores attributed to overall GPA in each race/ethnicity varied among 34.1%, 37.4%, 34.4%, 53.1%, and 98.0% respectively.

Additionally, the findings of the Pearson's product-moment correlation of economically disadvantaged students also showed a statistically significant positive relationship in students' GPAs and post-secondary readiness, $r = .544$, $r^2 = .296$, $p < .001$. In economically disadvantaged students, the higher the overall GPA the higher the scores on the AP English exam. The proportion of variation in AP English scores attributed to overall GPA in economically disadvantaged students was 29.6%, respectively. Table 4.7 displays the correlation between student demographics of students' overall GPA and the AP English exam.

Table 4.7

Correlations: Students' Overall GPA and AP English Exam

Variable	N	<i>r</i> -value	<i>p</i> -value	r^2
All Students	277	.672	<.001*	.452
Male	127	.616	<.001*	.379
Female	150	.727	<.001*	.528
African American	52	.612	<.001*	.374
Asian	85	.729	<.001*	.531
Hispanic	74	.584	<.001*	.341
Two or more races	4	.990	.010*	.980
White	62	.587	<.001*	.344
Economically Disadvantaged	65	.544	<.001*	.296

*Statistically significant ($p < .05$)

The findings of the Pearson's product-moment correlation between male students' overall GPA and AP Calculus AB showed a statistically significant positive relationship between male students' overall GPA and post-secondary readiness in mathematics, $r = .486$, $r^2 = .236$, $p = .001$. In male students, as the overall GPA increased, so did students'

scores on the AP Calculus AB exam. The proportion of variation in AP Calculus AB scores attributed to overall GPA in male students was 23.6%, respectively. The results of the Pearson's product-moment correlation did not show a statistically significant relationship between female students' overall GPA and post-secondary readiness in mathematics ($p > .05$).

Findings of the Pearson's product-moment correlation for race/ethnicity subgroups between overall GPA and AP Calculus AB showed only a statistically significant positive relationship for Hispanic and Asian students, $r = .658$, $r^2 = .433$, $p = .028$ (Hispanic) and $r = .521$, $r^2 = .271$, $p < .001$ (Asian). As the students' overall GPA increased, so did the students' score on the AP Calculus AB exam. The proportion of variation in AP Calculus AB scores attributed to overall GPA in Hispanic and Asian students varied between 43.3% and 27.1%, respectively. However, the results of the Pearson's product-moment correlation showed no statistically significant correlation between African American, White and students of two or more races' overall GPA and post-secondary readiness in mathematics ($p > .05$). Finally, the results of the Pearson's product-moment correlation did not show a statistically significant relationship between economically disadvantaged students' overall GPA and post-secondary readiness in mathematics ($p > .05$). Table 4.8 displays the correlation between student demographics of students' overall GPA and the AP Calculus AB exam.

Table 4.8

Correlations: Students' Overall GPA and AP Calculus AB Exam

Variable	N	<i>r</i> -value	<i>p</i> -value	<i>r</i> ²
All Students	84	.364	.001*	.132
Male	46	.486	.001*	.236
Female	38	.216	.192	-----
African American	7	.241	.602	-----
Asian	41	.521	<.001*	.271
Hispanic	11	.658	.028*	.433
Two or more races	3	-.366	.761	-----
White	22	.857	.857	-----
Economically Disadvantaged	4	.561	.439	-----

*Statistically significant ($p < .05$)**Research Question Two**

Research question two, *Is there a statistically significant relationship between a student's PSAT score and his or her post-secondary readiness?*, was answered by conducting Pearson's product moment correlations (r) between students' PSAT scores and their score on the AP English and/or AP Calculus AB exam. Findings of the Pearson's product-moment correlation suggested a statistically significant positive relationship between a student's PSAT reading score and his or her AP English scores, $r = .590$, $r^2 = .348$, $p < .001$. The findings of the Pearson's product-moment correlation also indicated a statistically significant positive relationship between a student's PSAT mathematics scores and his or her AP Calculus AB scores, $r = .452$, $r^2 = .204$, $p < .001$. As the student's PSAT scores in reading and mathematics increased, so did their scores on the AP English and AP Calculus AB exams. The proportion of variation in AP English

and AP Calculus AB scores attributed to PSAT reading and mathematics varied between 34.8% and 20.4% respectively.

Although the Pearson's product-moment correlation showed a statistically significant positive relationship overall, when additional analyses were conducted on the subgroups: gender, race/ethnicity and economic status, the findings of the Pearson's product-moment correlation indicated both male and female students showed a statistically significant positive relationship in PSAT reading score and post-secondary readiness, $r = .628$, $r^2 = .394$, $p < .001$ (males) and $r = .558$, $r^2 = .311$, $p < .001$ (females). In both male and female students, as the PSAT reading score increased, so did their scores on the AP English exam. The proportion of variation in AP English attributed to PSAT reading scores in male and female students varied between 39.4% and 31.1%, respectively.

Findings of the Pearson's a statistically significant positive relationship in students' PSAT reading score and AP English exam scores for Hispanic, $r = .512$, $r^2 = .262$, $p < .001$, African American $r = .388$, $r^2 = .150$, $p = .005$, White $r = .479$, $r^2 = .229$, $p < .001$ and Asian $r = .695$, $r^2 = .483$, $p < .001$ students. As students' PSAT reading exam scores increased, for these subgroups, so did his or her AP English exam scores. The proportion of variation in AP English attributed to PSAT reading scores in Hispanic, African American, White and Asian students varied between 26.2%, 15.0%, 22.9%, and 48.3% respectively. However, the results of the Pearson's product-moment correlation for PSAT reading score and score on AP English showed no statistically significant relationship in students of two or more races ($p > .05$).

Finally, the Pearson's product-moment correlation for economically disadvantaged students also showed a statistically significant relationship between PSAT reading scores and post-secondary readiness, $r = .387$, $r^2 = .148$, $p = .001$. With regard to

economically disadvantaged students, as their PSAT reading scores increased, so did their scores on the AP English exam. The proportion of variation in AP English attributed to PSAT reading scores in economically disadvantaged students was 14.8%, respectively. Table 4.9 displays the correlation between student demographics of students' PSAT reading exam and the AP English exam.

Table 4.9

Correlations: Student PSAT Reading Exam and AP English Exam

Variable	N	<i>r</i> -value	<i>p</i> -value	<i>r</i> ²
All Students	277	.590	<.001*	.348
Male	127	.628	<.001*	.394
Female	150	.558	<.001*	.311
African American	52	.388	.005*	.150
Asian	85	.695	<.001*	.483
Hispanic	74	.512	<.001*	.262
Two or more races	4	.870	.130	-----
White	62	.479	<.001*	.229
Economically Disadvantaged	65	.387	.001*	.148

*Statistically significant ($p < .05$)

Regarding analysis of gender, the Pearson's product-moment correlation indicated both male and female students showed a statistically significant positive relationship between PSAT mathematic scores and post-secondary readiness in mathematics, $r = .406$, $r^2 = .165$, $p = .005$ (male) and $r = .490$, $r^2 = .240$, $p = .002$ (female). In both male and female students, as his or her PSAT mathematic score increased, so did the score on the AP Calculus AB exam. The proportion of variation in AP Calculus AB attributed to

PSAT mathematic scores in male and female students varied between 16.5% and 24.0%, respectively.

Findings for race/ethnicity subgroups, the Pearson's product-moment correlation showed a statistically significant positive relationship in African American and Asian students' PSAT mathematic scores and post-secondary readiness in mathematics, $r = .814$, $r^2 = .663$, $p = .026$ (African American) and $r = .531$, $r^2 = .282$, $p < .001$ (Asian). For African American and Asian students, as their PSAT mathematics scores increased, so did their AP Calculus AB scores. The proportion of variation in AP Calculus AB attributed to PSAT mathematic scores in African American and Asian students varied between 66.3% and 28.2%, respectively. Findings of the Pearson's product-moment correlation indicated no statistically significant relationship between Hispanic, White and students of two or more races ($p > .05$). Results of the Pearson's product-moment for economically disadvantaged students indicated no statistically significant relationship between students' PSAT mathematics scores and post-secondary readiness in mathematics ($p > .05$). Table 4.10 displays the correlation between student demographics of students' PSAT mathematics exam and the AP Calculus AB exam.

Table 4.10

Correlations: Student PSAT Mathematics Exam and AP Calculus AB Exam

Variable	N	<i>r</i> -value	<i>p</i> -value	<i>r</i> ²
All Students	84	.452	<.001*	.204
Male	46	.406	.005*	.165
Female	38	.490	.002*	.240
African American	7	.814	.026*	.663
Asian	41	.531	<.001*	.282
Hispanic	11	.071	.835	-----
Two or more races	3	.756	.454	-----
White	22	.413	.056	-----
Economically Disadvantaged	4	.762	.238	-----

*Statistically significant ($p < .05$)

Research Question Three

Research question three, *Is there a statistically significant relationship between a student's STAAR score and his or her post-secondary readiness?*, was answered by conducting Pearson's product moment correlations (r) between students' STAAR scores on English II and Algebra I exams and their score on the AP English and/or AP Calculus AB exam.

Findings of the Pearson's product-moment correlation indicated a statistically significant positive relationship between a student's STAAR English II score and his or her AP English scores, $r = .627$, $r^2 = .393$, $p < .001$. Additionally, findings of the Pearson's product-moment correlation indicated there is a statistically significant positive relationship between a student's STAAR Algebra I score and his or her AP Calculus AB scores, $r = .504$, $r^2 = .254$, $p < .001$. As the student's STAAR scores in English II and Algebra I increased, so did scores on the AP English and AP Calculus AB exams. The

proportion of variation in AP English and AP Calculus AB scores attributed to STAAR English II and Algebra I varied between 39.3% and 25.4%, respectively.

Results of the Pearson's product-moment correlation for male and female students' English II scores and post-secondary readiness showed a statistically significant positive relationship, $r = .619$, $r^2 = .383$, $p < .001$ (male) and $r = .638$, $r^2 = .407$, $p < .001$ (female). In both male and female students, as English II STAAR EOC exam scores increased, so did the AP English exam scores. The proportion of variation in AP English scores attributed to STAAR EOC English II in male and female students varied between 38.3% and 40.7%, respectively.

The results of the Pearson's product-moment correlation for individual ethnicity subgroups showed a statistically significant positive relationship in Hispanic, African American, White, Asian and students of two or more races' English II EOC scores and post-secondary readiness, $r = .459$, $r^2 = .211$, $p < .001$ (Hispanic), $r = .579$, $r^2 = .335$, $p < .001$ (African American), $r = .665$, $r^2 = .442$, $p < .001$ (White), $r = .636$, $r^2 = .404$, $p < .001$ (Asian) and $r = .967$, $r^2 = .935$, $p = .033$ (Two or more races). As all student ethnicity subgroups scores on English II STAAR EOC exam increased, so did his and her scores on the AP English exam. The proportion of variation in AP English scores attributed to STAAR English II in ethnicity subgroups varied between 21.1%, 33.5%, 44.2%, 40.4%, and 93.5% respectively.

Finally, the results of the Pearson's product-moment correlation for economically disadvantaged students indicated a statistically significant positive relationship in STAAR EOC English II scores and post-secondary readiness, $r = .529$, $r^2 = .280$, $p < .001$. As economically disadvantaged students' scores on the English II STAAR EOC exam increased, so did their scores on the AP English exam. The proportion of variation in AP English scores attributed to STAAR EOC English II in economically

disadvantaged students was 28.0%. Table 4.11 displays the correlation between student demographics of students' English II STAAR EOC exam and the AP English exam.

Table 4.11

Correlations: Students' English II STAAR EOC Exam and AP English Exam

Variable	N	<i>r</i> -value	<i>p</i> -value	<i>r</i> ²
All Students	275	.627	<.001*	.393
Male	127	.619	<.001*	.383
Female	148	.638	<.001*	.407
African American	52	.579	<.001*	.335
Asian	85	.636	<.001*	.404
Hispanic	72	.459	<.001*	.211
Two or more races	4	.967	.033*	.935
White	62	.665	<.001*	.442
Economically Disadvantaged	64	.529	<.001*	.280

*Statistically significant ($p < .05$)

With regard to STAAR EOC Algebra I, results of the Pearson's product-moment correlation showed a statistically significant positive relationship between both male and female students' STAAR EOC Algebra I and post-secondary readiness in mathematics, $r = .524$, $r^2 = .275$, $p = .001$ (males), $r = .481$, and $r^2 = .231$, $p = .015$ (females). For male and female students, as his or her score increased on the Algebra I STAAR EOC exam, so did his or her score on the AP Calculus AB exam. The proportion of variation in AP Calculus scores attributed to STAAR EOC Algebra I in male and female students varied between 27.5% and 23.1%, respectively.

The results of the Pearson's product-moment correlation for race/ethnicity subgroups only showed a statistically significant positive relationship in Asian students

and post-secondary readiness in mathematics, $r = .661$, $r^2 = .437$, $p < .001$. With regard to Asian students, as their Algebra I STAAR EOC exam scores increased, so did their scores on the AP Calculus AB exam. The proportion of variation in AP Calculus scores attributed to STAAR EOC Algebra I in Asian students was 43.7%, respectively. Results of the Pearson's product-moment correlation showed no statistically significant relationship in Hispanic, African American, or White students' STAAR EOC Algebra I scores and AP Calculus scores ($p > .05$).

In addition, results of the Pearson's product-moment correlation showed a statistically significant positive relationship between economically disadvantaged students' STAAR EOC Algebra I and post-secondary readiness in mathematics, $r = .974$, $r^2 = .949$, $p = .026$. For economically disadvantaged students, as his or her score increased on the Algebra I STAAR EOC exam, so did his or her score on the AP Calculus AB exam. The proportion of variation in AP Calculus scores attributed to STAAR EOC Algebra I in economically disadvantaged students was 94.9%. Table 4.12 displays the correlation between student demographics of students' Algebra I STAAR EOC exam and the AP Calculus AB exam.

Table 4.12

Correlations: Students' Algebra I STAAR EOC Exam and AP Calculus AB Exam

Variable	N	<i>r</i> -value	<i>p</i> -value	<i>r</i> ²
All Students	60	.504	<.001*	.254
Male	35	.524	.001*	.275
Female	25	.481	.015*	.231
African American	4	-.393	.607	-----
Asian	33	.661	<.001*	.437
Hispanic	6	.419	.408	-----
Two or more races	2	**	**	**
White	15	.376	.167	-----
Economically Disadvantaged	4	.974	.026*	.949

*Statistically significant ($p < .05$)

**Findings inconclusive because of only two students.

Research Question Four

Research question four, Is there a statistically significant mean difference in post-secondary readiness between gifted and talented and non-gifted and talented students?, was answered using an independent t-test with gifted and talented status as the independent variable and the AP English and AP Calculus AB as the dependent variable. Table 4.13 provides the results of the independent t-test for gifted and talented status and the AP English exam. Findings of the independent t-test suggest that gifted and talented status had an influence on post-secondary readiness, $t(157) = 5.688$, $p < .001$, $d = .74$ (medium effect size), $r^2 = .12$. Levene's test indicated unequal variances ($F = 10.388$, $p = .001$); degrees of freedom were adjusted from 275 to 157. Participants who were identified as gifted and talented had overall higher scores on the AP English exam ($M = 3.24$) than students identified as non-gifted and talented ($M = 2.42$). The r^2 value of .12 indicated that only 12% of the variation in the AP English exam scores can be explained

by the gifted and talented status. Table 4.14 provides the results of the independent t-test for gifted and talented status and AP Calculus AB exam. Findings of the independent t-test did show, on the other hand, that a students' gifted and talented status did not have an influence on their post-secondary readiness in mathematics ($p > .05$). Levene's test indicated equal variance across GT and non-GT groups.

Table 4.13

Student Gifted and Talented Status and AP English Exam

GT Status	N	M	SD	df	t-value	p-value	d	r ²
GT students	96	3.24	1.229	157	5.688*	<.001*	.74	.12
Non-GT students	181	2.42	.955					

*Statistically significant ($p < .05$)

Table 4.14

Student Gifted and Talented Status and AP Calculus AB Exam

GT Status	N	M	SD	df	t-value	p-value
GT students	55	3.29	1.257	82	.051	.959
Non-GT students	29	3.28	1.334			

*Statistically significant ($p < .05$)

Research Question Five

Research question five, *What are AP teachers' perceptions of the impact of student achievement on post-secondary readiness?*, was answered by using a qualitative inductive coding process. In an attempt to capture a more in-depth understanding of the impact of student achievement factors on post-secondary readiness, 10 AP teachers were interviewed for their perceptions on the issue. Table 4.6 provides the demographics for

the interview participants. The inductive coding analysis derived four themes or categories of responses concerning student achievement factors and post-secondary readiness: (a) impact of open enrollment, (b) screening process for AP classes, (c) student achievement factors to identify students, and (d) teacher promotion of AP courses. The emergent themes are provided below followed by a sample of the AP teacher comments.

Impact of Open Enrollment

With regard to AP teachers' perceptions on the impact of open enrollment in AP courses, 90% of the AP teachers interviewed felt that, except for the required prerequisite required by College Board, AP courses were all open enrollment and all students should have the opportunity to take advanced classes, whereas 10% of the AP teachers did not feel there should be open enrollment. When asked, *"Do you know if your school or department has any policies regarding student enrollment into AP courses?"* One AP teacher commented, "It's open enrollment, so it's really open to anybody that is interested." Comments representative of the responses received from other AP teachers included: "If students met the prerequisites for the course then it is open enrollment," and "We have open enrollment. The AP coordinator/GT specialist and counselors make recommendations but ultimately it is the student's choice." One AP teacher stated, "Not really. Nothing set in stone anyway." Another AP teacher commented, "No, other than the prereqs it's open. Anybody can join, and I do have kids like in AVID that require students to take an AP course." An AP teacher also explained, in reference to open enrollment:

No, there's no policies in place really. If a student wanted to take a minimum of just one AP course in their academic career then they are able to do so. If they want to, in any given year, take a full class, a full load of 8 courses, they are

eligible to do that as well. They're not capped by a number of how many they can take.

When AP teachers were asked, "*How do you feel about open enrollment for AP courses?*" Examples of such comments are provided below:

I think that kids should have the opportunity to try an AP course. I think we make judgments based on that incorrectly sometimes. So I don't think that kids, in general, should be dissuaded from trying it anyway.

I'm giving students an opportunity to really discover biology and to take a course that they may have otherwise never had the opportunity to take. Some of my students, you know, may find that they absolutely love the course. I think that their brains aren't fully developed and they don't even know what they know and what they like, so being able to come in and electively take something I think can be a good opportunity for kiddos. They will have a memory, a positive memory, and I think that's worth it.

Overall 90% of AP teachers support the concept of open enrollment and providing students with the opportunity to take advanced classes. The one AP teacher that did not feel strongly about open enrollment stated, "I feel that some students don't belong in AP and don't have the motivation or ability to thrive in the rigor of the courses."

Screening Process for AP Courses

When analyzing screening processes for AP courses, sixty percent of the AP teachers interviewed said they do not use any type of screening process. AP teachers were asked, "*Do you currently use any screening processes for potential AP students?*" The responses included, "I do not use any screening methods, but assign summer homework to gauge where the students are at," "No I don't do any screens. I've gone back and forth thinking about this over the years," and "I take what I get, open

enrollment.” One AP teacher said, “I do not, no. There is no prescreening. I give them an assessment at the beginning so that they can self-screen but there is no pre-screening school wide.” Another AP teacher stated, “No I don’t screen them. I take them at all levels I typically have a mix of students who it is their first AP course and students who take all AP course.” In addition, AP teachers were asked, “*How do you feel about a screening process for AP courses?*” Examples of their comments are below:

When I came into teaching I thought it was important and I wanted to do it, but I just didn’t know how to go about doing it and getting it started. To screen students, I bet my AP average would go up. It would be easier on me, for sure. Teaching would be easier, I would get the best and the brightest students, and whew, that sounds amazing. They would come to me with a good understanding of chemistry topics. They would come to me with a good understanding of basic biology concepts and I would absolutely appreciate that. On the other hand, I’m giving students an opportunity to really discover biology and take a course that they may have otherwise never had the opportunity to take. There are pros and cons to it and I don’t know which way I lean. I think I lean more towards being open and not excluding.

Before the school year starts, no. Whoever is in Skyward is who I’m working with. As far as the first nine weeks goes I don’t know if I necessarily screen them as to counsel them to drop, I screen them as in, are you sure that you’re committed to this level of work. Because right now it doesn’t feel like you are. And I tell all of them it is not my job to go to a counselor and say you need to move that kids out of my class. It’s my job to think all of them can do this, and how do we get you to be successful at this so where are we at? Is it how you study, can you manage your time a little bit better, are you just not used to this

workload, what is it that we can help you with? But I'm never going to be the teacher that says you need to get this kid out of my class.

AP teachers were also asked, *"Do you think you would feel differently about screening a prospective AP student if you taught in a different school or a different community?"* Some of the responses from the AP teachers interviewed are provided below:

I don't know, to me I appreciate the fact that anybody that wants to commit to this can do it. So to like screen them, to interview them, or say no I don't think they can, I don't know, that doesn't feel right. You don't know what happened to that kid over the summer, there could've been a huge change and they're ready to make something different happen, so I say why not give them a try.

I have taught in a different area and I thought there should be a screening, but now feel torn because the community and environment really affects students and I don't know how screening could affect potential students.

I think it is possible, but I'm not sure. I've been here at this school, in this community for the last five years. I know these guys and I know this community. If I taught somewhere else I would follow administrative protocols whenever it was recommended and whenever it was allowed. For sure I would follow the guidelines, but I'm not sure. My natural personality is going to lean toward not excluding anyone. I think it really depends on the culture surrounding the teachers and the administration that works there that's going to guide whether I choose to screen or not.

Maybe, but I do like the concept of reaching out to students who may not be "AP" students but have the drive to complete the course. I have had some students that

it really helped build their confidence for where they wanted to go for college. It isn't always about the test scores but sometimes the journey.

Forty percent of the teachers said they would not feel differently about having a screening process if they were at a different school or community, and AP teachers commented, "I am not a fan of weeding out students so it's important to look at data beforehand to see if a student would be a good fit," and "No, because I was under the impression that we couldn't screen so I don't know any different. I don't think I have an opinion on it."

For the teachers that did have some type of screening process in place, when asked, *What led to the current screening of students before taking your AP course?* one AP teacher stated, "We had a couple of years where we did not screen the kids and the passing rate on the AP exam was really low. We decided screening would be a much more beneficial way of having the kids in class." Three of AP teachers said their school required a recommendation from their previous teacher to be considered for AP course enrollment. Examples of teachers' responses included, "They [school] also require approval from a current teacher," and "Last year was a policy that students wanting to take an advanced course had to get their current teacher to sign off on a form."

Although the majority of AP teachers did not use a screening process to enroll in the class, three of the ten AP teachers had some sort of process in place once students start the class to determine where the students are academically so they can offer support. One AP teacher commented, "I screen them as in are you sure that you're committed to this level of work." Another AP teacher commented, "I give them an assessment at the beginning so they can self-screen but there is no pre-screening that's done like school wide to determine eligibility or preparedness for the course." Although there was some differences in the perception of AP teachers in terms of pre-screening students for AP course enrollment, 100% of the AP teachers agreed that students should be given the

opportunity to enroll in advanced courses if they are willing to put in the effort needed to be successful.

Student Achievement Factors to Identify Students

A common trend amongst AP teachers responses regarding student achievement factors in identifying students for AP courses was uncertainty overall about their use as a tool for identification. When AP teachers where asked, *“How do you feel about student achievement factors, such as GPA, PSAT scores and STAAR EOC scores as an indicator for success in AP courses?”* 40% of the AP teachers did not see GPA, PSAT scores or STAAR EOC scores as reliable factors to identify students for AP courses. One AP teacher stated, “I think that using those factors are probably not the most idea. AP courses in themselves have different expectations.” Another teacher elaborated with the following statement:

Well, it’s been my observation, I’ve been doing this long enough now, they’re indicators but they are certainly not a guarantee. I mean they’re a way to mine the field and look for kids, but I have a lot of kids that their scores are maybe not quite at that same level but they put a staggering amount of effort into the class and doing a better job.

On the other hand, 60% percent felt like these factors could possibility be helpful in identifying students. For example, some AP teachers commented, “I think that those achievement factors provide an insight in predicting future academic achievement,” and “I think they are helpful but not a be all end all.” In addition, a teacher stated, “I think it can be a decent baseline, however, I wouldn’t put all my consideration with the scores.”

GPA. Sixty percent of the AP teachers expressed student achievement factors could be used to identify students for AP courses and 50% of those teachers specifically

saw GPA as an indicator. When teachers were asked specifically about GPA as an indicator teachers stated the following:

GPA shows that they can handle maybe higher level or content level. But I don't know that that has any indication on whether or not they can handle the workload or how they're going to manage their time because there are some soft skills that go into this that I don't think can be measured through that at all.

I would think if they have a high GPA that's implying to me, well hopefully, that they have worked their butt off to get there, so I mean if they have the grit and organizational skills to make it to that preparedness I would imagine that they would be successful in the course.

I think GPA tends to show, you know, the student has good time management, the student has good organizational skills. It tends to show that, I think, more than anything else.

On the other hand, 40%, of the AP teachers interviewed, did not see a value in GPA to identify students for AP courses. AP teacher comments were, "I think GPA can sometimes be misconstrued, where a student could be making Bs and Cs in AP courses and still reflect better than a student who's taking all on level courses and doing well making As and Bs," and "I am not sure. I haven't personally used them but I think everyone should be able to take an AP course if they are up to the challenge." A 100% of the AP teachers said they have never used GPA to identify students for their AP course.

PSAT scores. Out of the 60% of AP teachers that felt student achievement factors were beneficial in identifying AP students, only 33% specifically supported PSAT scores as a potential good indicator to identify students. Examples of AP teachers comments were: "A PSAT score, I think could help predict success. It's usually the indicator for predicting college readiness so, you know, I think it would help to predict AP success as

well, I do like having these kids for sure,” and “Maybe PSAT shows that they can handle maybe higher level or content level.” On the other hand, one AP teacher stated:

I don’t think their PSAT scores, because those types of scores for those types of exams, students can spend months studying for them. They can prepare and take courses and kind of get into a routine to prepare for them. You don’t do that for AP courses. You don’t spend months, beforehand, going through practices and simulations and things like that so I don’t believe those should be things that we use to qualify whether or not students are eligible for the course.

Only one AP teacher said they have used PSAT scores to identify students to recruit for their AP course, and 90% of the AP teachers said they have never used PSAT scores to identify students for AP courses.

STAAR EOC scores. Seventy percent of the AP teachers interviewed did not support using STAAR EOC as an indicator for AP courses. Among AP teacher comments were, “I don’t know that STAAR scores have anything to do with their success in an AP class at all,” and “Some students don’t always have the best test scores but can do well in an AP course if they put forth the effort.” Another AP teacher stated:

EOC might validate what I’m thinking as a professional but I have directed students to take an AP class and say you can do this. So as far as EOCs, I do look at past scores at the beginning of the year, but I have a number of students who didn’t meet the criteria of exceeds expectations but they passed the test. I will tell you that the STAAR English test is much more difficult than any other English test and I’ve taught through them all. Some of the questions are SAT level on the English STAAR and that’s a year or two years above the grade level that we’re expecting them to pass. The STAAR writing cripples our kids. I have to un-teach them that an essay is not 26 lines long. They have to try to fit four paragraphs. So

they come to AP English III thinking a paragraph is this long but an essay is AP English III is much longer. So I think the writing portion is crippling. Does it assess whether or not they can write at the college ready level? I don't know about that, but it does say that they can write well enough to be a success later or they have the ability to do so.

In contrast, 30% of AP teachers felt the STAAR EOC could offer some insight into student performance. Examples of AP teachers responses include: "I think EOC scores show how well the student has learned the content and the skills throughout the course. It can show summative information, you know, how well that they've retained it", and "At the high school you can look at the EOC scores, you could look at their STAAR scores in reading. Basically the English AP test is a STAAR test in Spanish." A 100% of the AP teachers interviewed said they have never used STAAR EOC scores to identify students for AP courses.

Teacher Promotion of AP Courses

When examining teacher promotion of their AP course to increase student enrollment, 80% of the AP teachers stated they do some type of promotion. The most common method used among the AP teachers is word of mouth from their current students. AP teachers comments included, "They talk to each other and influence each other's decisions and base what courses they want to take on hearing "Oh I like this teacher or that teacher," that is just how it is," and "Current students tell others about my course and help build rapport for me and students come in having a level of trust in taking my course." One AP teacher said:

Mostly word of mouth. I get kids to go when they start, when it's time to sign up, I say "hey go tell your buddies they might want to take this class." The elective fair is basically useless for me because my kids are supposed to be juniors and

seniors and I'm talking to freshman parents and that doesn't do any good for anybody. So that is of no use to me.

Other promotions of AP courses included visiting classes and elective fairs and putting up posters. One AP teacher who taught a 9th grade AP course stated, "I promote a lot at the Freshman Frenzy and communicate with middle school teachers about potential students. I also go to middle schools to present to students about my program." One AP science teacher stated:

I do the yearly elective fair and I do these lab investigations and my booth is kind of a go-to-spot the last couple of years. I do a bunch of little lab demonstrations, but really that's being promoted more to freshman and incoming freshman. I end up being more of like a word of mouth. I like to think that they're saying more positive things about me and I think that they are. In the spring I usually touch base with my freshman students and I encourage them. I want to do more of a showy thing when I do that. I talk to them privately and they appreciate being noticed. They appreciate being noticed for their efforts. Those kiddos that I target, they come to me. They come to me in AP. Other than that I don't do any other specific promotional things but that's something that I do need to work on.

Other AP teacher comments included, "I go to Human Geography classes each January and I sell them the program," and "I do promote. I post flyers and encourage peer to peer recommendations. The AP coordinator does a really good job of having the AP ambassadors help explain what AP biology is about." Only one of the AP teachers did not promote their AP course and stated: "Like do I go out and recruit? No. Yeah I don't know that I need to." When the AP teachers were asked, "*Do you promote AP participation to historically underrepresented students such as African American or Latinos?*" only one

of the AP teachers suggested they target underrepresented students to their AP course and they stated:

I try to get, especially my African American and Latino kids that are in the class to talk to it up to their friends. I also, very early on in the year, if I can identify some students that are misplaced in my Environmental Systems class, I say “hey you know maybe you might want to try the AP class.”

Several other AP teachers saw their campus as being very diverse already and have classes that consisted of a diverse population. They stated, “Not specially. The school is already very diverse and so are my classes,” and “Our demographics are mostly underrepresented.”

Research Question Six

Research question six, *What are AP teachers’ perceptions of the impact of being gifted and talented and post-secondary readiness?* was answered by using a qualitative inductive coding process. In an attempt to capture a more in-depth understanding of the impact of being gifted and talented on post-secondary readiness, 10 AP teachers were interviewed for their perceptions on the issue. The inductive coding analysis revealed three themes or categories of responses concerning gifted and talented status and post-secondary readiness: (a) academic ability, (b) motivation, and (c) GT identification and reevaluation. The themes are provided below followed by a sample of the AP teacher comments.

Academic Ability

”When AP teachers were specifically asked about GT students’ and post-secondary readiness?” 60% of AP teachers interviewed suggested that GT status was a potential factor for AP course success. AP teachers felt that GT students have an increased ability to understand the content of the course. For example, AP teachers stated,

“I’ve noticed with my test scores is that my high scorers, my 4s and 5s, they come to me as GT students,” and “They can do really well because they will grasp concepts pretty quickly (if it interests them/challenges them) but for some it can be a struggle with organization and the amount of outside class time they may need/not be used to.” Along with the comment, “GT students understand the content and can usually handle to rigor of the course.” Another AP teacher interviewed said, “GT students can do very well in AP.” Additional comments made by AP teachers included, “I think it shows that they can handle the content level or higher level thinking,” and “I do find my GT kids are well capable and just innately get it. You don’t have to go into a lot of explanation with them.”

The majority of the AP teachers interviewed supported GT status as a good factor in identifying students for AP courses, but a few AP teachers did not see GT status as a possible indicator for AP course success. Among the comments of AP teachers who did not view GT status as an indicator were, “I’ve found that GT doesn’t guarantee anything,” and “I don’t know if I personally believe that GT status is the best measure.” One AP teacher stated, “I do not think that it is an indicator of the soft skills that go into being able to handle the class.” There were some differences among AP teachers’ views of GT students and their academic ability overall 60% agreed that GT students have an increased ability to grasp the content and stated GT status is a good indicator of a student’s academic ability and success in AP courses. Although, 100% of the AP teachers stated they do not use GT status as a factor to recruit students to AP courses.

Motivation

A reoccurring theme from the AP teacher interviews for GT students was motivation. The majority of AP teachers believed that GT students have the academic ability for AP courses, but felt GT students can lack the motivation to be successful. For example, one AP teacher stated, “GT students can do very well in AP, but they have to be

motivated.” Another AP teacher said, “You don’t have to go into a lot of detail to them, otherwise they will just tune out because they already know it.” Additional comments from teachers were, “If I have a GT student hooked in, and have their attention, and they are excited to come to class they’re going to do well. Yes, GT status is a predictor for success, but I have to have them hooked in too,” and “students have to have the motivation to thrive in the rigor of the coursework.” The following are other examples of comments from AP teachers:

GT students may be able to grasp the concepts better and handle the rigor of the coursework, but pace can often be an issue. In AP, there are many instances that require self-teaching instruction and up to the student to take the initiative to do the work.

Many students only take AP courses to keep up or increase their rank and/or GPA but only do the bare minimum in the class. These students often see no reason to strive to pass the AP exam since they are focused on the GPA points. On the other hand, I have had students that fail the class and have no motivation to do the classwork but then score a 4 on the exam.

The vast majority of AP teachers feel that, although the students have the ability, GT students can require an increased level of engagement to keep them interested in completing the coursework.

GT Identification and Reevaluation

One concern that emerged through the interview process was when students are identified as being gifted and talented but there is no reevaluation process. A few AP teachers felt students are often tested and identified to be GT in elementary school and are not reevaluated at any time throughout their educational years. Examples of such comments are provided below:

Personally, I think that identifying a child in third grade is too young. That's just me personally. Yes, it may indicate giftedness at that age but there are other kids who might not show that giftedness until a little later. I have the GT endorsement so obviously I do believe that kids do need to have programs in place to serve them so that they can spend at least some of their class day with their academic peers. It is a fine line there. Like if there's a kid in the group who gets to do all the peer editing of the paper, that's not fair either.

I don't know if I personally believe that GT status is the best measure and the only reason why I say that is because being in a middle school now you could be labelled as a GT student, I don't know, the kids I see can be labelled as 6th graders at that point and there's no reevaluation process. If I knew that there was a continuous reevaluation process, then maybe I would think differently about it. But because I know it's just something that you can be labelled that once and it kind of follows you assuming that you stay consistent. I don't know how that process works to be honest, but I think there's just not enough reevaluation processes in order to determine that it is a good indicator of how they would do in Advanced Placement courses.

There should be a reevaluation process at the high school level to get a sense of student's strengths rather than have every door open to everything. Many students may be strong in the Arts but not in Science and Math and vice versa. I have experienced instances where a student may be great at AP English and History but when it comes to AP Physics they really struggle. They have been steered that way since they are "GT" but do not have interest in the material and forced into classes due to their status.

To summarize, this overall concern of identification and reevaluation was only concerning to only a few of the AP teachers interviewed. The majority of teachers, did not see it as a factor prohibiting GT student performance in AP courses. This notion was supported by an AP teacher when she stated, “I just feel like the GT kids, kids that are labelled GT, are just well adapted to the course.” The ability of GT students was less of an issue for most AP teachers, but they had an overall concern about motivation to engagement in the course and complete the work.

Summary of Findings

Overall GPA and Post-Secondary Readiness

Regarding the potential relationship between students’ overall GPA and post-secondary readiness, findings from this research suggested that a statistically significant positive relationship existed between a student’s GPA and their post-secondary readiness. As the students’ overall GPA increased so did their post-secondary readiness. Additionally, a statistically significant positive relationship was not found to exist between the subgroups of economically disadvantaged and female students’ GPA and post-secondary readiness in mathematics. When evaluating the AP teachers’ perceptions with regard to the role of students’ GPA and post-secondary readiness, less than half of the AP teachers agreed specifically that GPA was a good indicator of a student’s post-secondary readiness. Since GPA is cumulative over time, several teachers felt it showed soft skills and grit needed to be successful in post-secondary coursework. On the other hand, 40% of the AP teachers were unsure of its validity and believe GPA can be misleading due to weighed GPA between regular and advanced courses.

PSAT Scores and Post-Secondary Readiness

When examining the relationship between students’ PSAT scores in reading and mathematics and post-secondary readiness, findings indicated a statistically significant

positive relationship existed between PSAT scores in reading and mathematics and post-secondary readiness. This would suggest that as students' PSAT scores in reading and mathematics increase so does post-secondary readiness for students overall. When analysis of subgroups was performed, a relationship was not found to exist between economically disadvantaged students' PSAT mathematics scores and post-secondary readiness. In the analysis of the AP teachers' perceptions regarding the use of PSAT scores to indicate post-secondary readiness, very few saw PSAT scores as a viable indicator for post-secondary readiness due to the ability to test prep materials and courses. Less than 60% of AP teachers interviewed felt that the PSAT is a tool used to predict a student's post-secondary readiness as stated by the College Board.

STAAR EOC Scores and Post-Secondary Readiness

When data were examined regarding the relationship between students' STAAR EOC scores and post-secondary readiness, findings indicated a statistically significant positive relationship between students' English II and Algebra I EOC scores and their post-secondary readiness. As the students' STAAR EOC scores increased, in both English II and Algebra I, so did their post-secondary readiness. These results were duplicated throughout all subgroups. When evaluating AP teachers' perceptions on students' STAAR EOC scores and post-secondary readiness, there was little support from AP teachers that any STAAR EOC scores would be a good indicator to determine a student's post-secondary readiness. Several of the AP teachers used STAAR EOC results to confirm thoughts of a student's ability to be successful, but none of the AP teachers indicated they used EOCs to identify students for AP courses.

Gifted and Talented Students and Post-Secondary Readiness

In addition to examining student achievement factors, the data were analyzed to determine if a statistically significant mean difference in post-secondary readiness

between gifted and talented students and non-gifted and talented students existed. Findings indicated that a statistically significant mean difference in a student's post-secondary readiness for English exist between gifted and talented and non-gifted and talented students. The findings also showed there was no statistically significant mean difference in students' post-secondary readiness for mathematics between gifted and talented and non-gifted and talented students. When studying AP teachers' perceptions of GT students and post-secondary readiness, only one-third of the AP teachers supported GT status as a potential indicator for post-secondary readiness. The majority of AP teachers felt that GT students possessed the academic ability to be successful in post-secondary course work, but believed they sometimes lack the motivation and engagement to be successful. There was some question about identification and lack of a reevaluation process of GT students as they reached the high school level.

Conclusion

This chapter presented the analysis of quantitative and quantitative data collected from archived data and interviews, participant demographics, and processes of answering each research question. Chapter V provides a discussion of the findings detailed in this chapter in comparison to the findings listed in Chapter II. Implication of the findings concluded for this study and recommendations for future research studies are also included.

CHAPTER V: SUMMARY, IMPLICATIONS, AND FUTURE RESEARCH RECOMMENDATIONS

Recent years have seen a significant increase in the number of students across the United States who are completing AP courses and passing the corresponding AP exams (Kolluri, 2018). Although there have been many studies conducted emphasizing that students who complete AP courses, and pass AP exams, gain increased exposure to rigorous course work and are better prepared for post-secondary coursework (Evans, 2019), there is far less research on specific factors identifying students with the academic ability to be successful in AP courses and on AP exams. To examine student achievement factors as potential indicators to identify students with the academic ability to take AP courses and pass AP exams, this study investigated district archived data from AP students who took AP exams in AP English and AP Calculus AB in 2019 from three different high school campuses, and interview transcripts for 10 AP teachers of those three high schools. The chapter presents a thorough discussion of the findings, along with the implications of the findings and future research recommendations.

Summary

The research questions addressed whether a relationship exist among student achievement factors, gifted and talented status and post-secondary readiness. The following research questions guided this study:

1. Is there a statistically significant relationship between a student's overall high school GPA and post-secondary readiness?
2. Is there a statistically significant relationship between a student's PSAT scores and post-secondary readiness?
3. Is there a statistically significant relationship between a student's STAAR EOC scores and post-secondary readiness?

4. Is there a statistically significant mean difference in post-secondary readiness between gifted and talented and non-gifted and talented students?
5. What are AP teachers' perceptions of the impact of student achievement factors on post-secondary readiness?
6. What are AP teachers' perceptions of the impact of being identified as gifted and talented on post-secondary readiness?

Student achievement has three factors (GPA, PSAT scores and STAAR EOC scores), gifted and talented status, and post-secondary readiness is defined as the students' performance on the AP English and/or AP Calculus AB exam. The researcher investigated the relationship in each respected question.

Research Question 1

Research question one asked if there is a statistically significant relationship between a student's overall high school GPA and post-secondary readiness. The quantitative analysis of student data showed a statistically significant relationship overall between student's overall high school GPA and their post-secondary readiness in both English and mathematics. The results of the study were supported by previous research by Galla et al. (2019) showing GPA was a good predictor of students' ability to be successful in college-level coursework, and students with higher GPA possess self-regulation skills, such as homework completion, study skills and regular class attendance which are necessary skills for post-secondary readiness. The findings of this study were also supported by research conducted by Westrick et al., (2015) who examined the best method to identify high school students with the potential to be successful in college-level coursework. The researchers determined that GPA was among the best indicators of a student's future academic performance and valid college admissions criteria (Westrick

et al., 2015). In fact, the study showed GPA was a better indicator of student success than socioeconomic status (Westrick et al., 2015).

Additional analyses of subgroups within the study indicated female, African American, White, two or more races and economically disadvantaged students, did not show a statistically significant relationship between their overall high school GPA and post-secondary readiness in mathematics. A study by Shewach, McNeal, Kuncel and Sackett (2019), suggested that females take more AP courses and typically perform better than male students, and economically disadvantaged status was not a factor in AP course enrollment. This was consistent with the above findings where there was not a statistically significant positive relationship between female and economically disadvantaged students overall high school GPA and post-secondary readiness.

Research Question 2

Research question two asked if there was a statistically significant relationship between a student's PSAT scores and post-secondary readiness. The quantitative analysis revealed a statistically significant positive relationship exists between a student's PSAT scores in reading and mathematics and post-secondary readiness. With regard to PSAT reading scores and post-secondary readiness all subgroups showed a statistically significant positive relationship, except students of two or more races. The PSAT mathematics scores and post-secondary readiness did not show a statistically significant relationship in Hispanic, White, two or more races and economically disadvantaged students.

The findings of the study were supported by research conducted by Koretz and Langi (2018) where standardized testing proved to be a good indicator of post-secondary success and was more reliable than a student's high school GPA. Furthermore, a study by Gonzalez (2017) supported the PSAT specifically as an indicator for students' academic

ability and the identification of students with the aptitude to be successful in post-secondary coursework. In addition, Richardson et al., (2016) found that students' reading and mathematics PSAT scores showed a strong relationship with post-secondary readiness in non-STEM course performance. Students' STEM course academic performance showed a statistically significant relationship among their PSAT mathematics, reading, and writing scores and post-secondary success (Richardson et al., 2016). Students' race also indicated a statistically significant relationship with their performance on mathematics post-secondary readiness but socioeconomic status did not (Richardson et al., 2016).

Research Question 3

Research question three asked if there was a statistically significant relationship between a student's STAAR EOC scores and post-secondary readiness. The quantitative analysis revealed a statistically significant positive relationship does exist between a student's STAAR EOC scores in English II and Algebra I and post-secondary readiness in English and mathematics. Koretz et al., (2016) and Koretz and Langi (2018) found that standardized test scores, including high school standardized test scores, were good indicators of students' post-secondary success. This is consistent with findings from Shu, Kuncel and Sackett (2017) where standardized test scores showed to be a valid predictor of student achievement in college-level course work. Additional analysis of the subgroups showed no statistically significant relationship exists among African American, Hispanic, White and students of two or more races for Algebra I and post-secondary readiness in mathematics.

Research Question 4

Research question four asked if there was a statistically significant mean difference in post-secondary readiness between gifted and talented and non-gifted and

talented students. The quantitative analysis showed that gifted and talented status had an influence on student's post-secondary readiness in English, but not for mathematics. With regard to English, the findings of this study were consistent with previous research conducted by Welsch and Zimmer (2018) showing increased success in life, including education for students that participated in GT programs.

The findings of the study were supported by research by Graefe and Ritchotte (2019) that showed no significant difference in AP exam performance in economically disadvantaged or Hispanic GT students. The researchers also reported that Hispanic students who participated in AP courses were three times more likely to be successful on AP exams than non-gifted and talented Hispanic students (Graefe & Ritchotte, 2019). On the other hand, the findings of the study did not support research conducted by Vu, Harshbarger, Crow and Henderson (2019) where GT students typically perform better in STEM related courses than non-GT students.

Research Question 5

Research question five asked what AP teachers' perceptions of the impact of student achievement factors had on post-secondary readiness. The findings were analyzed using an inductive coding process based on AP teacher interviews. Findings were organized into four major themes: (a) impact of open enrollment, (b) screening process for AP classes, (c) student achievement factors to identify students and (d) teacher promotion of AP courses. The findings were consistent across all AP teachers that AP courses had open enrollment with the exception of meeting prerequisites set forth by the College Board. The AP teachers agreed that students should have the opportunity to take challenging coursework to prepare them for more rigorous coursework. This is supported by Woods, Park, Hu and Jones (2018) study showing that students who take AP courses and pass the AP exams in high school had a higher passing rate in first-year college

coursework. A study conducted by Warne, Larsen, Anderson and Odasso (2015) also showed students who take and pass the corresponding AP exam had increased success in their first-year college coursework, but less or no additional success was observed in students who did not pass the AP exam or did not take the AP exam.

The theme of student achievement factors to identify students was sub-categorized to include: (a) GPA, (b) PSAT scores and (c) STAAR EOC scores. Sixty percent of all the AP teachers interviewed felt that student's GPA, PSAT scores and STAAR EOC scores were valid indicators for post-secondary success. Less than 50% of these teachers felt that GPA specifically was a good factor to predict student success. This was consistent with research studies conducted by Galla et al. (2019), Westrick et al. (2015) Vulperhorst, Lutz, de Kleijn and van Tartwijk (2018) that supported GPA as a good indicator for future academic achievement.

PSAT scores were less supported by AP teachers as an indicator for future student success with only 20% of teacher in agreement. On the other hand, research by Koretz and Langi (2018) and Richardson et al. (2016) showed PSAT scores to be good indicators for academic ability and identification of students with the aptitude for post-secondary success. A study by Gonzalez (2017) showed that students identified using PSAT scores and enrolled in AP courses had increased success on at least one AP exam.

With regard to the STAAR EOC exam, 70% of the AP teachers interviewed did not support STAAR EOC as a valid indicator to identify students for post-secondary readiness. This was contrary to a study conducted by Koretz et al. (2016) who addressed state-standardized testing directly as a possible indicator for students' post-secondary readiness. The findings of the study showed a positive association between students' academic achievement in their first-year of college courses and scores on state-standardized tests.

Lastly, 80% of AP teachers said they did some type of promotion for their AP course. The most common was the use of word of mouth from previous or current AP students. Elective fairs were also mentioned as a tool but few of the teachers saw them as valuable in promoting their courses. A study by Judson, Bowers and Glassmeyer (2019) showed the most commonly used AP course teacher promotions were; word of mouth, direct promotion to students in non-AP courses and/or counselor recommendations.

Research Question 6

Research question six asked what AP teachers' perceptions were of the impact of gifted and talented status on post-secondary readiness. The findings were analyzed using an inductive coding process based on AP teacher interviews. Findings were organized into three major themes: (a) academic ability, (b) motivation, and (c) identification and reevaluation. The majority of AP teachers interviewed felt that GT status could be a potential factor showing academic ability and the aptitude to handle the rigor of an AP course. These findings are supported by Smith (2018) who suggested GT students have characteristics, such as intellectual ability, academic aptitude, and thinking skills. In addition, a study by Graefe and Ritchotte (2019) showed no difference in AP exam performance between White and Hispanic students, and GT Hispanic students were three times more likely to be successful than non-GT students.

Although the majority of AP teachers felt that GT students had the academic ability to be successful in AP courses, they were more concerned about their level of motivation. A study conducted by Siegle, Rubenstein and McCoach (2019) showed that for GT students to be motivated and self-regulated they need to have self-efficacy, goal valuation and environmental perception. They also suggested that when students see meaning in their coursework they are more likely to be motivated (Siegle, Rubenstein & McCoach, 2019).

Finally, a smaller percentage of AP teachers expressed concern about the early age of GT identification and the lack of a re-evaluation process through their academic career. The teachers felt that identifying students in elementary school could persuade students to take advanced courses they may not have the aptitude for or interest in. This is in direct contradiction to a study in 2017 by Young, Young and Ford showing that when students are not identified at a young age they often lose academic confidence and interest, especially in STEM related courses. The effect is even greater on underrepresented students (Young, Young & Ford, 2017).

Implications

In spite of this study's limitations, the findings have important implications for teachers and school administrators. There has been an increasing effort during recent years at the national and state levels to increase students' post-secondary readiness. (Roegman, Allen & Hatch, 2019). Advanced Placement courses provide high school students with the opportunity to take first-year college level courses and potentially gain college credit along with gaining necessary skills needed to be successful in post-secondary coursework (Kolluri, 2018). Students who are able to score 3, 4, or 5 on an AP exam demonstrate post-secondary readiness and increase their chances of obtaining a college degree within five years of entering college (Gagnon & Mattingly, 2016).

Based on the potential impact, enrolling into AP courses can have on a student's future success, schools need to be aware there are many students who possess the academic ability to be successful in AP courses who do not participate in AP courses. According to the College Board (2014) approximately 300,000 students in the United States demonstrate the ability to be successful in post-secondary coursework but do not enroll in the courses. In an effort for schools and districts to increase enrollment into AP

courses, especially underrepresented students, they need to understand the implications of student achievement factors and their indication of students' future academic success.

The College Board has set an open enrollment policy, with the exception of prerequisites for some courses, to allow access of AP courses to all students (Roegman, Allen & Hatch, 2019). This allows all students to participate without exclusion and allows schools to promote AP enrollment by reviewing student data available to assist in identifying and recruiting students that demonstrate the academic ability to be successful in post-secondary coursework. This will also require educating students and their parents on the benefits of participating in advanced courses.

One student achievement factor for schools to consider as an indicator for post-secondary readiness is students' overall high school GPA. Colleges and universities have long been using overall high school GPA for college admissions. According to Galla et al. (2019), a student's overall GPA is a good indicator of his or her self-regulation and academic abilities, abilities needed to be successful in post-secondary coursework. In addition, a study conducted by Westrick et al. (2015), showed a student's overall high school GPA is among the best predictor of college-level coursework success. This study supports the previous findings that a student's overall high school GPA is a good indicator of post-secondary success. As students' GPAs increased so did their post-secondary readiness in English. Students' GPAs are also good indicators overall for students' post-secondary readiness in mathematics with exception to student subgroups: female, African American, White, Two or more races and economically disadvantaged. These results are likely to be contributed to the prerequisite requirement for AP Calculus AB. Currently, the College Board does not have any prerequisite requirement for students to enroll in AP English, however, AP Calculus AB requires the completion of Algebra I, Geometry, Algebra II and Pre-Calculus (College Board, 2020). All students enrolling in

AP Calculus AB would typically be better prepared for the course. These findings are supported by Terry, de La Harpe and Kontur (2016) showing prerequisite courses provide the basic skills needed for students to be successful in subsequent courses.

Another student achievement factor for schools to consider in the identification and recruitment of students for post-secondary readiness are PSAT scores. In addition to overall high school GPA, standardized test scores, such as SAT and ACT, are commonly used by college and universities in the admissions process (Westrick et. al., 2015). Standardized test scores show a strong predictability of students' academic ability both within schools and between schools (Koretz & Langi, 2018). The two standardized tests available to schools are PSAT scores and state-mandated standardized test scores.

The findings of this study, showed that as students' PSAT scores increased in reading so did their post-secondary readiness in English. This was also true for students' PSAT mathematics scores and post-secondary readiness in mathematics, except for the subgroups: Hispanic, White, Two or more races and economically disadvantaged students. Again, this is mostly likely due to the prerequisite needed to enroll in AP Calculus AB.

In Texas, high school students are required to take a series of end-of-course exams to qualify for graduation. In the review of students' scores on the English II and Algebra I STAAR EOC and their post-secondary readiness, students' who have increased scores on the English II EOC exam also showed increased post-secondary readiness. This was also true overall for Algebra I scores and post-secondary readiness in mathematics. There were some exceptions to Algebra I scores and post-secondary readiness in African American, Hispanic and White students. This is also suspected to be the result of the prerequisites for AP Calculus AB. Based on the feedback from AP teachers, few teachers see the STAAR EOC scores as a potential indicator to identify students for post-

secondary readiness. This contradicts findings by Koretz et al. (2016) who found state-mandated tests have similar predictability as college admissions exams in students' post-secondary performance.

In regard to gifted and talented status, one might expect students labeled GT would demonstrate post-secondary readiness at a higher rate than their non-GT counterparts. As corroborated in this study, there is clear evidence that GT students show increased post-secondary readiness in English than non-GT students. On the other hand, the study did not support GT students having an increased rate of post-secondary readiness in mathematics as compared to non-GT students. The greatest significant difference between post-secondary courses in English and mathematics is the prerequisites. Post-secondary coursework in English does not require prerequisite coursework for student enrollment, while the mathematic course require a number of prerequisite courses before a student is able to enroll in the course. This leads to students enrolling in post-secondary mathematic courses more likely having the fundamental skills to be successful in the course. Policy makers for AP courses, may want to consider an in-depth analysis of the prerequisite requirement or recommendation for each course to provide students with an academic foundation to be successful in the AP course and on the corresponding AP exam.

In an effort to support a quality AP program, schools must provide students with the opportunity to engage in rigorous coursework at a younger age. According to Young, Young, and Ford (2017), students who are not prepared tend to lose interest as they enter middle and high school, especially underrepresented students. This requires schools and districts to allocate funding to support proper training for school counselors to advice

students, and professional development for teachers to deliver rigorous curriculum to students. An increase in funding would require support from policy makers at the national, state and local levels. Educators must continue to advocate for funding that would allow for additional support for schools to provide students with curriculum from elementary to high school that is engaging and rigorous along with providing the necessary foundation for students to be ready for post-secondary coursework.

Recommendations for Future Research

A number of recommendations are suggested for future research. First, a more in-depth study should be conducted on the effects of prerequisites and students' performance on all post-secondary coursework. The study should focus on student subgroups performance on courses with set prerequisites compared with courses that have minimal to no prerequisites for enrollment. The completion of prerequisite coursework allows students to conquer key concepts necessary for success (Terry, de La Harpe & Kontur, 2016).

Secondly, a study is needed to examine the post-secondary readiness of students enrolled in AP courses versus students who opt to enroll in dual credit courses. The primary focus of the study should focus on teachers who teach both the AP course and the dual credit course in the same subject versus dual credit teachers who do not teach AP. This would provide an insight into whether students taking a dual credit course from an AP teacher are better prepared for post-secondary success.

A final recommendation for future study is one involving the relationship between teacher education and student post-secondary success. The study should focus on the level of teacher education along with teachers' field of study and how well their students perform on college-level course work. This would provide insight into whether or not a teacher's education level is a factor in student achievement. In most districts teachers are

not required to have a master's degree to teach AP, but colleges and universities require a master's degree to teach dual credit and college level courses.

Conclusion

A student's success in college-level coursework and graduating college within four years of entering college is closely tied to their high school coursework and performance in those courses (Kettler & Hurst, 2017). Students who participate in post-secondary coursework in the form of AP courses are generally better prepared for the rigor of college-level courses (Kolluri, 2018). AP courses provide students with the opportunity to take rigorous curricula and potentially gain college credit by their score on the corresponding AP exams (Warne, 2017). Given that students who are more prepared for college are more likely to complete their degree within four years (Kolluri, 2018), it is imperative to utilize all student achievement factors available to identify students who have the academic ability to be successful in AP courses. Considering there are approximately 300,000 students who do not participate in any AP course but have the academic ability to be successful (Kerr, 2014), this study could provide a significant contribution to identifying and recruiting students for enrollment in AP courses.

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APPENDIX A:
INFORMED CONSENT TO PARTICIPATE IN RESEARCH

You are being asked to participate in the research project described below. Your participation in this study is entirely voluntary and you may refuse to participate, or you may decide to stop your participation at any time. Should you refuse to participate in the study or should you withdraw your consent and stop participation in the study, your decision will involve no penalty or loss of benefits to which you may be otherwise entitled. You are being asked to read the information below carefully, and ask questions about anything you don't understand before deciding whether or not to participate.

Title: Examining Student Achievement Factors and Post-Secondary Readiness

Principal Investigator(s): Tonya Patterson, MS., MS.

Faculty Sponsor: Dr. Michelle Peters, COE

PURPOSE OF THE STUDY

The purpose of this research study was to examine the relationship between student achievement, gifted and talented status, and post-secondary readiness.

PROCEDURES

If you are participating in the study, please fill out the information on the consent form and email to the principal investigator.

EXPECTED DURATION

The total anticipated time commitment will be approximately for the interview is approximately 30 minutes.

RISKS OF PARTICIPATION

There are no anticipated risks associated with participation in this project

BENEFITS TO THE SUBJECT

There is no direct benefit received from your participation in this study, but your participation will help the investigator(s) better understand potential indicators to target students for Advanced Placement courses and leading to increased college readiness.

CONFIDENTIALITY OF RECORDS

Every effort will be made to maintain the confidentiality of your study records. The data collected from the study will be used for educational and publication purposes, however, you will not be identified by name. For federal audit purposes, the participant's documentation for this research project will be maintained and safeguarded by the Principal Investigator for a minimum of three years after completion of the study. After that time, the participant's documentation may be destroyed.

FINANCIAL COMPENSATION

There is no financial compensation to be offered for participation in the study.

INVESTIGATOR'S RIGHT TO WITHDRAW PARTICIPANT

The investigator has the right to withdraw you from this study at any time.

CONTACT INFORMATION FOR QUESTIONS OR PROBLEMS

The investigator has offered to answer all your questions. If you have additional questions during the course of this study about the research or any related problem, you may contact the Principal Investigator Tonya Patterson., at 832-226-4695 or by email atPattert1620@yahoo.com.

If you have additional questions during the course of this study about the research or any related problem, you may contact the Faculty Sponsor Dr. Peters, Ph.D., may be contacted at phone number 281-283-7600 or by email at petersm@uhcl.edu.

SIGNATURES:

Your signature below acknowledges your voluntary participation in this research project. Such participation does not release the investigator(s), institution(s), sponsor(s) or granting agency(ies) from their professional and ethical responsibility to you. By signing the form, you are not waiving any of your legal rights.

The purpose of this study, procedures to be followed, and explanation of risks or benefits have been explained to you. You have been allowed to ask questions and your questions have been answered to your satisfaction. You have been told who to contact if you have additional questions. You have read this consent form and voluntarily agree to participate as a subject in this study. You are free to withdraw your consent at any time by contacting the Principal Investigator or Student Researcher/Faculty Sponsor. You will be given a copy of the consent form you have signed.

Subject's printed	
name:	_____
Signature of Subject:	_____
Date:	_____

Using language that is understandable and appropriate, I have discussed this project and the items listed above with the subject.

Printed name and title	_____
Signature of Person Obtaining Consent:	_____
Date:	_____

THE UNIVERSITY OF HOUSTON-CLEAR LAKE (UHCL) COMMITTEE FOR PROTECTION OF HUMAN SUBJECTS HAS
REVIEWED AND APPROVED THIS PROJECT. ANY QUESTIONS REGARDING YOUR RIGHTS AS A RESEARCH
SUBJECT MAY BE ADDRESSED TO THE UHCL COMMITTEE FOR THE PROTECTION OF HUMAN SUBJECTS (281-
283-3015). ALL RESEARCH PROJECTS THAT ARE CARRIED OUT BY INVESTIGATORS AT UHCL ARE GOVERNED BY
REQUIREMENTS OF THE UNIVERSITY AND THE FEDERAL GOVERNMENT. (FEDERALWIDE ASSURANCE #
FWA00004068)

APPENDIX B:
INTERVIEW PROTOCOL

1. How long have you been a teacher?
2. Why did you decide to go into teaching?
3. How did you begin teaching an AP course?
4. What do you like about teaching an AP course?
5. What do you dislike about teaching an AP course?
6. How does your school or department decide to offer an AP course?
7. Does your department, school, or district have any policies regarding student enrollment into an AP course?
8. What led you to currently screen or not screen students before they can take your AP course?
9. Would you feel different about screening prospective AP students if you taught at a different school site or taught in a different community?
10. How do you feel about student achievement factors, such as GPA, PSAT scores and STAAR EOC scores as an indicator for success in an AP course?
11. How do you feel about a student's GT status as an indicator for success in an AP course?
12. Do you promote AP participation to students?
 - a. Do you promote AP participation to historically underrepresented students such as African American or Latino students?
13. Do you have any questions for me?