DIFFERENCES IN COMPLETION RATES FOR DUAL CREDIT, ADVANCED PLACEMENT/INTERNATIONAL BACCALAUREATE, AND ASSOCIATE DEGREE AS A FUNCTION OF ETHNICITY/RACE AND ECONOMIC STATUS

A Dissertation
Presented to
The Faculty of the Department of Educational Leadership
Sam Houston State University

In Partial Fulfillment
of the Requirements for the Degree of
Doctor of Education

by
Stacey M. Moseley
August, 2022
DIFFERENCES IN COMPLETION RATES FOR DUAL CREDIT, ADVANCED PLACEMENT/INTERNATIONAL BACCALAUREATE, AND ASSOCIATE DEGREE AS A FUNCTION OF ETHNICITY/RACE AND ECONOMIC STATUS

By

Stacey M. Moseley

APPROVED:

Dr. John R. Slate
Dissertation Chair

Dr. Frederick C. Lunenburg
Committee Member

Dr. Cynthia Martinez-Garcia
Committee Member

Dr. Janene W. Hemmen
Committee Member

Dr. Stacey L. Edmonson
Dean, College of Education
DEDICATION

I dedicate my dissertation to my mother, Marion Louise Gunnari Nordstrom, and to my father, Roy George Nordstrom, who left this world too early over 20 years ago. They were raised in small villages in the Upper Peninsula of Michigan near Houghton and were high school sweethearts. My dad joined the military right out of high school and rose to the rank of Chief Master Sergeant during his 22 year career. Then, he worked for the Federal Aviation Administration until he passed at the age of 56. My mom graduated high school and was able to stay at home with my sibling and me. While growing up, they told us that we would be going to college and education was important. For us, college was never not an option!

When I got my first teaching degree, I knew that I wanted to go back to school for my Master’s degree in School Counseling in 1994. My mom and dad were so supportive, and they were so proud when I got my first counseling job in 1999. In 2016, I wanted to start working on my Administration certification. While thinking about this career change, I knew what my parents would have told me. They would have said, “Go for it! We know you can do it!” The next year, I decided to start the doctoral program at Sam Houston University. Again, I know they would have said the same thing, “Go for it!” It breaks my heart that my parents cannot share this time with me. However, their love and their support has motivated and has sustained me throughout my lifetime, and I would not be where I am today without them. I miss you so much and I will always love you!
ABSTRACT

Moseley, Stacey M., *Differences in completion rates for dual credit, Advanced Placement/International Baccalaureate, and Associate degree as a function of ethnicity/race and economic status*. Doctor of Education (Educational Leadership), August 2022, Sam Houston State University, Huntsville, Texas.

**Purpose**

The purpose of this journal-ready dissertation was to determine the degree to which ethnicity/race and economic status were related to the completion rates for dual-credit courses, the met criterion rates for Advanced Placement/International Baccalaureate, and the completion rates for Associate degrees for the 2016-2017, 2017-2018, 2018-2019, and 2019-2020 school years. In the first study, the purpose was to determine the completion rates for students who completed at least three hours of a dual-credit in English Language Arts or mathematics, or completed at least nine or more hours of dual-credit course work as a function of their ethnicity/race and economic status. In the second study, the purpose was to determine the met criterion rates for students who took Advanced Placement/International Baccalaureate examinations as a function of their ethnicity/race and economic status. In the third study, the purpose was to determine the completion rates for students who completed an Associate degree as a function of their ethnicity/race and economic status. The final purpose of this journal-ready dissertation was to determine the extent to which trends were present in each of the three articles.

**Method**

For this study, a non-experimental causal-comparative design was used. Archival data were acquired from the Texas Education Agency for the 2016-2017, 2017-2018, 2018-2019, and 2019-2020 school years.
Findings

Black students had the lowest percentages of students who had completed dual-credit courses and met criterion on Advanced Placement/International Baccalaureate examinations for the 2016-2017 through the 2019-2020 school years. Asian students had the highest percentages of students who met criterion on Advanced Placement/International Baccalaureate examinations across all four years. The order of highest percentages to lowest percentages of students who completed an Associate degree were Hispanic, Asian, Black, and White students for all four years. Further, the number of students earning an Associate degree were very low when compared to overall high school student enrollment in the State of Texas. All students had higher percentages of students who had completed dual-credit courses, met criterion on Advanced Placement/International Baccalaureate examinations, and completed an Associate degree than their peers who were economically disadvantaged across all four years.

KEYWORDS: Advanced Placement; Asian; Associate degree; Black; College readiness; Dual-credit; Economically disadvantaged; Ethnicity/race; Hispanic; High schools; International Baccalaureate; Texas Assessment Performance Report; Texas Education Agency; White
ACKNOWLEDGEMENTS

To my husband, Dale, and my daughter, Taylor, I want to say thank you so much for being so supportive throughout this process. If things got difficult, you were there to push me to succeed. The extra help around the house and your endless support were integral in getting me to the finish line. I could not have survived these past few years, along with the COVID pandemic, without both of you. I love you so much!

To my sibling, Jessica Nordstrom, I want you to know that your endless support and love are so appreciated! If I ever needed someone to listen to me, you always picked up the phone and allowed me to vent. To Leigh, my sister-in-law, I also want to thank you for your support and understanding. Through the ups and downs of the past few years, you have been a rock, and I am so grateful to have you in my life.

To Debra Creel, I could not have made it through the process without you. Your phone calls, snacks, happy hours, and support have made all the difference in these last few years. Your quick wit and humor were often the balm that I needed to get me through the tough times.

To Dr. John R. Slate, I am so grateful for you and for your expertise. During the COVID pandemic, I struggled to finish my dissertation. Your ability to give me short deadlines along with your amazingly fast editing skills made all the difference in my ability to finish. I would not have been able to make it without you! To my Dissertation Committee Members, Dr. Hemmen, Dr. Lunenburg, and Dr. Martinez-Garcia, I want to thank you for being a part of my committee. I value your input, your time, your guidance, and your attention to detail! To Dr. Julie Combs, I was very intimidated when I started the doctoral program in your Academic Writing and Research class. However,
by the end of the class, my ability to write in an academic setting vastly improved, and the thought of writing a dissertation seemed completely doable. As a former math teacher, I am very proud of my writing ability, which is a testament to your extraordinary ability as a teacher. To my professors at Sam Houston State University, Dr. Borg and Dr. Moore, I could not have accomplished my doctoral degree without your ability to challenge me on a daily basis. You pushed me to be the best educator that I can be.

To Cohort 38 members, you are forever a part of my family. You helped me stay focused when it was difficult to see a light at the end of the tunnel. Every time I struggled, I would think about our group’s motto, “Tequila and cheese”, to get me through the rough times. To Chris and Rhonda, my amazing accountability partners, I could not have made it without you! I am so grateful to you for reaching out last semester. You motivated me to get it done, and your encouragement and our Wednesday night meetings in the computer library made such a difference. Now, it is your turn!

To the members of my Book club, we have been meeting for five years. Throughout that time, your unwavering support and encouragement have been a blessing. Thank you so much for being a part of my life. You are appreciated.

To my Conroe ISD and The Woodlands High School family, your support has been immeasurable. I am so proud of how hard all the faculty and staff work every day to make a difference. I am humbled to be a part of this amazing team!

I am so blessed to have so many friends and family who have given me their time and their love. I could not have made it without all of you. With all of my heart, I thank each of you.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEDICATION</td>
<td>ii</td>
</tr>
<tr>
<td>ABSTRACT</td>
<td>iii</td>
</tr>
<tr>
<td>ACKNOWLEGEMENTS</td>
<td>v</td>
</tr>
<tr>
<td>TABLE OF CONTENTS</td>
<td>vii</td>
</tr>
<tr>
<td>LIST OF TABLES</td>
<td>x</td>
</tr>
<tr>
<td>LIST OF FIGURES</td>
<td>xiv</td>
</tr>
<tr>
<td>CHAPTER I: INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>Statement of the Problem</td>
<td>21</td>
</tr>
<tr>
<td>Purpose of the Study</td>
<td>22</td>
</tr>
<tr>
<td>Significance of the Study</td>
<td>22</td>
</tr>
<tr>
<td>Definition of Terms</td>
<td>24</td>
</tr>
<tr>
<td>Literature Review Search Procedures</td>
<td>26</td>
</tr>
<tr>
<td>Delimitations</td>
<td>27</td>
</tr>
<tr>
<td>Limitations</td>
<td>28</td>
</tr>
<tr>
<td>Assumptions</td>
<td>28</td>
</tr>
<tr>
<td>Procedures</td>
<td>29</td>
</tr>
<tr>
<td>Organization of the Study</td>
<td>29</td>
</tr>
<tr>
<td>CHAPTER II: DIFFERENCES IN TEXAS STUDENTS’</td>
<td>31</td>
</tr>
<tr>
<td>COMPLETION RATES</td>
<td></td>
</tr>
<tr>
<td>FOR DUAL CREDIT AS A FUNCTION OF ETHNICITY/RACE AND ECONOMIC STATUS</td>
<td>32</td>
</tr>
</tbody>
</table>
References .................................................................................................................. 141

CHAPTER V: DISCUSSION ........................................................................................... 154

Conclusion ..................................................................................................................... 166

REFERENCES .............................................................................................................. 168

APPENDIX ................................................................................................................... 178

VITA .............................................................................................................................. 180
LIST OF TABLES

Table | Page
--- | ---
2.1. Descriptive Statistics for the Percentages of Asian and Black Students who Had Completed Dual-credit Courses in the 2016-2017 Through the 2019-2020 School Years | 63
2.2. Descriptive Statistics for the Percentages of Asian and Hispanic Students who Had Completed Dual-credit Courses in the 2016-2017 Through the 2019-2020 School Years | 64
2.3. Descriptive Statistics for the Percentages of Asian and White Students who Had Completed Dual-credit Courses in the 2016-2017 Through the 2019-2020 School Years | 65
2.4. Descriptive Statistics for the Percentages of Black and Hispanic Students who Had Completed Dual-credit Courses in the 2016-2017 Through the 2019-2020 School Years | 66
2.5. Descriptive Statistics for the Percentages of Black and White Students who Had Completed Dual-credit Courses in the 2016-2017 Through the 2019-2020 School Years | 67
2.6. Descriptive Statistics for the Percentages of Hispanic and White Students who Had Completed Dual-credit Courses in the 2016-2017 Through the 2019-2020 School Years | 68
2.7. Descriptive Statistics for the Percentages of Students Who Were Economically Disadvantaged and All Students who Had Completed Dual-credit Courses for the 2016-2017 Through the 2019-2020 School Years .................................................. 69


3.2. Descriptive Statistics for the Percentages of Asian and Hispanic Students who Met Criterion on Advanced Placement/International Baccalaureate Examinations for the 2016-2017 Through the 2019-2020 School Years ................................................................. 106


3.7. Descriptive Statistics for the Percentages of Students who Were Economically Disadvantaged and All Students who Met Criterion on Advanced Placement/International Baccalaureate Examinations for the 2016-2017 Through the 2019-2020 School Years ............................................. 111

4.1. Descriptive Statistics for the Percentages of Asian and Black Students who Completed an Associate Degree for the 2016-2017 Through the 2019-2020 School Years ................................................................. 145

4.2. Descriptive Statistics for the Percentages of Asian and Hispanic Students who Completed an Associate Degree for the 2016-2017 Through the 2019-2020 School Years ................................................................. 146

4.3. Descriptive Statistics for the Percentages of Asian and White Students who Completed an Associate Degree for the 2016-2017 Through the 2019-2020 School Years ................................................................. 147
4.4. Descriptive Statistics for the Percentages of Black and Hispanic Students who Completed an Associate Degree for the 2016-2017 Through the 2019-2020 School Years .................................................................148

4.5. Descriptive Statistics for the Percentages of Black and White Students who Completed an Associate Degree for the 2016-2017 Through the 2019-2020 School Years .................................................................149

4.6. Descriptive Statistics for the Percentages of Hispanic and White Students who Completed an Associate Degree for the 2016-2017 Through the 2019-2020 School Years .................................................................150

4.7. Descriptive Statistics for the Percentages of Students who Were Economically Disadvantaged and All Students who Completed an Associate Degree for the 2016-2017 Through the 2019-2020 School Years .................................................................151
## LIST OF FIGURES

<table>
<thead>
<tr>
<th>Figure</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1 Mean percentages of students who completed dual-credit courses by ethnicity/race for the 2016-2017 through the 2019-2020 school years</td>
<td>70</td>
</tr>
<tr>
<td>2.2 Mean percentages of students who completed dual-credit courses by economic status for the 2016-2017 through the 2019-2020 school years</td>
<td>71</td>
</tr>
<tr>
<td>3.1 Mean percentages of students who met criterion on Advanced Placement/International Baccalaureate examinations by ethnicity/race for the 2016-2017 through the 2019-2020 school years</td>
<td>112</td>
</tr>
<tr>
<td>3.2 Mean percentages of students who met criterion on Advanced Placement/International Baccalaureate examinations by economic status for the 2016-2017 through the 2019-2020 school years</td>
<td>113</td>
</tr>
<tr>
<td>4.1 Mean percentages of students who completed an Associate degree by ethnicity/race for the 2016-2017 through the 2019-2020 school years</td>
<td>152</td>
</tr>
<tr>
<td>4.2 Mean percentages of students who completed an Associate degree by economic status for the 2016-2017 through the 2019-2020 school years</td>
<td>153</td>
</tr>
</tbody>
</table>
CHAPTER I
INTRODUCTION

College and career readiness is the level of preparation that a student, without remediation, needs to be successful in a postsecondary institution, which offers credits toward a certification program or a degree-based program (Conley, 2010). The need for college and career readiness has never been greater than in today’s labor market. In 2019, United States workers who are 25 and over without at least a high school diploma had the highest unemployment rate of 5.4% and the lowest median weekly wage of $592 whereas workers with graduate degrees had the lowest unemployment rates and the highest median weekly wages of $1,248 for Bachelor’s degrees, $1,497 for Master’s degrees, $1,861 for Professional degrees, and $1,883 for Doctoral degrees (U.S. Bureau of Labor Statistics, 2020).

In the recession of 2008, the United States job market changed substantially with an increased need for workers with higher skill sets, which required some form of postsecondary education. With the growth of over 11.6 million new jobs over the last several years, which included 99% of these new jobs going to employees with some form of postsecondary education, employers need highly trained workers to fill current job openings across the country (Texas Higher Education Coordinating Board, 2020b). Currently, in the State of Texas, only 42% of Texans between the ages of 25 and 34 hold an Associate degree or higher degree. Over the next decade, with at least 60% of all new jobs requiring some form of postsecondary education, the State of Texas must prepare its citizens for these changes in the job market (Texas Higher Education Coordinating Board, 2020b).
In preparation of this shift toward new jobs requiring some postsecondary education, high school students must be ready academically and financially to enroll in college upon high school graduation. By demonstrating college readiness, high school students will have the opportunity to earn a certificate or degree, which increases their level of knowledge and the likelihood of higher paying jobs in the future (Texas Higher Education Coordinating Board, 2018a). While still in high school, students who have demonstrated that they are ready for college prior to graduation are able to participate in college-level courses (i.e., dual-credit, Advanced Placement, and International Baccalaureate). Such enrollment can lower the overall costs of a college education (Texas Education Agency, 2020c). Additionally, in the State of Texas, students of color and students who are economically disadvantaged are not completing college degrees at the same rate as White students (Texas Higher Education Coordinating Board, 2019).

**Review of the Literature for Dual-credit**

High school completion rates have risen approximately four percentage points between 2007 and 2017 in the United States. As such, the high school completion rate in 2017 was 90% (Snyder et al., 2019). Young adults within the United States pursue a postsecondary education at higher rates every year to gain higher paying jobs. In 2007, approximately 30% of young adults who were 25 years and older achieved a bachelor’s degree or higher and in 2017, approximately 36% of young adults who were 25 years and older achieved a bachelor’s degree or higher. In regard to the attainment of a post-bachelor’s degree, about 7% of young adults completed a master’s degree and about 2% held a doctor’s degree (Snyder et al., 2019). Based on these statistics, adults are enrolling in postsecondary settings after graduating from high school. One reason for this shift
toward higher education is the current trend in labor statistics. From May of 2007 through May 2010, occupations in the United States that required a high school diploma or no formal educational training decreased by nearly 7.4 million jobs (Watson, 2017). Further, from 2014 to 2024, the rate of growth of occupations that require a high school diploma are projected to grow more slowly than the overall average, which will cause a greater shift to occupations requiring some form of higher education (Watson, 2017).

In previous studies, researchers who analyzed data on dual credit course offerings have documented the presence of benefits for young adults. In one such investigation, An (2015) used data from the Wabash National Study of Liberal Arts Education and determined that dual-credit enrollment was positively related to first-year GPA in college, even after controlling for ethnicity/race, gender, family background, ACT scores, and precollege academic motivation. An (2015) further investigated whether dual-credit enrollment increased student academic motivation and engagement. Results were that students who participated in dual credit were more highly motivated and engaged in their college course work (An, 2015).

In another study, An (2013b) analyzed data from the Beginning Postsecondary Students Longitudinal Study and determined that first-year GPAs in college were higher for students who had taken a dual-credit course than students who had not taken a dual-credit course. Additionally, students who had taken a dual-credit course were less likely to take a remedial course during their first year of college. Another group of researchers (Wang et al. 2015) examined the effect of taking a dual-credit course on first semester GPAs with students from a 2-year technical school in Wisconsin. They documented that
students who were enrolled in a dual-credit course had higher first-semester GPAs than students who were not enrolled in a dual-credit course.

Blankenberger et al. (2017) conducted an analysis of the effect of dual-credit enrollment on postsecondary degree attainment with the large database of the 2003 Illinois graduating class. Students who were enrolled in dual-credit had higher levels of degree attainment for any type of postsecondary degree and for a bachelor’s degree than students who were not enrolled in dual-credit. Further, a greater result occurred for students starting at a 2-year college or a lesser competitive 4-year college (Blankenberger et al., 2017). Two other researchers, Phelps and Chan (2016) analyzed longitudinal student data from college and K-12 systems along with Unemployment Insurance wage records. Findings were that almost 30% of high school graduates from 20 different high schools transferred at least two dual-credit courses to a public technical college. Based on their analysis, dual-credit students had higher degree completion rates and a higher second year retention rate than their nondual-credit peers (Phelps & Chan, 2016).

Another researcher, Swanson (2010) determined that adults who had taken a dual-credit course while in high school were more likely to enroll in college within seven months of high school graduation and to persist through their second year of college. Further, students who had taken a dual-credit course who enrolled in college within seven months of graduation were 16% to 20% more likely than their peers who had not taken a dual-credit course to receive a bachelor’s degree (Swanson, 2010).

Dual-credit enrollment at 2-year or 4-year universities can be course work in a variety of academic disciplines such as English, mathematics, science, and social studies. However, some researchers chose to concentrate on specific types of dual-credit courses
or a specific type of dual-credit program. One example of a study about a specific type of dual-credit course was Karp and Hughes (2008) who focused on students who had taken career and technical education dual-credit courses in New York City and Florida and their subsequent progression to college. In Florida, students who participated in career and technical dual-credit courses were more likely to receive their high school diploma and enroll in a 4-year college than students who had not participated in a career and technical education dual-credit program. After students were enrolled in college, students who had taken dual-credit courses had higher persistence rates in degree completion as well as higher GPAs (Karp & Hughes, 2008). In another investigation in New York City, Allen and Dadgar (2012) examined data regarding students who had participated in the CUNY College Now dual-credit program to determine the effect of dual enrollment on student college credit acquisition, GPA, and persistence toward their second year in college. Students who had been enrolled in a dual-credit course were more likely to attain more credits during their first semester of college, to have a higher first year GPA, and to enroll in a third semester of college (Allen & Dadgar, 2012) than students who had not been enrolled in such a course.

In another investigation where students resided in a specific geographic area, Cowan and Goldhaber (2015) analyzed data from high school and college students from the Education and Data Center warehouse in Washington State, which included a sample cohort of 55,342 students who first enrolled in Grade 9 in the 2006-6007 school year. Some of the students within this sample participated in the dual-credit program in Washington State, which is called Running Start and was formed in 1992. Within this program, juniors and seniors can take courses at any of the state’s 2-year colleges without
paying college fees. In this study, 73% of students who participated in the Running Start program attended a college within the calendar year after they graduated from high school, and 59% of them attended a college full-time while 59% of students not enrolled in dual-credit attended a college within the calendar year after they graduated from high school and 50% of them attended a college full-time. Regarding lower-performing students within the Running Start program, they gained the most through their participation in dual-credit courses (Cowan & Goldhaber, 2015).

Continuing the trend of researchers focused on certain areas, Ganzert (2014) investigated traditional dual-credit courses and Huskins Bill courses, which focused on vocational education and transferability to other colleges in the State of North Carolina. The data for the study included 15,527 students who were spring or summer graduates of high school in 2003 and who enrolled at a North Carolina community college in the fall of 2003. These students were followed through 2008 to determine their college graduation rates (Ganzert, 2014). Students who had been enrolled in dual-credit or in Huskins Bill courses had higher first-year average GPAs than students who had not participated in either program. Graduation rates from college were 33.7% for students who had been enrolled in a dual-credit course, 28.3% for Huskins Bill students, and 22.5% for students who had not been enrolled in a dual-credit course (Ganzert, 2014).

With the trend in the labor force to include a higher number of jobs that need higher education after high school, dual-credit enrollment in high schools could be a way for students who are economically disadvantaged to start their postsecondary education. Unfortunately, very few researchers have focused specifically on dual credit enrollment of students who were economically disadvantaged. In one such investigation, using the
National Institute Longitudinal Study, An (2013a) examined the relationship between college degree attainment and dual-credit course enrollment for students who were economically disadvantaged along with students from wealthier backgrounds. Dual-credit enrollment increased the likelihood of degree attainment for students who were economically disadvantaged along with smaller effects of degree attainment for students from more affluent families. Further, dual-credit coursework increased the probability of any type of postsecondary degree or bachelor’s degree (An, 2013a).

While the previous researcher used a national sample of students, Moreno et al. (2021) examined students who completed dual-credit courses at a local community college in Texas while attending nearby high schools. Within the full sample of high school students, which included traditional high schools and Early College High Schools, the percentages by ethnicity/race were 1.8% Asian, 17.7% Black, 55% Hispanic, and 23.4% White while the percentage of students who were economically disadvantaged was 52.7%. Regardless of their participation in dual-credit courses, students who were not economically disadvantaged were 2.46 times more likely to enroll in a 2-year or 4-year college than their peers who were economically disadvantaged. Another group of researchers (Pierson et al., 2017) investigated dual credit course offerings between the 2005-2006 and 2013-2014 calendar years in which high school students took college level courses both at the high school and at local community colleges in Oregon. During these years, 98% of their sample attended a high school that offered dual credit courses through a local community college. Within all ethnic/racial groups, students who were economically disadvantaged participated in dual credit course options at lower rates than students who were not economically disadvantaged (Pierson et al., 2017).
Educators would like to see student diversity in dual-credit enrollment. From 2007-2017, the State of Texas had a 57% increase in total dual-credit enrollment across all ethnic/racial groups of students. During this time span, dual-credit enrollment percentages for White students decreased from 50% to 37% whereas dual-credit enrollment percentages increased for Asian/Pacific Islander students from 3% to 4%, for Black students from 5% to 7%, and for Hispanic students from 38% to 46% (Texas Higher Education Coordinating Board, 2018b). In a Texas-based investigation, the change in percentages among the various ethnic/racial groups can be explained in part by the changing demographics of student enrollment in the State of Texas (Texas Higher Education Coordinating Board, 2018b).

A group of researchers, Young et al. (2013), analyzed data from a Southwest Texas Community College for the 2005-2006 through the 2011-2012 academic years to determine the extent to which dual-credit enrollment differed by student ethnicity/race. In the first year, the order of highest to lowest percentages was White, Hispanic, Black, and Asian. In the most recent six academic years, the order changed to reflect Asians with the highest percentage of participation in dual credit, followed by White, Hispanic, and Black (Young et al., 2013). Lastly, in this same study, the only two groups of students to have statistically significant differences, when analyzing ethnicity/race and gender, were Hispanic and White students. Hispanic girls and White girls had higher rates of dual-credit participation than Hispanic boys and White boys (Young et al., 2013). In another study, Pierson et al. (2017) discovered similar differences in dual credit participation based on ethnicity/race over an 8-year time span in Oregon. The highest level of participation was Asian/Pacific Islander followed by White, Multiracial, American
Indian/Alaska Native, Hispanic, and Black (Pierson et al., 2017). Based on the recent research investigations into dual-credit coursework, the equity gaps in dual credit participation among high school students of various ethnic/racial groups continue to exist.

**Review of the Literature for Advanced Placement**

High school students across the United States have participated and continue to participate in Advanced Placement courses and examinations. Such participation has allowed and continues to allow high school students to experience college-level coursework prior to high school graduation. Students who have Advanced Placement exam scores of 3 or higher have been eligible to receive college credit upon admission into college (College Board, 2014). Of note is that students who took Advanced Placement courses and scored a 3 or higher on an Advanced Placement exam were more likely to earn higher GPAs while in college, to graduate college in 5 years or less, and to have higher degree attainment than students who did not take Advanced placement courses and have a 3 or higher score on the Advanced Placement examinations (Morgan et al., 2007). With positive benefits related to Advanced Placement coursework, the number of high school students who have participated in the program has continued to increase over the years. For example, in the class of 2013, College Board had 1,003,430 students who took at least one of the 3,153,014 Advanced Placement examinations (College Board, 2014) while in the class of 2020, College Board had 2,642,530 students who took at least one of the 4,751,957 Advanced Placement examinations (College Board, 2020).

With many students choosing to take Advanced Placement courses as a way to earn college credit, Shaw et al. (2013) investigated how college admission officers might
use Advanced Placement variables as a predictor of students’ first-year college GPA. The sample size for the study was 74,501 students from over 125 colleges across the United States. Regarding race/ethnicity, Asian students were more likely to have the highest performance on Advanced Placement exam scores whereas Black students were more likely to have the lowest Advanced Placement exam scores (Shaw et al., 2013). The strongest Advanced Placement predictor that was related to first-year college GPA was the average Advanced Placement exam score. When the average Advanced Placement exam score increased, the first-year college GPA also increased (Shaw et al., 2013).

With increased participation in Advanced Placement coursework and examinations over the years along with added benefits of college-level rigor, researchers have focused on demographic characteristics of students who have taken Advanced Placement courses and examinations. In one such investigation, Moore and Slate (2008) analyzed data from the State of Texas for the 2004-2005 and 2005-2006 school years to investigate student participation and student performance in Advanced Placement courses by ethnicity/race and gender. In both years, student participation for Advanced Placement courses was almost 19% for White students, a little more than 10% for Black students, and a little less than 12% for Hispanic students while approximately 17% of girls participated in an Advanced Placement course compared to about 13% of boys. For both years, Hispanic students had the highest percentage of students who scored at or above the criterion on Advanced Placement examinations when compared to White students or Black students. Moreover, boys had a slighter higher percentage who scored
at or above the criterion on Advanced Placement examinations when compared to girls (Moore & Slate, 2008).

With a more narrow focus, Koch et al. (2016) analyzed archival Advanced Placement exam data between 1997 and 2012 from the States of Arizona, California, and Texas for Hispanic students who took two specific examinations: (a) Advanced Placement English Language and Composition and (b) Advanced Placement English Literature and Composition. Throughout the 16 years, the number of Hispanic students who took both examinations increased from 20 to 1,242 students in Arizona, from 832 to 15,581 students in California, and from 1,321 to 11,404 in Texas. Although the numbers of students increased, the overall average performance decreased across all three states (Koch et al., 2016). Regarding the Advanced Placement English Language and Composition exam percentages for students earning an exam score of 3 or higher over the 16-year time span, Arizona had the highest percentage at 34%, California had the next highest at 31%, and Texas had the lowest percentage at 24%. Advanced Placement English Literature and Composition exam scores followed a similar pattern, with Arizona having the highest percentage at 34%, California the next highest at 33%, and Texas with the lowest percentage at 27% (Koch et al., 2016). Overall, many Hispanic students in all three states did not score high enough on either test to earn college credit.

Although data on Hispanic students across three states were present in the previous study, Moore et al. (2010) examined the overall performance of Asian students compared to the overall performance of White students in Advanced Placement examinations across the United States from 1997 through 2008. For all 12 years, the Advanced Placement examination scores by Asian students were statistically
significantly higher than the average exam scores of White students. Differences in the average Advanced Placement examination score increased from the 1997 test administration to the 2008 test administration. In 2008, Asian students had almost 6% more of the highest Advanced Placement score of 5 than did White students (Moore et al., 2010).

Although the prior researchers examined data across three states, Kettler and Hurst (2017) collected data from 117 suburban high schools in the State of Texas from the 2000-2001 and the 2010-2011 school years on student participation in Advanced Placement/International examinations for Grade 11 and Grade 12. Over the 10-year period, the Advanced Placement/International Baccalaureate examination rate increased for all three ethnic/racial groups (i.e., Black, Hispanic, and White). During both years, the Advanced Placement/International Baccalaureate examination rate for White students was higher than Black and Hispanic students (Kettler & Hurst, 2017). Further, the ethnic/racial gap between Black students and White students was larger than the ethnic/racial gap between Hispanic students and White students (Kettler & Hurst, 2017).

The studies discussed above were just a few of the investigations in which researchers analyzed Advanced Placement score performance based on ethnicity/race. With respect to gender, Moore et al. (2012) investigated differences on Advanced Placement examinations between boys and girls for the 2007 and 2011 test administrations. In 2007 and 2011, boys had a higher percentage of overall Advanced Placement examination scores than girls, and the percentages of boys earning a score of 5 or higher on Advanced Placement examinations (i.e., 16.19% and 16.81%) were higher when compared to the percentages of girls (i.e., 11.59% and 12.44%). Further, after
identification of the 12 most popular Advanced Placement examinations for boys and girls for 2007 and 2011, boys scored higher than girls on 10 out of 12 of the Advanced Placement examinations whereas girls scored higher than boys on Advanced Placement Literature & Composition and Spanish Language (Moore et al., 2012).

In another investigation involving gender, Morris and Slate (2012) analyzed College Board data on student performance on Advanced Placement Calculus AB, Calculus BC, and Statistics examinations from across the United States for the 2000, 2005, and 2010 test administrations. From 2000 to 2010, the overall number of students participating in the Advanced Placement mathematics examinations increased each year and the highest number of students took the Advanced Placement Calculus examination. For all three years, the relationships between gender and performance on the Advanced Placement examinations for all three tests were statistically significant. Higher percentages of boys than girls earned a score of 3 or higher on the Advanced Placement mathematics examinations (Morris & Slate, 2012).

In a different study with a smaller sample size, Clark et al. (2012) investigated demographic characteristics of students who were enrolled in Advanced Placement courses within a Texas urban school district for the 2005-2006 and 2006-2007 school years. For both years, girls had a higher percentage of enrollment in Advanced Placement courses than boys and White students had the highest enrollment percentage of Advanced Placement courses compared to other ethnic/racial groups (Clark et al., 2012). White students had the highest percentage of students with an Advanced Placement scores of a 3 or higher whereas Black students had the lowest percentage of Advanced Placement scores of a 3 or higher (Clark et al., 2012).
In a different study in which the combination of ethnicity/race and economic status was addressed, Colgren and Sappington (2015) examined Advanced Placement and ACT data on 145,560 high school students who were eligible to take the ACT during the 2012-2013 school year in the State of Illinois. Black, Hispanic, and White students who participated in Advanced Placement courses had higher average scores on the ACT than Black, Hispanic, and White students who had not participated in Advanced Placement courses. Also, White students who participated in Advanced Placement courses had higher average ACT scores than Black and Hispanic students who participated in Advanced Placement courses, which depicted the continued existence of an equity gap between the three ethnic/racial groups of students (Colgren & Sappington, 2015).

Regarding economic status, students who were economically disadvantaged and participated in Advanced Placement courses had lower average ACT scores than students who were not economically disadvantaged and who had participated in Advanced Placement courses (Colgren & Sappington, 2015).

In another study, Phillips and Lane (2021) investigated college outcomes for 11,190 students who had participated in an Advanced Placement exam and graduated from a high school, between the 2008-2009 and 2012-2013 school years. Asian, White, and students who were not economically disadvantaged had better college matriculation and persistence rates than Black, Hispanic, and students who were economically disadvantaged (Phillips & Lane, 2021). The researchers also compared the results of their initial database, which was described above, to the results for the Massachusetts’s students who graduated in the 2010-2011 school year. College outcomes for students who participated in the Advanced Placement STEM & English program were better than
the college outcomes for all students in the State of Massachusetts (Phillips and Lane, 2021). Regarding Black, Hispanic, and students who were economically disadvantaged, students who had participated in the Advanced Placement STEM & English program were 18.37 to 29.56 percentage points higher in rates of college matriculation, persistence, and graduation than Massachusetts students with similar racial and economic factors (Phillips and Lane, 2021).

Although e several investigations exist regarding Advanced Placement, Perna et al. (2015) examined the availability and the enrollment of students in an International Baccalaureate Diploma Programme by ethnicity/race and economic status from the combination of the Common Core of Data from the National Center for Education Statistics and the International Baccalaureate database between 2006 and 2009. In the study, enrollment in an International Baccalaureate Diploma Programme for Black and Hispanic students increased slightly over the 4-year period. Further, the number of students who were economically disadvantaged and who participated in an International Baccalaureate Diploma Programme increased from 13% in 2006 to 17%, even though the availability of International Baccalaureate Diploma Programme at high schools also increased during that time period for students who were economically disadvantaged (Perna et al., 2015).

**Review of the Literature for Associate Degree Completion**

With the trend in employment for job seekers to need more than a high school diploma, educational leaders need to find ways to assist students in transitioning from high school to postsecondary education (Camara et al., 2015). One way that high schools might stimulate student interest in higher education is course offerings in dual credit,
which are courses that allow students to earn high school credit and college credit simultaneously (Texas Higher Education Coordinating Board, 2018b). High school students can begin their college course work early either by taking a mixture of dual-credit courses or by taking a prescribed list of dual-credit courses to obtain an Associate degree. Wang et al. (2015) examined the effect of dual credit enrollment on high school students entering college without any type of delay between high school and 2-year technical colleges in the State of Wisconsin. Dual-credit enrollment increased the likelihood of students entering a 2-year technical college immediately after graduating from high school (Wang et al., 2015).

Another group of researchers, Grubb et al. (2017), assessed the effects of dual-credit coursework on the likelihood of students needing remediation courses as well as graduation rates at a community college in northeast Tennessee. Students who had enrolled in dual credit courses were 9% less likely to need remediation courses, which minimized their need to take additional coursework. Regarding graduation rates at the 2-year college, students who had been enrolled in dual credit were 26% more likely to complete their degree in two years and 28% more likely to complete their degree in three years than students who had not been enrolled in dual-credit during high school (Grubb et al., 2017).

In other studies, earning college credit while still attending high school had many positive outcomes. In one investigation, students who had been enrolled in dual-credit had higher first-term college GPAs after completing some form of dual-credit coursework while in high school than their nondual-credit peers (Young et al., 2013). An increase in self-confidence was another positive result of taking dual-credit courses in
high school (Speroni, 2011). Students at a 4-year Tennessee university who enrolled in at least one dual-credit course while in high school had higher second year college retention rates than students who had not enrolled in any dual-credit courses while in high school (Bowers & Foley, 2018). After controlling for several educational and socioeconomic factors, enrollment at 2-year and 4-year colleges was higher in the State of Illinois for dual-credit students than for nondual-credit students (Lichtenberger et al., 2014).

In another study, Struhl and Vargas (2012) examined dual-credit enrollment in Texas for a sample of high school seniors in the 2003-2004 school year and followed them for six years past high school graduation. Students who participated in dual-credit coursework were 2.2 times more likely to enroll in a 2-yr or 4-yr college, 2 times more likely to persist into the second year of college, and 1.7 times more likely to obtain a college degree. Regarding students who were economically disadvantaged, dual-credit enrollment increased their rate of enrollment in college upon high school graduation (Struhl & Vargas, 2012).

Within the State of Illinois, Taylor (2015) analyzed dual-credit enrollment during the 2002-2003 school year. For dual-credit students, 91% enrolled in a college and 52% earned a college degree whereas for nondual-credit students, only 63% enrolled in a college and only 29% earned a college degree. For students of color who were in dual-credit, 91% enrolled in a college and 43% obtained a college degree. In contrast, 62% of nondual-credit students of color enrolled in college and 23% obtained a college degree (Taylor, 2015). Concerning students who were economically disadvantaged, differences were even greater between dual-credit and nondual-credit students. For college enrollment of these students, 85% of the dual-credit students enrolled in a college
whereas only 58% of the nondual-credit enrolled in a college. With respect to earning a college degree, 34% of the dual-credit students were successful and 18% of the nondual-credit students were successful (Taylor, 2015).

Although some high schools across the country participate in dual-credit courses through a partnership with a 2-year or 4-year college, the Early College High Schools followed a different path by having every student focused on college readiness (Edmonds, 2012). In 2002, The Early College High School Initiative originated through the Bill and Melinda Gates Foundation to assist students who were economically disadvantaged by giving them an opportunity to earn an Associate degree while attending high school (Hoffman et al., 2009). The Early College High School campuses often were located on 2-year or 4-year colleges in an attempt to minimize the transition between high school and college (Edmonds, 2012). Another tenet of Early College High Schools was to recruit first-generation college students along with other underrepresented populations such as English Learners, students who were economically disadvantaged, or students of color (Hoffman, 2005). These types of high schools often serve students who were economically disadvantaged, students of color, and students who were first-generation college students with the opportunity to earn college credit (Seltzer, 2010).

In a qualitative investigation, Saenz and Combs (2015) interviewed 17 Hispanic students in Grade 12 who were enrolled in an Early College High School. The theme of earning an Associate degree was important in the study, and the ability to obtain 60 hours of college course credit was considered a gift to these students and their families along with other benefits such as scholarship opportunities to 4-year universities. These students developed adult skills such as decision-making, commitment, goal-setting, and
responsibility. Another positive outcome in regard to Early College High School was increased social and emotional learning such as self-awareness and self-esteem (Saenz & Combs, 2015).

In another qualitative investigation, Woodcock and Olson Beal (2013) interviewed three Early College High School students to uncover common themes related to their experiences. The students discussed how their attendance in an Early College High School helped them to be successful academically in college. In addition, they reported that having to leave their long-term friendships behind was difficult. However, they were able to develop new friendships through their participation in the Early College High School program. The ability to take college courses prior to entering a 4-year university prepared the students well for the rigor of college-level coursework in the future (Woodcock & Olson Beal, 2013). One student discussed the amount of time needed for studying and for preparing for classes left little time for any other type of extracurricular activities, which were often a part of a traditional high schools within the United States. In regard to social relationships, all three students described having positive experiences, including building new friendships (Woodcock & Olson Beal, 2013).

Another set of researchers, Edmonds et al. (2020), explored the effects of Early College High Schools on student attainment of postsecondary degrees and their GPAs in 4-year universities. The sample included 4,054 students who participated in Early College High Schools from the 2005-2006 school year through the 2010-2011 school year in rural and urban locations in North Carolina. At the end of four years after high school, 37.8% of students who had attended an Early College High School had obtained a
postsecondary degree compared to 22% of students who had not attended an Early College High School (Edmonds et al., 2020). Early College High Schools had a statistically significant effect on 4-year degree attainment for students who were economically disadvantaged, which was consistent with the purpose of an Early College High School’s goal to remove barriers from students who were economically disadvantaged and first-generation college students (Edmonds et al., 2020). In another investigation, Burns et al. (2019) examined different Early College High School programs and the time to bachelor’s degree attainment at a metropolitan Midwestern land grant university. With student participation in an Early College High School program, time to graduation with a bachelor’s degree was reduced and probability of attaining a bachelor’s degree was increased (Burns et al., 2019).

In a national longitudinal study, Haxton et al. (2016) focused on a sample of 10 Early College High Schools out of 154 Early College High Schools that enrolled Grades 9 through Grade 12 students between the 2005-2006 school year and the 2007-2008 school year. The Early College High Schools had to use lotteries for admission processes for incoming Grade 9 students, had at least one year of high school graduates, and retained their lottery records (Haxton et al., 2016). Upon graduation from high school, 80.9% of students who had attended an Early College High School enrolled in a postsecondary setting whereas 72.2% of students who did not attend an Early College High School enrolled in a postsecondary setting. Regarding postsecondary degree attainment, 24.9% of students who had attended an Early College High School earned some form of postsecondary degree compared to only 4.7% of students who had not attended an Early College High School (Haxton et al., 2016). Concerning ethnicity/race,
students of color who had attended an Early College High School were almost 10 times more likely to have earned a college degree than students of color who had not attended an Early College High School. White students who had attended an Early College High School were about four times more likely to earn a college degree compared to students who had not attended an Early College High School. Lastly, students who attended an Early College High School and who were economically disadvantaged were 8.5 times more likely to obtain a college degree than their non-Early College High School counterparts (Haxton et al., 2016).

Statement of the Problem

College, career, and military readiness is a renewed focus for the State of Texas as evidenced by House Bill 3 (HB 3), recently passed by the 86th Texas Legislature and signed by Governor Greg Abbott (Texas Education Agency, 2019). Along with financial incentives for school districts, students and families also received funding for at least one form of college entrance assessment exam, which included the ACT, SAT, and the Texas Success Initiative Assessment, and for one industry certification exam prior to high school graduation (Texas Education Agency, 2019). These initiatives were established to expand opportunities for high school students to achieve a higher rate of college and career readiness prior to graduation due to the increased need for some type of postsecondary education following completion of high school.

Under the Texas public school accountability system, school districts are affected by the college readiness of their high school students in multiple reporting categories as well as distinction designations for outstanding achievement in specific areas (Texas Education Agency, 2020a). With the importance placed on college, career, and military
readiness on school district funding and state accountability ratings, Texas school board members, school educators, and community stakeholders continue to seek a higher number of students who meet these types of college readiness standards.

**Purpose of the Study**

The purpose of this journal-ready dissertation was to determine college preparedness in the State of Texas through analysis of data regarding students who completed dual-credit coursework; scored at or above the criterion on Advanced Placement/International Baccalaureate examinations; and who earned an Associate degree as a function of ethnicity/race and economic status. In the first article, the focus was placed on dual-credit courses in English Language Arts or mathematics as a function of student ethnicity/race and economic status. In the second article, the emphasis was on Advanced Placement/International Baccalaureate examinations as a function of student ethnicity/race and economic status. In the third article, the focus was placed on Associate degree as a function of student ethnicity/race and economic status. Lastly, the final purpose of this journal-ready dissertation was to determine the extent to which trends were present in each of the three articles.

**Significance of the Study**

With the growing changes into today’s marketplace requiring a higher skill set, future high school graduates are going to need the benefits of postsecondary education to increase their income potential after graduation. During high school, they could benefit from college credit opportunities such as dual-credit, Advanced Placement, and International Baccalaureate courses. Some positive outcomes from research on dual-credit enrollment were higher first-year GPAs (Allen & Dadgar, 2012; An, 2013b, 2015;
Ganzert, 2014; Wang et al., 2015) and a higher percentage of college degree attainment (An, 2013a; Blankenberger et al., 2017; Ganzert, 2014; Karp & Hughes, 2008; Phelps & Chan, 2016). In other studies, researchers examined the equitable participation in Advanced Placement courses across student demographic characteristics such as ethnicity/race and economic status (Clark et al., 2012; Koch et al., 2016; Moore & Slate, 2008). With the ability to increase their earnings potential, high school graduates may benefit from opportunities to earn an Associate degree while still in high school. Research investigations about the completion of Associate degrees by ethnicity/race and economic status in high school are limited and more research studies about Associate degree completion would be beneficial to assist in decision-making by educational leaders in high schools, in school districts, and in colleges.

In the State of Texas, college, career, and military readiness data are included in multiple reporting categories, including the distinction designations for outstanding achievement in specific areas (Texas Education Agency, 2020a). Due to the recent changes in Texas’s public school accountability ratings and in public school funding during the 2016-2017 school year, the opportunity for students to show college readiness and to earn college credits prior to graduation constitute important topics for high school students, parents, school board members, community stakeholders, college admission officers, and state legislature representatives. The results from this journal-ready dissertation will add to the existing body of literature on the subject of college readiness through findings on dual-credit enrollment, Advanced Placement and International Baccalaureate exam performance, and Associate degree completions.
Definition of Terms

The following definitions are to assist the reader in understanding the context of the studies in this journal-ready dissertation.

Advanced Placement

The Texas Education Agency (2020b) defined Advanced Placement as a program offered through College Board, which allows “students the opportunity to take one or more advanced level courses and examinations from six academic areas: arts, English, History and social sciences, mathematics and computer science, sciences and world languages” (p. 1).

Associate Degree

According to the Texas Administrative Code, Title 19, Rule §7.3, an Associate degree is defined as “a grouping of courses designed to lead the individual directly to employment in a specific career or to transfer to an upper-level baccalaureate program”. These types of degrees can include these forms: (a) the Associate of Arts, (b) the Associate of Science, (c) the Associate of Applied Arts, (d) the Associate of Applied Science, and (e) the Associate of Occupational Studies (19 Texas Administrative Code §7.3, 2020).

College Readiness

Conley (2007) defined college readiness as “the level of preparation a student needs in order to enroll and succeed—without remediation—in a credit-bearing general education course at a postsecondary institution that offers a baccalaureate degree or transfer to a baccalaureate program” (p. 5).
**Dual-credit**

The Texas Higher Education Coordinating Board (2018b) defined dual-credit as a “system under which an eligible high school student enrolls in college course(s) and receives credit for the course(s) from both the college and the high school” (p. 1). Dual-Credit courses were taught by an approved instructor either on the high school campus or on the college campus and included academic core courses as well as technical courses (Texas Higher Education Coordinating Board, 2018b).

**Economically Disadvantaged**

The Texas Education Agency (2020a) defined economically disadvantaged as a student “who is eligible for free or reduced-price meals under the National School Lunch and Child Nutrition Program” (p. 1).

**Ethnicity/Race**

The Texas Education Agency (2020a) collects data on race and ethnicity based on a two-part question, which was in compliance with a new federal standard. The first question regarding ethnicity had two choices in which only one choice could be selected: (a) Hispanic/Latino and (b) Not Hispanic/Latino. The second question regarding race had five choices in which one or more was selected regardless of ethnicity: (a) American Indian or Alaska Native; (b) Asian; (c) Black or African American; (d) Native Hawaiian/Other Pacific Islander; and (e) White (Texas Education Agency, 2020a).
High Schools

In the State of Texas, high schools will be designated by Grade 9 through Grade 12.

Texas Assessment Performance Report

The Texas Education Agency (2020b) produces an annual statistical report in the fall of each school calendar year that represents information about student performance, student demographics, school staffing, and district staffing for every school district in Texas.

Texas Education Agency

The Texas Education Agency is a state agency that provides oversight for all students in Texas (Texas Education Agency, 2020d). The Commissioner of Education is the leader of the organization that seeks to improve outcomes for over 5 million Texas students. Additionally, this agency provides leadership, guidance, and support to all schools across the state on a variety of topics (Texas Education Agency, 2020d).

Literature Review Search Procedures

For this journal-ready dissertation, the literature regarding college preparedness in dual credit, Advanced Placement, and Associate degree for students and its relationship to ethnicity/race and economic status was examined. The phrases of Advanced Placement, Associate degree, dual credit, dual enrollment, economically disadvantaged, ethnicity, race, and Texas were used during the search for applicable literature on these topics. The EBSCO host database for academic journals, which is an acronym for the Elton B. Scott Company, was used for all online searches for this journal-ready dissertation. The criteria for the searches included only scholarly peer reviewed articles.
with a publication date within the last 10 years. Additional searches were conducted by reviewing the reference sections of several dissertations and articles pertaining to the topics of dual credit, Advanced Placement, and Associate degree that were published within the last 10 years.

**Delimitations**

In this journal-ready dissertation, the three studies were limited to four major ethnic/racial groups of students (i.e., Asian, Black, Hispanic, and White) who had previously participated in dual credit courses, Advanced Placement /International Baccalaureate examinations, and/or Associate degree programs in the State of Texas and to students (i.e., economically disadvantaged and not economically disadvantaged) who had previously participated in dual credit courses, Advanced Placement /International Baccalaureate examinations, and/or Associate degree programs in the State of Texas. The data sets that were analyzed included the percentage of students who met criteria for dual credit course completion, for Advanced Placement/International Baccalaureate examinations, and for Associate degree completion. For all three studies, data were limited to the 2016-2017 school year through the 2019-2020 school year, and trends, if any, were analyzed herein.

For the three studies, the data that were examined will involve four different school years in the State of Texas. Data for other students from other school years were not included nor analyzed. For this journal-ready dissertation, the data for the three studies were downloaded from the Texas Academic Performance Reports (Texas Education Agency, 2021c).
Limitations

One limitation for this journal-ready dissertation was the availability of the data for only four school years (i.e., 2016-2017, 2017-2018, 2018-2019, and 2019-2020). The 2019-2020 and 2020-2021 school year data were not available because of the COVID pandemic that affected the United States in the spring of 2020. As a result of this global event, the Texas Education Agency limited the reporting categories on the Texas Academic Performance Reports for the 2019-2020 school year through the 2020-2021 school year (Texas Education Agency, 2021b). Another limitation was the dependence on empirical archival data from one single source, the Texas Academic Performance Reports. Lastly, this journal-ready dissertation had another limitation because of how the definitions of key terms (i.e., ethnicity/race and economically disadvantaged) were defined by the Texas Education Agency (2020a).

Assumptions

For this journal-ready dissertation, an assumption was made that the data from the Texas Academic Performance Reports were downloaded accurately from their online system and that all variables such as ethnicity/race and economically disadvantaged were recorded accurately. However, if any inaccuracies are present, they were assumed to be trivial in nature and to be consistent across the four years of data. The Texas Education Agency (2021a), which provided the data in the Texas Academic Performance Reports, had several procedures in place to ensure the quality and integrity of the data.
Procedures

The first step in this journal-ready dissertation was to seek initial approval from the researcher’s dissertation committee. Once approval was granted by the dissertation committee to proceed, additional approval was requested from Sam Houston State University’s Institutional Review Board. Then, upon approval from both the dissertation committee and Sam Houston State University’s Institutional Review Board, data for students who were in high school in the State of Texas and who had previously participated in dual credit courses, Advanced Placement/International Baccalaureate examinations, and/or Associate degree programs in the 2016-2017 school year through the 2019-2020 school year from the Texas Academic Performance Reports were downloaded and analyzed.

Organization of the Study

Three research investigations were conducted in this journal-ready dissertation. For the first journal-ready article, the research questions that were addressed involved the effect of ethnicity/race (i.e., Asian, Black, Hispanic, or White) and the effect of economic status (i.e., economically disadvantaged or not economically disadvantaged) on the percentage of students who completed at least three hours of a dual-credit course in English Language Arts or mathematics, or who completed at least nine or more hours of dual-credit course work for the 2016-2017 through the 2019-2020 school year. Further, in the first investigation, trends were analyzed regarding the effect of ethnicity/race and economic status on the completion rates for all four school years.

In the second journal-ready article, the research questions that were included were on the effect of ethnicity/race and the effect of economic status on the percentage of
students who met criteria on Advanced Placement/International Baccalaureate. Also, in this second investigation, trends were analyzed on the percentage of students who met criteria on Advanced Placement/International Baccalaureate examinations as a function of their ethnicity/race and of their economic status for the 2016-2017 through the 2019-2020 school years. In the third study, the research questions involved the effect of ethnicity/race and of economic status on the percentage of students who earned an Associate degree. Lastly, trends were analyzed on the percentage of students who earned an Associate degree as a function of their ethnicity/race and as a function of their economic status.

This journal-ready dissertation consists of five chapters. Chapter I includes the background of the study, state of the problem, purpose of the study, significance of the study, definition of terms, assumptions, delimitations, and limitations of the three research investigations. In Chapter II, the differences in completion rates as a function of ethnicity/race and economic status were analyzed. In Chapter III, the differences in students who met criteria for Advanced Placement/International Baccalaureate examinations as a function of their ethnicity/race and economic status were discussed. In Chapter IV, the completion rates for students who earned an Associate degree as a function of their ethnicity/race and economic status were examined. In Chapter V, the results of all three studies were discussed.
CHAPTER II
DIFFERENCES IN TEXAS DUAL CREDIT COMPLETION RATES AS A FUNCTION OF ETHNICITY/RACE AND ECONOMIC STATUS

This dissertation follows the style and format of Research in the Schools (RITS).
Abstract

In this investigation, the degree to which differences were present in the percentages of students who completed dual-credit courses as a function of their ethnicity/race and economic status was examined for the 2016-2017 through the 2019-2020 school years. Statistically significant differences were revealed in the completion rates for dual-credit courses across all four years. The average percentages for Asian and White students who had completed dual-credit courses were over twice the average percentages of Black students who had completed dual-credit courses. Across all four years, the average percentages for Hispanic students who had completed dual-credit courses were almost eight percentage points higher than the average percentages for Black students. Black students had the lowest percentage of students who had completed dual-credit courses. For all four years, the average percentages for students who completed dual-credit courses were almost seven percentage points higher than their peers who were economically disadvantaged. As such, clear disparities were documented in the completion of dual-credit courses and college-readiness.

Keywords: Asian; Black; Dual-credit; Economically disadvantaged; Ethnicity/race; Hispanic; White
DIFFERENCES IN TEXAS DUAL CREDIT COMPLETION RATES AS A FUNCTION OF ETHNICITY/RACE AND ECONOMIC STATUS

High school completion rates have risen approximately four percentage points between 2007 and 2017 in the United States. As such, the high school completion rate in 2017 was 90% (Snyder et al., 2019). Young adults within the United States pursue a postsecondary education at higher rates every year to gain higher paying jobs. In 2007, approximately 30% of young adults who were 25 years and older achieved a bachelor’s degree or higher and in 2017, approximately 36% of young adults who were 25 years and older achieved a bachelor’s degree or higher. In regard to the attainment of a post-bachelor’s degree, about 7% of young adults completed a master’s degree and about 2% held a doctor’s degree (Snyder et al., 2019). Based on these statistics, adults are enrolling in postsecondary settings after graduating from high school. One reason for this shift toward higher education is the current trend in labor statistics. From May of 2007 through May 2010, occupations in the United States that require a high school diploma or no formal educational training decreased by nearly 7.4 million jobs (Watson, 2017). Further, from 2014 to 2024, the rate of growth of occupations that require a high school diploma is projected to grow more slowly than the overall average, which will cause a greater shift to occupations requiring some form of higher education (Watson, 2017).

In previous studies, researchers who analyzed data on dual credit course offerings have documented the presence of benefits for young adults. In one such investigation, An (2015) used data from the Wabash National Study of Liberal Arts Education that indicated dual-credit enrollment was positively related to first-year GPA in college, even after controlling for ethnicity/race, gender, family background, ACT scores, and
precollege academic motivation. An (2015) further investigated whether dual-credit enrollment increased student academic motivation and engagement. Results were that students who participated in dual credit were more highly motivated and engaged in their college course work (An, 2015). In another study, An (2013b) analyzed data from the Beginning Postsecondary Students Longitudinal Study and determined that first-year GPAs in college were higher for students who had taken a dual-credit course than students who had not taken a dual-credit course. Additionally, students who had taken a dual-credit course were less likely to take a remedial course during their first year of college. Another group of researchers (Wang et al., 2015) examined the effect of taking a dual-credit course on first semester GPAs with students from a 2-year technical school in Wisconsin. They determined students who were enrolled in a dual-credit course had higher first-semester GPAs than students who were not enrolled in a dual-credit course.

Blankenberger et al. (2017) conducted an analysis of the effect of dual-credit enrollment on postsecondary degree attainment with the large database of the 2003 Illinois graduating class. Students who were enrolled in dual-credit had higher levels of degree attainment for any type of postsecondary degree and for a bachelor’s degree than students who were not enrolled in dual-credit. Further, a greater result occurred for students starting at a 2-year college or a lesser competitive 4-year college (Blankenberger et al., 2017). Two other researchers, Phelps and Chan (2016), analyzed longitudinal student data from college and K-12 systems along with Unemployment Insurance wage records. Findings were that almost 30% of high school graduates from 20 different high schools transferred at least two dual-credit courses to a public technical college. Based on their analysis, dual-credit students had higher degree completion rates and a higher
second year retention rate than their nondual-credit peers (Phelps & Chan, 2016). Another researcher, Swanson (2010) determined that students who had taken a dual-credit course were more likely to enroll in college within seven months of high school graduation and to persist through their second year of college. Further, students who had taken a dual-credit course and enrolled in college within seven months of graduation were 16% to 20% more likely than their peers who had not taken a dual-credit course to receive a bachelor’s degree (Swanson, 2010).

Dual-credit enrollment at 2-year or 4-year universities can contain course work in a variety of academic disciplines such as English, mathematics, science, and social studies. However, some researchers chose to concentrate on specific types of dual-credit courses or a specific type of dual-credit program. One example of a study about a specific type of dual-credit course was Karp and Hughes (2008) who focused on students who had taken career and technical education dual-credit courses in New York City and Florida and their subsequent progression to college. In Florida, students who participated in career and technical dual-credit courses were more likely to receive their high school diploma and enroll in a 4-year college than students who had not participated in a career and technical education dual-credit program. After students were enrolled in college, students who had taken dual-credit courses had higher persistence rates in degree completion as well as higher GPAs (Karp & Hughes, 2008). In another investigation in New York City, Allen and Dadgar (2012) examined data regarding students who had participated in the CUNY College Now dual-credit program to determine the effect of dual enrollment on student college credit acquisition, GPA, and persistence toward their second year in college. Students who had been enrolled in a dual-credit course were
more likely to attain more credits during their first semester of college, to have a higher first year GPA, and to enroll in a third semester of college (Allen & Dadgar, 2012) than students who had not been enrolled in such a course.

In another investigation where students resided in a specific geographic area, Cowan and Goldhaber (2015) analyzed data from high school and college students from the Education and Data Center warehouse in Washington State, which included a sample cohort of 55,342 students who first enrolled in Ninth grade in the 2006-2007 school year. Some of the students within this sample participated in the dual-credit program in Washington State, which is called Running Start and was formed in 1992. Within this program, juniors and seniors can take courses at any of the state’s 2-year colleges without paying any college fees. In this study, 73% of students who participated in the Running Start program attended a college within the calendar year after they graduated from high school, and 59% of them attended a college full-time whereas 59% of students not enrolled in dual-credit attended a college within the calendar year after they graduated from high school and 50% of them attended a college full-time. Regarding lower-performing students within the Running Start program, they gained the most through their participation in dual-credit courses (Cowan & Goldhaber, 2015).

Continuing the trend of researchers focused on certain areas, Ganzert (2014) investigated traditional dual-credit courses and Huskins Bill courses, which focused on vocational education and transferability to other colleges in the State of North Carolina. The data for the study included 15,527 students who were spring or summer graduates of high school in 2003 and who enrolled at a North Carolina community college in the fall of 2003. These students were followed through 2008 to determine their college
graduation rates (Ganzert, 2014). Students who were in dual-credit or in Huskins Bill courses had higher first-year average GPAs than students who had not participated in either program. Graduation rates from college were 33.7% for students who had been enrolled in a dual-credit course, 28.3% for Huskins Bill students, and 22.5% for students who had not been enrolled in a dual-credit course (Ganzert, 2014).

With the trend in the labor force to include a higher number of jobs that need higher education after high school, dual-credit enrollment in high schools could be a way for students who are economically disadvantaged to start their postsecondary education. Unfortunately, very few researchers have focused specifically on dual credit enrollment of students who were economically disadvantaged. In one such investigation, using the National Institute Longitudinal Study, An (2013a) examined the relationship between college degree attainment and dual-credit course enrollment for students who were economically disadvantaged along with students from wealthier backgrounds. Dual-credit enrollment increased the likelihood of degree attainment for students who were economically disadvantaged along with smaller effects of degree attainment for students from more affluent families. Further, dual-credit coursework increased the probability of any type of postsecondary degree or bachelor’s degree (An, 2013a). While the previous study used a national sample of students, Moreno et al. (2021) examined students who completed dual-credit courses at a local community college in Texas while attending nearby high schools. Within the full sample of high school students, which included traditional high schools and Early College High Schools, the percentages by ethnicity/race were 1.8% Asian, 17.7% Black, 55% Hispanic and 23.4% White while the percentage of students who were economically disadvantaged was 52.7%. Regardless of
their participation in dual-credit courses, students who were not economically disadvantaged were 2.46 times more likely to enroll in a 2-year or 4-year college than their peers who were economically disadvantaged. Another group of researchers (Pierson et al., 2017) investigated dual credit course offerings between the 2005-2006 and 2013-2014 calendar years in which high school students took college level courses both at the high school and at local community colleges in Oregon. During these years, 98% of their sample attended a high school that offered dual credit courses through a local community college. Within all ethnic/racial groups, students who were economically disadvantaged participated in dual credit course options at lower rates than students who were not economically disadvantaged (Pierson et al., 2017).

Educators would like to see student diversity in dual-credit enrollment. From 2007-2017, the State of Texas had a 57% increase in total dual-credit enrollment across all ethnic/racial groups of students. During this time span, dual-credit enrollment percentages for White students decreased from 50% to 37% whereas dual-credit enrollment percentages increased for Asian/Pacific Islander students from 3% to 4%, for Black students from 5% to 7%, and for Hispanic students from 38% to 46% (Texas Higher Education Coordinating Board, 2018). In a Texas-based investigation, the change in percentages among the various ethnic/racial groups can be explained in part by the changing demographics of student enrollment in the State of Texas (Texas Higher Education Coordinating Board, 2018).

A group of researchers, Young et al. (2013), analyzed data from a Southwest Texas Community College for the 2005-2006 through the 2011-2012 academic years to determine the extent to which dual-credit enrollment differed by student ethnicity/race. In
In the first year, the order of highest to lowest percentages was White, Hispanic, Black, and Asian. In the most recent six academic years, the order changed to reflect Asians with the highest percentage of participation in dual credit, followed by White, Hispanic, and Black (Young et al, 2013). Lastly, in this same study, the only two groups of students to have statistically significant differences, when analyzing ethnicity/race and gender, were Hispanic and White students. Hispanic girls and White girls had higher rates of dual-credit participation than Hispanic boys and White boys (Young et al., 2013). In another study in Oregon, Pierson et al. (2017) discovered similar differences in dual credit participation based on ethnicity/race over an 8-year time span. The highest level of participation was Asian/Pacific Islander followed by White, Multiracial, American Indian/Alaska Native, Hispanic, and Black (Pierson et al., 2017). Based on the recent research investigations into dual-credit coursework, the equity gaps in dual credit participation among high school students of various ethnic/racial groups has continued to exist.

**Statement of the Problem**

College, career, and military readiness is a renewed focus for the State of Texas as seen by House Bill 3 (HB 3), which was recently passed by the 86th Texas Legislature and signed by Governor Greg Abbott (Texas Education Agency, 2019). Within HB 3, school districts received additional funding for career and technical education courses in Grades 9 through 12 along with including technology application courses such as computer science for funding in Grades 7 through 12. Along with the financial incentive for districts, students and families also received funding for at least one form of college entrance assessment exam, which included the ACT, SAT, and the Texas Success
Initiative Assessment, and for one industry certification exam prior to high school graduation (Texas Education Agency, 2019). These initiatives were established to expand opportunities for high school students to achieve a higher rate of college and career readiness prior to graduation due to the increased need for some type of postsecondary education following completion of high school.

In the next decade, at least 60% of the job force in Texas will need to complete a certification program, an Associate degree, or a bachelor’s degree to be competitive in the global economy. Recently, only one out of every five Grade 8 Texas students in 2006 graduated from a university by 2017, which showcased the need for increased college and career readiness (Texas Higher Education Coordinating Board, 2020). The most recent data for the State of Texas were that 43.5% of the adult population completed a certification or a degree from a Texas or out-state higher education institution, which is over a 3% increase over the past four years. Further, the most underrepresented groups (i.e., Black, Hispanic, male, and economically disadvantaged) had small average annual improvement rates from 2015-2018 ranging from 2.2% through 6.2% toward completion of a certificate or a degree. Of the four groups, Hispanic individuals had the highest rate of growth whereas Black individuals had the lowest rate of growth (Texas Higher Education Coordinating Board, 2019).

**Purpose of the Study**

The purpose of this study was to determine the degree to which differences were present in the percentages of students who completed at least three hours of a dual-credit course in English Language Arts or mathematics, or completed at least nine or more hours of dual-credit course work as a function of their ethnicity/race (i.e., Asian, Black,
Hispanic, and White) and economic status (i.e., not poor and poor). At the time of the study, the percentages for all four groups of students were compared for four school years (i.e., 2016-2017, 2017-2018, 2018-2019, and 2019-2020) of Texas statewide data. These four years of high school data represented the most recent data available.

**Significance of the Study**

With the growing changes into today’s marketplace, high school graduates are going to need the benefits of postsecondary education. One part of this article will have the differences present in advanced dual-credit course completion percentages for high school students in the State of Texas over four years as a function of their ethnicity/race and economic status. Additionally, another component of this article will be an analysis of trends present regarding the differences in advanced dual-credit course completion percentages as a function of their ethnicity/race and economic status. With the changes in state accountability regarding college readiness for high school students, school board members, community members, parents, 2-year college admission officers, 4-year college admission officers, and state legislature representatives would find the enrollment in advanced dual-credit courses an important topic of interest. Texas high schools are rated on college, career, and military readiness as a part of their state accountability ratings. Therefore, educational leaders would be interested in the percentages of enrollment in advanced dual-credit courses across the State of Texas. Through this information, school districts might seek to establish more opportunities for advanced dual-credit courses on their respective campuses.
**Research Questions**

In this research study, the following research questions were addressed: (a) What is the difference in the percentage of students who completed at least three hours of a dual-credit course in English Language Arts or mathematics, or completed at least nine or more hours of dual-credit course work as a function of their ethnicity/race? (b) What is the difference in the percentage of students who completed at least three hours of a dual-credit course in English Language Arts or mathematics, or completed at least nine or more hours of dual-credit course work as a function of their economic status? (c) What trend exists in the percentage of students who completed at least three hours of a dual-credit course in English Language Arts or mathematics, or completed at least nine or more hours of dual-credit course work as a function of their ethnicity/race from the 2016-2017 through the 2019-2020 school years? (d) What trend exists in the percentage of students who completed at least three hours of a dual-credit course in English Language Arts or mathematics, or completed at least nine or more hours of dual-credit course work as a function of their economic status from the 2016-2017 through the 2019-2020 school years? The first two research questions were repeated for the 2017-2018, 2018-2019, and 2019-2020 school years and the last two research questions involved all four school years to determine a possible trend in the data. As a result, this study consisted of 10 research questions.
Method

Research Design

For this study, a non-experimental causal-comparative research design was used (Creswell & Creswell, 2018). Archival data were acquired about the completion rates for dual-credit courses from the Texas Academic Performance Reports for the 2016-2017 through the 2019-2020 school years. The archival data that were examined reflect previous events, and therefore, the independent and the dependent variables could not be changed or manipulated (Johnson & Christensen, 2019). The independent variables for this study were ethnicity/race (i.e., Asian, Black, Hispanic, and White) and economic status (i.e., economically disadvantaged and not economically disadvantaged) and the dependent variable was the percentage of students who had completed a dual-credit course. For this study, the archival data on high schools were assumed to be accurate and free of errors due to the rigorous data standards and audit practices by the Texas Education Agency (Texas Education Agency, 2021a).

Participants and Instrumentation

For the purpose of this study, participants were high school students by ethnicity/race (i.e., Asian, Black, Hispanic, and White) who had completed a dual-credit course or were high school students by economic status (i.e., economically disadvantaged or not economically disadvantaged) who had completed a dual-credit course. The archival data were from the 2016-2017 through the 2019-2020 school years for high school students in the State of Texas and were acquired from the Texas Education Agency, which has data on dual-credit students in high schools through the Texas Academic Performance Report websites (Texas Education Agency, 2021b). The data
from the Texas Academic Performance Reports are public and are accessible for any users who want information on high school students in the State of Texas (Texas Education Agency, 2021b).

For this article, two terms need to be defined: (a) dual-credit and (b) economically disadvantaged. The Texas Higher Education Coordinating Board (2018) defines the term, dual-credit, as a system where a high school student is enrolled in a college course and receives credit from the high school and from the college. Further, the courses can be taught on the high school campus or on the college campus (Texas Education Coordinating Board, 2018). Economically disadvantaged, as defined by the Texas Education Agency (2020), is a student “who is eligible for free or reduced-price meals under the National School Lunch and Child Nutrition Program” (p. 1).

Results

Before conducting inferential statistics to determine whether statistically significant differences were present in the percentages of students who completed at least three hours of a dual-credit course in English Language Arts or mathematics, or completed at least nine or more hours of dual-credit course work as a function of their ethnicity/race and economic status, checks were conducted to determine the extent to which these data were normally distributed. Although almost all the assumptions were not met, Field (2018) contends that the parametric independent samples $t$-test procedure is sufficiently robust to withstand violations of its underlying assumptions. Thus, parametric independent samples $t$-tests were calculated to answer the previous research questions regarding dual-credit completion rates.
Results for Dual-Credit Completion Rates by Ethnicity/Race for the 2016-2017 through the 2019-2020 School Years

For this section, the results for dual-credit completion rates will be presented by school year and by ethnicity/race. The findings will be discussed for six different pairs: (a) Asian and Black; (b) Asian and Hispanic; (c) Asian and White; (d) Black and Hispanic; (e) Black and White; and (f) Hispanic and White. For the dual-credit completion rate comparison between Asian and Black students in the 2016-2017 school year, a statistically significant difference was present, $t(308) = 13.31, p < .001$. This difference represented a near-large effect size, Cohen’s $d$ of 0.76 (Cohen, 1988). As presented in Table 2.1, the percentage of Asian students who had completed dual-credit courses was more than twice the percentage of Black students. Readers should note the very low percentage of Black students who had completed a dual-credit course.

Insert Table 2.1 about here

In the 2017-2018 school year, a statistically significant difference was present, $t(318) = 13.88, p < .001$. This difference represented a near-large effect size, Cohen’s $d$ of 0.78 (Cohen, 1988). The percentage of Asian students who had completed dual-credit courses was more than twice the percentage of Black students. Very low percentages of Black students had completed a dual-credit course.

With respect to the 2018-2019 school year, a statistically significant difference was revealed, $t(345) = 16.22, p < .001$. This difference represented a large effect size, Cohen’s $d$ of 0.87 (Cohen, 1988). The percentage of Asian students who had completed
dual-credit courses was more than twice the percentage of Black students. Readers should again note the very low percentage of Black students who had completed a dual-credit course.

Concerning the 2019-2020 school year, a statistically significant difference was yielded, $t(342) = 14.78, p < .001$. This difference represented a large effect size, Cohen’s $d$ of 0.80 (Cohen, 1988). The percentage of Asian students who had completed dual-credit courses was more than twice the percentage of Black students. Congruent with the first three years of data analyzed, very low percentages of Black students had completed a dual-credit course. Descriptive statistics for these analyses are delineated in Table 2.1.

Regarding the dual-credit completion rate comparison between Asian and Hispanic students for the 2016-2017 school year, a statistically significant difference was present, $t(334) = 12.06, p < .001$. This difference represented a moderate effect size, Cohen’s $d$ of 0.66 (Cohen, 1988). As presented in Table 2.2, the percentage of Asian students who had completed dual-credit courses was over six percentage points higher than the percentage of Hispanic students.

In the 2017-2018 school year, a statistically significant difference was revealed, $t(341) = 12.86, p < .001$. This difference represented a moderate effect size, Cohen’s $d$ of 0.70 (Cohen, 1988). The percentage of Asian students who had completed dual-credit courses was almost eight percentage points higher than percentage of Hispanic students.
With respect to the 2018-2019 school year, a statistically significant difference was yielded, \( t(370) = 15.22, p < .001 \). This difference represented a near-large effect size, Cohen’s \( d \) of 0.79 (Cohen, 1988). The percentage of Asian students who had completed dual-credit courses was over nine points higher than percentage of Hispanic students who had completed dual-credit courses.

Concerning the 2019-2020 school year, a statistically significant difference was present, \( t(367) = 13.51, p < .001 \). This difference represented a moderate effect size, Cohen’s \( d \) of 0.70 (Cohen, 1988). The percentage of Asian students who had completed dual-credit courses was over eight points higher than percentage of Hispanic students who had completed dual-credit courses. Contained in Table 2.2 are the descriptive statistics for these analyses.

Regarding the dual-credit completion rate comparison between Asian and White students for the 2016-2017 school year, a statistically significant difference was revealed, \( t(327) = 4.94, p < .001 \). This difference represented a small effect size, Cohen’s \( d \) of 0.27 (Cohen, 1988). As delineated in Table 2.3, the percentage of White students who had completed dual-credit courses was almost two points higher than the percentage of Asian students.

-----------------------------------------------

Insert Table 2.3 about here

-----------------------------------------------

In the 2017-2018 school year, a statistically significant difference was yielded, \( t(332) = 5.03, p < .001 \). This difference was a small effect size, Cohen’s \( d \) of 0.28
(Cohen, 1988). The percentage of White students who had completed dual-credit courses was less than half a point higher than the percentage of Asian students.

With respect to the 2018-2019 school year, a statistically significant difference was present, $t(360) = 7.62$, $p < .001$. This difference represented a small effect size, Cohen’s $d$ of 0.40 (Cohen, 1988). The percentage of Asian students who had completed dual-credit courses was over one point higher than the percentage of White students. Readers should note that the percentage of Asian students increased above the percentage of White students, a result in contrast to the previous two years of data.

Concerning the 2019-2020 school year, a statistically significant difference was revealed, $t(359) = 6.34$, $p < .001$. This difference was a small effect size, Cohen’s $d$ of 0.33 (Cohen, 1988). The percentage of Asian students who had completed dual-credit courses was over one point higher than the percentage of White students. Again, readers should note that the percentage of Asian students was higher than the percentage of White students. Descriptive statistics for these analyses are presented in Table 2.3.

Regarding the dual-credit completion rate comparison between Black and Hispanic students for the 2016-2017 school year, a statistically significant difference was yielded, $t(639) = 10.99$, $p < .001$. This difference was a small effect size, Cohen’s $d$ of 0.44 (Cohen, 1988). The percentage of Hispanic students who had completed dual-credit courses was over eight points higher than the percentage of Black students. Table 2.4 contains the descriptive statistics for this analysis.

-----------------------------------------------------------------------------------------------

Insert Table 2.4 about here

-----------------------------------------------------------------------------------------------
In the 2017-2018 school year, a statistically significant difference was present, \( t(663) = 9.03, p < .001 \). This difference was a small effect size, Cohen’s \( d \) of 0.35 (Cohen, 1988). A higher percentage of Hispanic students had completed a dual-credit course, almost eight points higher, than Black students who had completed a dual-credit course.

With respect to the 2018-2019 school year, a statistically significant difference was revealed, \( t(667) = 10.25, p < .001 \). This difference was a small effect size, Cohen’s \( d \) of 0.39 (Cohen, 1988). The percentage of Hispanic students who had completed dual-credit courses was almost eight points higher than the percentage of Black students who had completed dual-credit courses.

Concerning the 2019-2020 school year, a statistically significant difference was yielded, \( t(685) = 10.67, p < .001 \). This difference was a small effect size, Cohen’s \( d \) of 0.41 (Cohen, 1988). The percentage of Hispanic students who had completed dual-credit courses was almost eight and a half points higher than the percentage of Black students. Descriptive statistics for these analyses are delineated in Table 2.4.

Regarding the dual-credit completion rate comparison between Black and White students for the 2016-2017 school year, a statistically significant difference was present, \( t(589) = 21.64, p < .001 \). This difference was a large effect size, Cohen’s \( d \) of 0.89 (Cohen, 1988). As delineated in Table 2.5, the percentage of White students who had completed dual-credit courses was over twice the percentage of Black students.

---------------------------------------------------------
Insert Table 2.5 about here
---------------------------------------------------------
In the 2017-2018 school year, a statistically significant difference was revealed, \( t(615) = 20.52, p < .001 \). This difference was a large effect size, Cohen’s \( d \) of 0.86 (Cohen, 1988). The percentage of White students who had completed dual-credit courses was over twice the percentage of Black students who had completed dual-credit courses.

With respect to the 2018-2019 school year, a statistically significant difference was yielded, \( t(631) = 21.64, p < .001 \). This difference was a large effect size, Cohen’s \( d \) of 0.86 (Cohen, 1988). The percentage of White students who had completed dual-credit courses was almost twice the percentage of Black students.

Concerning the 2019-2020 school year, a statistically significant difference was present, \( t(631) = 20.28, p < .001 \). This difference was a large effect size, Cohen’s \( d \) of 0.81 (Cohen, 1988). Congruent with the results for the previous three school years, the percentage of White students who had completed dual-credit courses was almost twice the percentage of Black students. Contained in Table 2.5 are the descriptive statistics for these analyses.

Regarding the dual-credit completion rate comparison between Hispanic and White students for the 2016-2017 school year, a statistically significant difference was revealed, \( t(910) = 20.92, p < .001 \). This difference represented a moderate effect size, Cohen’s \( d \) of 0.69 (Cohen, 1988). As presented in Table 2.6, the percentage of White students who had completed dual-credit courses was almost eight percentage points higher than the percentage of Hispanic students who had completed dual-credit courses.

---------------------------------------------------------

Insert Table 2.6 about here

---------------------------------------------------------
In the 2017-2018 school year, a statistically significant difference was yielded, \( t(945) = 21.69, p < .001 \). This difference was a moderate effect size, Cohen’s \( d \) of 0.71 (Cohen, 1988). The percentage of White students who had completed dual-credit courses was over eight points higher than the percentage of Hispanic students.

With respect to the 2018-2019 school year, a statistically significant difference was present, \( t(951) = 22.86, p < .001 \). This difference was a moderate effect size, Cohen’s \( d \) of 0.74 (Cohen, 1988). The percentage of White students who had completed dual-credit courses was almost eight points higher than the percentage of Hispanic students.

Concerning the 2019-2020 school year, a statistically significant difference was revealed, \( t(966) = 21.91, p < .001 \). This difference was a moderate effect size, Cohen’s \( d \) of 0.70 (Cohen, 1988). The percentage of White students who had completed dual-credit courses was almost seven points higher than the percentage of Hispanic students.

Descriptive statistics for these analyses are presented in Table 2.6.

**Results for Dual-Credit Completion Rates by Economic Status for the 2016-2017 through the 2019-2020 School Years**

In this section, the results for dual-credit completion rates will be presented by school year and economic status. Findings will be discussed for dual-credit students who were economically disadvantaged and for all dual-credit students. In the Texas Academic Performance Reports, a separate variable is not present for students who were not economically disadvantaged. Therefore, the all student rate for dual-credit students was used for statistical analyses. Because students who are economically disadvantaged
are included in the all student rate variable, any differences present in this study should be an underestimate of the real differences that exist in dual-credit completion rates.

Regarding the dual-credit completion rate comparison between students in poverty and all students, a statistically significant difference was yielded, $t(1125) = 27.70, p < .001$. This difference was a large effect size, Cohen’s $d$ of 0.82 (Cohen, 1988). As revealed in Table 2.7, the percentage of all students who had completed dual-credit courses was over seven percentage points higher than the percentage of students who were economically disadvantaged.

Insert Table 2.7 about here

In the 2017-2018 school year, a statistically significant difference was present, $t(1139) = 27.92, p < .001$. This difference was a large effect size. Cohen’s $d$ of 0.83 (Cohen, 1988). The percentage of all students who had completed dual-credit courses was almost seven percentage points higher than the percentage of students who were economically disadvantaged.

With respect to the 2018-2019 school year, a statistically significant difference was revealed, $t(1159) = 29.47, p < .001$. This difference was a large effect size, Cohen’s $d$ of 0.86 (Cohen, 1988). The percentage of all students who had completed dual-credit courses was almost seven percentage points higher than the percentage of students who were economically disadvantaged.

Concerning the 2019-2020 school year, a statistically significant difference was yielded, $t(1174) = 28.75, p < .001$. This difference was a large effect size, Cohen’s $d$ of
0.84 (Cohen, 1988). The percentage of all students who had completed dual-credit courses was almost seven percentage points higher than the percentage of students who were economically disadvantaged. Table 2.7 contains the descriptive statistics for these analyses.

**Discussion**

In this multiyear, statewide investigation, the degree to which differences were present in the percentages of students who completed at least three hours of dual-credit course work in English Language Arts or mathematics, or at least nine or more hours of dual-credit course work as a function of their ethnicity/race and economic status was analyzed for the 2016-2017, 2017-2018, 2018-2019, and 2019-2020 school years. Dual-credit variables were introduced in the 2016-2017 school year in the Texas Academic Performance Reports and are a part of the College, Career, and Military Ready indicators. In prior years, the variables for dual-credit course completion were reported based on any subject and on any core subjects (i.e., English Language Arts, mathematics, science, and social studies) or on the total number of courses completed. Therefore, the results from this study contained the only four years of data available due to the recent changes in the College, Career, and Military Ready variables.

With respect to the 2016-2017 through the 2019-2020 school years, Black students who completed dual-credit courses had the lowest percentage of students who had completed dual-credit courses as depicted in Figure 2.1. The average percentages of Asian and White students who had completed dual-credit courses were over twice the average percentages of Black students who had completed dual-credit courses across all four years. In all four school years, the average percentages of Hispanic students who
had completed dual-credit courses were almost eight percentage points higher than the average percentages for Black students who completed dual-credit courses.

Insert Figure 2.1 about here

Asian and White students who had completed dual-credit courses had the highest overall percentages for the 2016-2017 through the 2019-2020 school years. For the first two school years (i.e., 2016-2017 and 2017-2018), White students had the highest average percentages. For the last two school years (i.e., 2018-2019 and 2019-2020), Asian students had the highest percentages by ethnicity/race of students who had completed dual-credit courses.

Incremental gains were evident in the percentages of students who had completed dual-credit courses across all four ethnic/racial groups for the 2016-2017, 2017-2018, 2018-2019, and 2019-2020 school years. Asian students who had completed dual-credit courses had the highest percentage increase, which was slightly higher than seven points. White students who had completed dual-credit courses had the lowest percentage increase, which was slightly over four points.

For the 2016-2017 through the 2019-2020 school years, statistically significant dual-credit comparison rates were present by student economic status. Students who were economically disadvantaged had lower average percentages for dual-credit courses than their peers. These statistics are depicted in Figure 2.2. Higher percentages, almost seven percentage points higher, of students had completed dual-credit courses than their peers who were economically disadvantaged.
Connections with Existing Literature

In this multiyear, statewide investigation, statistically significant differences were present in the percentages of Asian, Black, Hispanic, and White students who had completed dual-credit courses. For the 2016-2017 and 2017-2018 school years, White students had the highest percentages of students who had completed dual-credit courses. With respect to the 2018-2019 and 2019-2020 school years, Asian students had the highest percentages of students who had completed dual-credit courses. For the last two school years, the order of highest percentages to the lowest percentages by ethnicity/race were Asian, White, Hispanic, and Black. These results are congruent with the findings of other researchers (Pierson et al., 2017; Young et al., 2013) regarding statistically significant disparities in dual-credit course participation by ethnicity/race.

Concerning the 2016-2017, 2017-2018, 2018-2019, and 2019-2020 school years, students who were economically disadvantaged had lower percentages of dual-credit course completion rates than all students. These results are congruent with the findings of researchers (e.g., Moreno et al., 2021; Pierson et al., 2017) who had documented the presence of statistically significant differences in dual-credit participation by economic status. Equity gaps in dual-credit participation rates continue to exist by student ethnicity/race and economic status.
Implications for Policy and for Practice

Several implications for policy and practice can be suggested based on the findings of this multiyear statewide investigation. Regarding policy implications, high school principals, district-level school administrators, and college administrators need to address the continuing equity gaps for dual-credit course completion across ethnic/racial groups and economic status. Because students of color or students who are economically disadvantaged are not participating in dual-credit courses at the same rate as Asian and White students, administrators at the high school and postsecondary levels need to improve current dual-credit policies to increase the ethnic/racial diversity and to increase the enrollment of students who are economically disadvantaged. Second, state legislators, district-level administrators, and college-level administrators need to work on forging new relationships between high school and college campuses where currently, students do not have an option to take dual-credit course work. Third, policymakers, district-level administrators, high school principals, and college-level administrators need to ensure that the cost of dual-credit course work is not prohibitive for students who are economically disadvantaged, which could include the possibility of financial aid for these students.

Concerning practice implications, dual-credit course work allows students to complete college course curriculum prior to high school graduation and as such, students must be college ready prior to enrollment in dual-credit course work. College readiness can be a stumbling block for many students in the enrollment process for dual-credit course work. Therefore, high school principals, district-level administrators, and teachers must strengthen their curriculum in the younger grades and target students struggling
with college readiness standards, so students are able to perform at a college level prior to high school graduation. Second, with recent changes to the Texas Success Initiative Assessment 2.0 along with upcoming changes to the SAT, teachers need to participate in professional development and district-wide curriculum development to address ways to incorporate these changes into their curriculum.

**Recommendations for Future Research**

Several recommendations can be made based on the findings of this multiyear, statewide study. First, because this study was restricted to high school students in the State of Texas, researchers are recommended to extend this study in other states to ascertain the degree to which the results might be generalizable. Second, the variables analyzed within this study were newly developed ones because of recent changes to college, career, and military readiness in the Texas state accountability system. Researchers are encouraged to replicate this study to include future years in their analysis. Third, ethnicity/race and economic status were the only demographic characteristics that were examined within this study. Future researchers might expand their analyses to include other demographic characteristics such as English Learners, students enrolled in special education, and students in Section 504. Fourth, with the new focus on college, career, and military readiness in Texas, researchers might include other indicators of college readiness such as completion of an On Ramps course, met criterion scores for ACT, SAT, and TSIA examinations, and completion of Industry Based Certifications.
Conclusion

The purpose of this article was to determine the degree to which differences were present in the percentages of students who completed at least three hours of a dual-credit course in English Language Arts or mathematics, or completed at least nine or more hours of dual-credit course work as a function of their ethnicity/race and economic status. Statistically significant differences were established in all four school years by ethnicity/race and by economic status. Black students had the lowest percentages of students who had completed dual-credit course work. Students who were economically disadvantaged had lower percentages of completion rates of all students. When observing the trends for all four years, equity gaps still persist across ethnic/racial and economic status groups.
References


https://doi.org/10.1080/10668926.2012.719483


https://doi.org/10.1080/10668926.2019.16887

https://doi.org/10.21061/jcte.v31i1.1496

Participation, and Outcomes for Oregon Students. REL 2017-216. Regional Educational Laboratory Northwest.


https://tea.texas.gov/sites/default/files/HB3_Bill_Summary.pdf


http://reportcenter.highered.texas.gov/agency-publication/miscellaneous/dual-credit/


### Table 2.1

*Descriptive Statistics for the Percentages of Asian and Black Students who Had Completed Dual-credit Courses in the 2016-2017 Through the 2019-2020 School Years*

<table>
<thead>
<tr>
<th>School Year and Comparison</th>
<th>n of schools</th>
<th>M%</th>
<th>SD%</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016-2017</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>335</td>
<td>27.75</td>
<td>24.39</td>
</tr>
<tr>
<td>Black</td>
<td>656</td>
<td>13.50</td>
<td>18.28</td>
</tr>
<tr>
<td>2017-2018</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>342</td>
<td>30.28</td>
<td>25.62</td>
</tr>
<tr>
<td>Black</td>
<td>674</td>
<td>14.76</td>
<td>19.40</td>
</tr>
<tr>
<td>2018-2019</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>371</td>
<td>34.13</td>
<td>25.56</td>
</tr>
<tr>
<td>Black</td>
<td>699</td>
<td>17.20</td>
<td>19.89</td>
</tr>
<tr>
<td>2019-2020</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>368</td>
<td>34.91</td>
<td>26.81</td>
</tr>
<tr>
<td>Black</td>
<td>697</td>
<td>18.44</td>
<td>21.16</td>
</tr>
</tbody>
</table>

*Note.* The n in the table above refers to the number of high schools from which data were obtained.
Table 2.2

Descriptive Statistics for the Percentages of Asian and Hispanic Students who Had Completed Dual-credit Courses in the 2016-2017 Through the 2019-2020 School Years

<table>
<thead>
<tr>
<th>School Year and Comparison</th>
<th>n of schools</th>
<th>$M%$</th>
<th>$SD%$</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016-2017</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>335</td>
<td>27.75</td>
<td>24.39</td>
</tr>
<tr>
<td>Hispanic</td>
<td>1,079</td>
<td>21.53</td>
<td>21.49</td>
</tr>
<tr>
<td>2017-2018</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>342</td>
<td>30.28</td>
<td>25.62</td>
</tr>
<tr>
<td>Hispanic</td>
<td>1,108</td>
<td>22.56</td>
<td>22.33</td>
</tr>
<tr>
<td>2018-2019</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>371</td>
<td>34.13</td>
<td>25.56</td>
</tr>
<tr>
<td>Hispanic</td>
<td>1,123</td>
<td>25.10</td>
<td>22.97</td>
</tr>
<tr>
<td>2019-2020</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>368</td>
<td>34.91</td>
<td>26.81</td>
</tr>
<tr>
<td>Hispanic</td>
<td>1,145</td>
<td>26.85</td>
<td>23.27</td>
</tr>
</tbody>
</table>

Note. The $n$ in the table above refers to the number of high schools from which data were obtained.
<table>
<thead>
<tr>
<th>School Year and Comparison</th>
<th>n of schools</th>
<th>M%</th>
<th>SD%</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016-2017</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>335</td>
<td>27.75</td>
<td>24.39</td>
</tr>
<tr>
<td>White</td>
<td>962</td>
<td>29.47</td>
<td>21.20</td>
</tr>
<tr>
<td>2017-2018</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>342</td>
<td>30.28</td>
<td>25.62</td>
</tr>
<tr>
<td>White</td>
<td>987</td>
<td>30.62</td>
<td>21.50</td>
</tr>
<tr>
<td>2018-2019</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>371</td>
<td>34.13</td>
<td>25.56</td>
</tr>
<tr>
<td>White</td>
<td>992</td>
<td>32.89</td>
<td>21.92</td>
</tr>
<tr>
<td>2019-2020</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>368</td>
<td>34.91</td>
<td>26.81</td>
</tr>
<tr>
<td>White</td>
<td>1,001</td>
<td>33.65</td>
<td>21.79</td>
</tr>
</tbody>
</table>

*Note.* The *n* in the table above refers to the number of high schools from which data were obtained.
Table 2.4

*Descriptive Statistics for the Percentages of Black and Hispanic Students who Had Completed Dual-credit Courses in the 2016-2017 Through the 2019-2020 School Years*

<table>
<thead>
<tr>
<th>School Year and Comparison</th>
<th>$n$ of schools</th>
<th>$M%$</th>
<th>$SD%$</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016-2017</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>656</td>
<td>13.50</td>
<td>18.28</td>
</tr>
<tr>
<td>Hispanic</td>
<td>1,079</td>
<td>21.53</td>
<td>21.49</td>
</tr>
<tr>
<td>2017-2018</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>674</td>
<td>14.76</td>
<td>19.40</td>
</tr>
<tr>
<td>Hispanic</td>
<td>1,108</td>
<td>22.56</td>
<td>22.33</td>
</tr>
<tr>
<td>2018-2019</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>699</td>
<td>17.20</td>
<td>19.89</td>
</tr>
<tr>
<td>Hispanic</td>
<td>1,123</td>
<td>25.10</td>
<td>22.97</td>
</tr>
<tr>
<td>2019-2020</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>697</td>
<td>18.44</td>
<td>21.16</td>
</tr>
<tr>
<td>Hispanic</td>
<td>1,145</td>
<td>26.85</td>
<td>23.27</td>
</tr>
</tbody>
</table>

*Note.* The $n$ in the table above refers to the number of high schools from which data were obtained.
Table 2.5

Descriptive Statistics for the Percentages of Black and White Students who Had Completed Dual-credit Courses in the 2016-2017 Through the 2019-2020 School Years

<table>
<thead>
<tr>
<th>School Year and Comparison</th>
<th>n of schools</th>
<th>M%</th>
<th>SD%</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016-2017</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>656</td>
<td>13.50</td>
<td>18.28</td>
</tr>
<tr>
<td>White</td>
<td>962</td>
<td>29.47</td>
<td>21.20</td>
</tr>
<tr>
<td>2017-2018</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>674</td>
<td>14.76</td>
<td>19.40</td>
</tr>
<tr>
<td>White</td>
<td>987</td>
<td>30.62</td>
<td>21.50</td>
</tr>
<tr>
<td>2018-2019</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>699</td>
<td>17.20</td>
<td>19.89</td>
</tr>
<tr>
<td>White</td>
<td>992</td>
<td>32.89</td>
<td>21.92</td>
</tr>
<tr>
<td>2019-2020</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>697</td>
<td>18.44</td>
<td>21.16</td>
</tr>
<tr>
<td>White</td>
<td>1,001</td>
<td>33.65</td>
<td>21.79</td>
</tr>
</tbody>
</table>

*Note.* The n in the table above refers to the number of high schools from which data were obtained.
# Table 2.6

**Descriptive Statistics for the Percentages of Hispanic and White Students who Had Completed Dual-credit Courses in the 2016-2017 Through the 2019-2020 School Years**

<table>
<thead>
<tr>
<th>School Year and Comparison</th>
<th>n of schools</th>
<th>M%</th>
<th>SD%</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016-2017</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
<td>1,079</td>
<td>21.53</td>
<td>21.49</td>
</tr>
<tr>
<td>White</td>
<td>962</td>
<td>29.47</td>
<td>21.20</td>
</tr>
<tr>
<td>2017-2018</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
<td>1,108</td>
<td>22.56</td>
<td>22.33</td>
</tr>
<tr>
<td>White</td>
<td>987</td>
<td>30.62</td>
<td>21.50</td>
</tr>
<tr>
<td>2018-2019</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
<td>1,123</td>
<td>25.10</td>
<td>22.97</td>
</tr>
<tr>
<td>White</td>
<td>992</td>
<td>32.89</td>
<td>21.92</td>
</tr>
<tr>
<td>2019-2020</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
<td>1,145</td>
<td>26.85</td>
<td>23.27</td>
</tr>
<tr>
<td>White</td>
<td>1,001</td>
<td>33.65</td>
<td>21.79</td>
</tr>
</tbody>
</table>

*Note.* The *n* in the table above refers to the number of high schools from which data were obtained.
Table 2.7

Descriptive Statistics for the Percentages of Students Who Were Economically Disadvantaged and All Students who Had Completed Dual-credit Courses for the 2016-2017 Through the 2019-2020 School Years

<table>
<thead>
<tr>
<th>School Year and Comparison</th>
<th>n of schools</th>
<th>M%</th>
<th>SD%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>2016-2017</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Economically Disadvantaged</td>
<td>1,126</td>
<td>18.22</td>
<td>20.53</td>
</tr>
<tr>
<td>All Students</td>
<td>1,133</td>
<td>25.24</td>
<td>21.40</td>
</tr>
<tr>
<td><strong>2017-2018</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Economically Disadvantaged</td>
<td>1,140</td>
<td>19.60</td>
<td>21.20</td>
</tr>
<tr>
<td>All Students</td>
<td>1,149</td>
<td>26.50</td>
<td>21.91</td>
</tr>
<tr>
<td><strong>2018-2019</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Economically Disadvantaged</td>
<td>1,160</td>
<td>22.19</td>
<td>21.98</td>
</tr>
<tr>
<td>All Students</td>
<td>1,164</td>
<td>28.98</td>
<td>22.39</td>
</tr>
<tr>
<td><strong>2019-2020</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Economically Disadvantaged</td>
<td>1,175</td>
<td>23.75</td>
<td>22.53</td>
</tr>
<tr>
<td>All Students</td>
<td>1,179</td>
<td>30.38</td>
<td>22.50</td>
</tr>
</tbody>
</table>

*Note.* The *n* in the table above refers to the number of high schools from which data were obtained.
Figure 2.1

*Mean Percentages of Students who Completed Dual-credit Courses by Ethnicity/race*

*Note.* Asian students, Black students, Hispanic students, and White students for the 2016-2017 through the 2019-2020 school years.
Figure 2.2

Mean Percentages of Students who Completed Dual-credit Courses by Economic Status

*Note.* All students and students who were economically disadvantaged for the 2016-2017 through the 2019-2020 school years.
CHAPTER III

DIFFERENCES IN TEXAS STUDENTS’ COMPLETION RATES FOR ADVANCED PLACEMENT/INTERNATIONAL BACCAULAUREATE AS A FUNCTION OF GENDER, ETHNICITY/RACE, AND ECONOMIC STATUS

This dissertation follows the style and format of Research in the Schools (RITS).
Abstract

In this multiyear investigation, the degree to which differences were present in the percentages of students who met criterion on Advanced Placement/International Baccalaureate examinations as a function of their ethnicity/race and economic status was addressed for the 2016-2017 through the 2019-2020 school years. Statistically significant differences were present in the met criterion rates for Advanced Placement/International Baccalaureate examinations across all four years. Black students had the lowest percentages of any ethnic/racial group who met criterion on Advanced Placement/International examinations, and the percentage of Asian students were over six times higher than the percentages for Hispanic and White students. Students who were economically disadvantaged had lower percentages who met criterion on Advanced Placement/International examinations than their peers.

Keywords: Advanced Placement; Asian; Black; Economically disadvantaged; Ethnicity/race; Hispanic; International Baccalaureate; White
DIFFERENCES IN TEXAS STUDENTS’ COMPLETION RATES FOR ADVANCED PLACEMENT/INTERNATIONAL BACCAULAUREATE AS A FUNCTION OF GENDER, ETHNICITY/RACE, AND ECONOMIC STATUS

High school students across the United States have participated and continue to participate in Advanced Placement courses and examinations. Such participation has allowed and continues to allow high school students to experience college-level coursework prior to high school graduation. Students who have Advanced Placement exam scores of 3 or higher have been eligible to receive college credit upon admission into college (College Board, 2014). Of note is that students who took Advanced Placement courses and scored a 3 or higher on an Advanced Placement exam were more likely to earn higher GPAs while in college, to graduate college in 5 years or less, and to have higher degree attainment than students who did not take Advanced placement courses with a 3 or higher score on the Advanced Placement examinations (Morgan et al., 2007). With positive benefits related to Advanced Placement coursework, the number of high school students who have participated in the program has continued to increase over the years. For example, in the class of 2013, College Board had 1,003,430 students who took at least one of the 3,153,014 Advanced Placement examinations (College Board, 2014) while in the class of 2020, College Board had 2,642,530 students who took at least one of the 4,751,957 Advanced Placement examinations (College Board, 2020).

With many students choosing to take Advanced Placement courses as a way to earn college credit, Shaw et al. (2013) investigated how college admission officers might use Advanced Placement variables as a predictor of students’ first-year college GPA. The sample size for the study was 74,501 students from over 125 colleges across the
United States. Regarding race/ethnicity, Asian students were more likely to have the highest performance on Advanced Placement exam scores whereas Black students were more likely to have the lowest Advanced Placement exam scores (Shaw et al., 2013). The strongest Advanced Placement predictor that was related to first-year college GPA was the average Advanced Placement exam score. When the average Advanced Placement exam score increased, the first-year college GPA also increased (Shaw et al., 2013).

With increased participation in Advanced Placement coursework and examinations over the years along with added benefits of college-level rigor, researchers have focused on demographic characteristics of students who have taken Advanced Placement courses and examinations. In one such investigation, Moore and Slate (2008) analyzed data from the State of Texas for the 2004-2005 and 2005-2006 school years to investigate student participation and student performance in Advanced Placement courses by ethnicity/race and gender. In both years, student participation for Advanced Placement courses was almost 19% for White students, a little more than 10% for Black students, and a little less than 12% for Hispanic students while approximately 17% of girls participated in an Advanced Placement course compared to about 13% of boys. For both years, Hispanic students had the highest percentage of students who scored at or above the criterion on Advanced Placement examinations when compared to White students or Black students. Moreover, boys had a slighter higher percentage who scored at or above the criterion on Advanced Placement examinations than did girls (Moore & Slate, 2008).
With a more narrow focus, Koch et al. (2016) analyzed archival Advanced Placement exam data between 1997 and 2012 from the States of Arizona, California, and Texas for Hispanic students who took two specific examinations: (a) Advanced Placement English Language and Composition and (b) Advanced Placement English Literature and Composition. Throughout the 16 years, the number of Hispanic students taking both examinations increased from 20 to 1,242 students in Arizona, from 832 to 15,581 students in California, and from 1,321 to 11,404 in Texas. Although the numbers of students increased, the overall average performance decreased across all three states (Koch et al., 2016). Regarding the Advanced Placement English Language and Composition exam percentages for students earning an exam score of 3 or higher over the 16-year time span, Arizona had the highest percentage at 34%, California had the next highest at 31%, and Texas had the lowest percentage at 24%. The Advanced Placement English Literature and Composition exam scores followed a similar pattern with Arizona had the highest percentage at 34%, California had the next highest at 33% and Texas had the lowest percentage at 27% (Koch et al., 2016). Overall, many Hispanic students in all three states did not score high enough on either test to earn college credit.

Although data on Hispanic students across three states were present in the previous study, Moore et al. (2010) examined the overall performance of Asian students in Advanced Placement examinations compared to the overall performance of White students in Advanced Placement examinations across the United States from 1997 through 2008. For all 12 years, the Advanced Placement examination scores by Asian students were statistically significantly higher than the average exam scores of White students. Differences in the average Advanced Placement examination score increased
from the 1997 test administration to the 2008 test administration. In 2008, Asian students had almost 6% more of the highest Advanced Placement score of 5 than did White students (Moore et al., 2010).

Though the prior researchers examined data across three states, Kettler and Hurst (2017) collected data from 117 suburban high schools in the State of Texas from the 2000-2001 and the 2010-2011 school years on student participation in Advanced Placement/International examinations for Grade 11 and Grade 12. Over the 10-year period, the Advanced Placement/International Baccalaureate examination rate increased for all three ethnic/racial groups (i.e., Black, Hispanic, and White). During both years, the Advanced Placement/International Baccalaureate examination rate for White students was higher than Black and Hispanic students (Kettler & Hurst, 2017). Further, the ethnicity gap between Black students and White students was larger than the ethnicity gap between Hispanic students and White students (Kettler & Hurst, 2017).

The studies discussed above were just a few of the investigations in which researchers analyzed Advanced Placement score performance based on ethnicity/race. With respect to gender, Moore et al. (2012) investigated differences on Advanced Placement examinations between boys and girls for the 2007 and 2011 test administrations. In 2007 and 2011, boys had a higher percentage of overall Advanced Placement examination scores than girls, and the percentages of boys earning a score of 5 or higher on Advanced Placement examinations (i.e., 16.19% and 16.81%) were higher when compared to the percentages of girls (i.e., 11.59% and 12.44%). Further, after identification of the 12 most popular Advanced Placement examinations for boys and girls for 2007 and 2011, boys scored higher than girls on 10 out 12 of the Advanced
Placement examinations whereas girls scored higher than boys on Advanced Placement Literature & Composition and Spanish Language (Moore et al., 2012).

In another study involving gender, Morris and Slate (2012) analyzed College Board data on student performance on Advanced Placement Calculus AB, Calculus BC, and Statistics examinations from across the United States for the 2000, 2005, and 2010 test administrations. From 2000 to 2010, the overall number of students participating in the Advanced Placement mathematics examinations increased each year and the highest number of students took the Advanced Placement Calculus examination. For all three years, the relationships between gender and performance on the Advanced Placement examinations for all three tests were statistically significant. Higher percentages of boys than girls earned a score of 3 or higher on the Advanced Placement mathematics examinations (Morris & Slate, 2012).

In a different study with a smaller sample size, Clark et al. (2012) investigated demographic characteristics of students who were enrolled in Advanced Placement courses within a Texas urban school district for the 2005-2006 and 2006-2007 school years. For both years, girls had a higher percentage of enrollment in Advanced Placement courses than boys and White students had the highest enrollment percentage of Advanced Placement courses compared to other ethnic/racial groups (Clark et al., 2012). White students had the highest percentage of students with an Advanced Placement scores of a 3 or higher whereas Black students had the lowest percentage of Advanced Placement scores of a 3 or higher (Clark et al., 2012).

In a different study in which the combination of ethnicity/race and economic status was addressed, Colgren and Sappington (2015) examined Advanced Placement and
ACT data on 145,560 high school students who were eligible to take the ACT during the 2012-2013 school year in the State of Illinois. Black, Hispanic, and White students who participated in Advanced Placement courses had higher mean averages on the ACT than Black, Hispanic, and White students who had not participated in Advanced Placement courses. Also, White students who participated in Advanced Placement courses had higher mean ACT averages than Black and Hispanic students who participated in Advanced Placement courses, which depicted the continued existence of an equity gap between the three ethnic/racial groups of students (Colgren & Sappington, 2015).

Regarding economic status, students who were economically disadvantaged and participated in Advanced Placement courses had lower average ACT scores than students who were not economically disadvantaged and who had participated in Advanced Placement courses (Colgren & Sappington, 2015).

In another study, Phillips and Lane (2021) investigated college outcomes for 11,190 students who had participated in an Advanced Placement exam and graduated from a high school, between the 2008-2009 and 2012-2013 school years. Asian, White, and students who were not economically disadvantaged had better college matriculation and persistence rates than Black, Hispanic, and students who were economically disadvantaged (Phillips & Lane, 2021). Also compared were the results of their initial database, which was described above, to the results for the Massachusetts’s students who graduated in the 2010-2011 school year. College outcomes for students who participated in the Advanced Placement STEM & English program were better than the college outcomes for all students in the State of Massachusetts (Phillips & Lane, 2021).

Regarding Black, Hispanic, and students who were economically disadvantaged, students
who had participated in the Advanced Placement STEM & English program were 18.37 to 29.56 percentage points higher in rates of college matriculation, persistence, and graduation than the Massachusetts students with similar racial and economic factors (Phillips & Lane, 2021).

Although several investigations exist regarding Advanced Placement, Perna et al. (2015) analyzed the availability and the enrollment of students in an International Baccalaureate Diploma Programme by ethnicity/race and economic status from the combination of the Common Core of Data from the National Center for Education Statistics and the International Baccalaureate database between 2006 and 2009. In the study, enrollment in an International Baccalaureate Diploma Programme for Black and Hispanic students increased slightly over the 4-year period. Further, the number of students who were economically disadvantaged and who participated in an International Baccalaureate Diploma Programme increased from 13% in 2006 to 17%, even though the availability of International Baccalaureate Diploma Programme at high schools also increased during that time period for students who were economically disadvantaged (Perna et al., 2015).

**Statement of the Problem**

With the passage of House Bill 3 in the 86th Texas Legislature, high school campuses in the State of Texas have a renewed interest in the improvement of college, career, and military readiness. Also, with the high school allotment fund being repealed, House Bill 3 provides a new form of funding for school districts, which is called a college, career, and military readiness outcomes bonus (Texas Education Agency, 2019). Another portion of House Bill 3 focuses on increasing funding for college prep exams
such as the ACT, the SAT, and the Texas Success Initiative Assessment TSIA, for industry-based certifications, and career and technical education courses (Texas Education Agency, 2019).

College, career, and military readiness also affect school districts in another way. Under the Texas public school accountability system, school districts are awarded distinction designations for outstanding achievement in specific areas, which include college, career, and military readiness standards in several areas. Further, high school students who meet criterion in scores on their Advanced Placement/International examinations can increase a high school campus’s state accountability rating (Texas Education Agency, 2020). With the importance placed on college, career, and military readiness on school district funding and state accountability ratings, Texas school board members, school educators, and community stakeholders continue to seek a higher number of students who score at or above the criterion on Advanced Placement/International examinations.

**Purpose of the Study**

The purpose of this study was to determine the degree to which differences were present in the percentages of students who met criteria on Advanced Placement/International Baccalaureate examinations as a function of their ethnicity/race (i.e., Asian, Black, Hispanic, and White) and economic status (i.e., not poor and poor). At the time of the study, the percentages for all four groups of students were compared for four school years (i.e., 2016-2017, 2017-2018, 2018-2019, and 2019-2020) of Texas statewide data. These four years of high school data represented the most recent data available. With the recent COVID-19 pandemic, all school campuses and school districts
received a label of Not Rated: Declared State of Disaster for the 2019-2020 school year, which affected the availability of data for that year. As a result, data related to Advanced Placement/International Baccalaureate examinations were not available.

**Significance of the Study**

With the need for employees to have postsecondary education in today’s workplace, high school students will benefit from college credit opportunities such as Advanced Placement/International examinations. In the body of literature on Advanced Placement, many positive outcomes for students participating in Advanced Placement coursework occur such as earning a higher GPA while in college, graduating college in 5 years or less, and reaching higher degree attainment (Morgan et al., 2007). In other studies, researchers examined the equitable participation in Advanced Placement courses across student demographic characteristics such as ethnicity/race and economic status (Clark et al., 2012; Koch et al., 2016; Moore & Slate, 2008). One part of this article was on the degree to which differences might be present in the percentages of students who scored at or above the criterion for Advanced Placement/International Baccalaureate examinations for high school students in the State of Texas. This analysis was conducted for a 4-year time period as a function of student ethnicity/race and economic status. Another aspect of this article was an analysis of any trends present in the differences in the percentages of students who have scores at or above the criterion for Advanced Placement/International Baccalaureate examinations by their ethnicity/race and economic status. With the change in state accountability ratings and in school district funding, college readiness constitutes an important topic for high school students, school board members, community stakeholders, parents, college admission officers, and state
legislature representatives. The results from this study will add to the existing body of literature on the subject of Advanced Placement and International Baccalaureate coursework.

**Research Questions**

The following research questions were addressed: (a) What is the difference in percentage of students who met criteria on Advanced Placement/International Baccalaureate examinations as a function of their ethnicity/race? (b) What is the difference in percentage of students who met criteria on Advanced Placement/International Baccalaureate examinations as a function of their economic status?; (c) What trend exists in the percentage of students who met criteria on Advanced Placement/International Baccalaureate examinations as a function of their ethnicity/race status from the 2016-2017 through the 2019-2020 school years?; and (d) What trend exists in the percentage of students who met criteria on Advanced Placement/International Baccalaureate examinations as a function of their economic status from the 2016-2017 through the 2019-2020 school years? The first two research questions were repeated for the 2017-2018, 2018-2019, and 2019-2020 school years and the last two research questions involved all four school years to determine a possible trend in the data. As a result, this study was comprised of 10 research questions.

**Method**

**Research Design**

For this investigation, a non-experimental causal-comparative research design was used (Creswell & Creswell, 2018). Archival data were downloaded from the Texas Academic Performance Reports for the 2016-2017 through the 2019-2020 school years.
Specifically, data obtained were the percentage of students who met criteria on Advanced Placement/International Baccalaureate examinations. Because all variables reflect past events, neither the independent variable nor the dependent variables can be changed or manipulated (Johnson & Christensen, 2019). Independent variables in this study were ethnicity/race (i.e., Asian, Black, Hispanic, and White) and economic status (i.e., economically disadvantaged and not economically disadvantaged). The dependent variable was the percentage of students who met criteria on the Advanced Placement/International Baccalaureate examinations. The assumption was made herein that, because the Texas Education Agency conducts audits of the data with which they are provided, the archival data analyzed were accurate and free of errors (Texas Education Agency, 2021a).

**Participants and Instrumentation**

For the purpose of this study, participants were high school students who had taken Advanced Placement/International Baccalaureate examinations or who were high school students who had taken an Advanced Placement/International Baccalaureate examination. Archival data were obtained from the Texas Education Agency, which has data on students who had taken Advanced Placement/International Baccalaureate examinations. The Texas Academic Performance Reports contained data from the 2016-2017 school year through the 2019-2020 school year for high school students in the State of Texas (Texas Education Agency, 2021b). These reports are publicly available to any users who want information on high school students in the State of Texas (Texas Education Agency, 2021b).
For this article, two terms need to be defined: (a) Advanced Placement/International Baccalaureate examination score at or above criterion on and (b) economically disadvantaged. Students who take at least one Advanced Placement/International Baccalaureate examination and who have valid Advanced Placement scores in the range of 1 to a 5 or who have valid International Baccalaureate scores in the range of 1 to a 7 are considered to be an examinee for that calendar year. For an examinee to score at or above the criterion, the student must earn a 3 or higher on an Advanced Placement examination or a 4 or higher on an International Baccalaureate examination (Texas Education Agency, 2020). As defined by the Texas Education Agency (2020), economically disadvantaged is a student “who is eligible for free or reduced-price meals under the National School Lunch and Child Nutrition Program” (p. 1).

Results

Prior to conducting inferential statistics to determine whether statistically significant differences were present in the percentages of students who met criterion on Advanced Placement/International Baccalaureate examinations as function of their ethnicity/race and economic status, checks for normalcy were conducted. Though all of the assumptions were not met, Field (2018) contends that the parametric independent samples t-test procedure is sufficiently robust to withstand violations of its underlying assumptions. Therefore, parametric independent samples t-tests were calculated to answer the previous research questions concerning Advanced Placement/International Baccalaureate examinations.
Results for Met Criterion Rates for Advanced Placement/International Baccalaureate Examinations by Ethnicity/Race for the 2016-2017 through the 2019-2020 School Years

In this section, results for students who met criterion rates for Advanced Placement/International Baccalaureate examinations will be presented by school year and by ethnicity/race. The findings will be discussed for six different pairs: (a) Asian and Black; (b) Asian and Hispanic; (c) Asian and White; (d) Black and Hispanic; (e) Black and White; and (f) Hispanic and White. With respect to the Advanced Placement/International Baccalaureate examination met criterion rate comparison between Asian and Black students in the 2016-2017 school year, a statistically significant difference was present, \( t(308) = 28.27, p < .001 \). This difference was a large effect size, Cohen’s \( d \) of 1.61 (Cohen, 1988). As delineated in Table 3.1, the percentage of Asian students who met criterion on Advanced Placement/International Baccalaureate examinations was almost six times higher than the percentage of Black students. Readers should note the very low percentage of Black students who met criterion on Advanced Placement/International Baccalaureate examinations.

Concerning the 2017-2018 school year, a statistically significant difference was revealed, \( t(318) = 29.21, p < .001 \). This difference was a large effect size, Cohen’s \( d \) of 1.64 (Cohen, 1988). The percentage of Asian students who met criterion on Advanced Placement/International Baccalaureate examinations was almost six times higher than the
percentage of Black students. Readers should note the very low percentage of Black students who met criterion on Advanced Placement/International examinations.

Regarding the 2018-2019 school year, a statistically significant difference was yielded, \( t(345) = 29.68, p < .001 \). This difference was a large effect size, Cohen’s \( d \) of 1.60 (Cohen, 1988). The percentage of Asian students who met criterion on Advanced Placement/International Baccalaureate examinations was almost six times higher than the percentage of Black students. Readers should again note the very low percentage of Black students who met criterion on Advanced Placement/International examinations.

In the 2019-2020 school year, a statistically significant difference was present, \( t(342) = 32.78, p < .001 \). This difference represented a large effect size, Cohen’s \( d \) of 1.77 (Cohen, 1988). The percentage of Asian students who met criterion on Advanced Placement/International Baccalaureate examinations was five and a half times higher than the percentage of Black students. Readers again should note the very low percentage of Black students who met criterion on Advanced Placement/International examinations. Descriptive statistics for these analyses are delineated in Table 3.1.

With respect to the Advanced Placement/International Baccalaureate examination met criterion rate comparison between Asian and Hispanic students in the 2016-2017 school year, a statistically significant difference was revealed, \( t(334) = 20.99, p < .001 \). This difference was a large effect size, Cohen’s \( d \) of 1.15 (Cohen, 1988). The percentage of Asian students who met criterion on Advanced Placement/International Baccalaureate examinations was almost three and a half times higher than the percentage of Hispanic students. Table 3.2 contains the descriptive statistics for this analysis.
Concerning the 2017-2018 school year, a statistically significant difference was yielded, $t(341) = 21.01, p < .001$. This difference was a large effect size, Cohen’s $d$ of 1.14 (Cohen, 1988). The percentage of Asian students who met criterion on Advanced Placement/International Baccalaureate examinations was approximately three times higher than the percentage of Hispanic students.

Regarding the 2018-2019 school year, a statistically significant difference was present, $t(370) = 21.37, p < .001$. This difference was a large effect size, Cohen’s $d$ of 1.11 (Cohen, 1988). The percentage of Asian students who met criterion on Advanced Placement/International Baccalaureate examinations was three times higher than the percentage of Hispanic students.

In the 2019-2020 school year, a statistically significant difference was revealed, $t(367) = 24.09, p < .001$. This difference was a large effect size, Cohen’s $d$ of 1.26 (Cohen, 1988). The percentage of Asian students who met criterion on Advanced Placement/International Baccalaureate examinations was approximately three times higher than the percentage of Hispanic students. Descriptive statistics for these analyses are presented in Table 3.2.

With respect to the Advanced Placement/International Baccalaureate examination met criterion rate comparison between Asian and White students in the 2016-2017 school year, a statistically significant difference was yielded, $t(327) = 16.72, p < .001$. This difference was a large effect size, Cohen’s $d$ of 0.92 (Cohen, 1988). As delineated in
Concerning the 2017-2018 school year, a statistically significant difference was present, $t(332) = 15.17, p < .001$. This difference was a large effect size, Cohen’s $d$ of 0.83 (Cohen, 1988). The percentage of Asian students who met criterion on Advanced Placement/International Baccalaureate examinations was almost three times higher than the percentage of White students.

Regarding the 2018-2019 school year, a statistically significant difference was revealed, $t(360) = 15.40, p < .001$. This difference was a large effect size, Cohen’s $d$ of 0.81 (Cohen, 1988). The percentage of Asian students who met criterion on Advanced Placement/International Baccalaureate examinations was approximately two and a half times higher than the percentage of White students.

In the 2019-2020 school year, a statistically significant difference was yielded, $t(359) = 18.74, p < .001$. This difference was a large effect size, Cohen’s $d$ of 0.99 (Cohen, 1988). The percentage of Asian students who met criterion on Advanced Placement/International Baccalaureate examinations was almost three times higher than the percentage of White students. Descriptive statistics for these analyses are delineated in Table 3.3.
With respect to the Advanced Placement/International Baccalaureate examination met criterion rate comparison between Black and Hispanic students in the 2016-2017 school year, a statistically significant difference was present, \( t(639) = 20.88, p < .001 \). This difference was a large effect size, Cohen’s \( d \) of 0.82 (Cohen, 1988). As presented in Table 3.4, the percentage of Hispanic students who met criterion on Advanced Placement/International Baccalaureate examinations was approximately one and a half times higher than the percentage of Black students.

Concerning the 2017-2018 school year, a statistically significant difference was revealed, \( t(635) = 21.64, p < .001 \). This difference was a large effect size, Cohen’s \( d \) of 0.84 (Cohen, 1988). The percentage of Hispanic students who met criterion on Advanced Placement/International Baccalaureate examinations was approximately one and a half times higher than the percentage of Black students.

Regarding the 2018-2019 school year, a statistically significant difference was yielded, \( t(687) = 23.27, p < .001 \). This difference was a large effect size, Cohen’s \( d \) of 0.89 (Cohen, 1988). The percentage of Hispanic students who met criterion on Advanced Placement/International Baccalaureate examinations was almost two times higher than the percentage of Black students.

In the 2019-2020 school year, a statistically significant difference was present, \( t(685) = 22.01, p < .001 \). This difference was a large effect size, Cohen’s \( d \) of 0.84 (Cohen, 1988). The percentage of Hispanic students who met criterion on Advanced Placement/International Baccalaureate examinations was almost two times higher than the percentage of Black students.
Placement/International Baccalaureate examinations was approximately one and a half times higher than the percentage of Black students. Descriptive statistics for these analyses are presented in Table 3.4.

With respect to the Advanced Placement/International Baccalaureate examination met criterion rate comparison between Black and White students in the 2016-2017 school year, a statistically significant difference was revealed, \( t(589) = 26.16, p < .001 \). This difference was a large effect size, Cohen’s \( d \) of 1.08 (Cohen, 1988). The percentage of White students who met criterion on Advanced Placement/International Baccalaureate examinations was approximately two times higher than the percentage of Black students as presented in Table 3.5.

Insert Table 3.5 about here

Concerning the 2017-2018 school year, a statistically significant difference was yielded, \( t(615) = 26.10, p < .001 \). This difference was a large effect size, Cohen’s \( d \) of 1.05 (Cohen, 1988). The percentage of White students who met criterion on Advanced Placement/International Baccalaureate examinations was approximately two times higher than the percentage of Black students.

Regarding the 2018-2019 school year, a statistically significant difference was present, \( t(631) = 25.92, p < .001 \). This difference was a large effect size, Cohen’s \( d \) of 1.03 (Cohen, 1988). The percentage of White students who met criterion on Advanced Placement/International Baccalaureate examinations was approximately two times higher than the percentage of Black students.
In the 2019-2020 school year, a statistically significant difference was revealed, $t(631) = 25.51, p < .001$. This difference was a large effect size, Cohen’s $d$ of 1.02 (Cohen, 1988). The percentage of White students who met criterion on Advanced Placement/International Baccalaureate examinations was almost two times higher than the percentage of Black students. Descriptive statistics for these analyses are delineated in Table 3.5.

With respect to the Advanced Placement/International Baccalaureate examination met criterion rate comparison between Hispanic and White students in the 2016-2017 school year, a statistically significant difference was yielded, $t(910) = 13.17, p < .001$. This difference was a small effect size, Cohen’s $d$ of 0.44 (Cohen, 1988). The percentage of White students who met criterion on Advanced Placement/International Baccalaureate examinations was almost three percentage points higher than the percentage of Hispanic students. Table 3.6 contains the descriptive statistics for this analysis.

Insert Table 3.6 about here

Concerning the 2017-2018 school year, a statistically significant difference was present, $t(945) = 13.03, p < .001$. This difference was a small effect size, Cohen’s $d$ of 0.42 (Cohen, 1988). The percentage of White students who met criterion on Advanced Placement/International Baccalaureate examinations was almost three percentage points higher than the percentage of Hispanic students.

Regarding the 2018-2019 school year, a statistically significant difference was revealed, $t(951) = 11.01, p < .001$. This difference was a small effect size, Cohen’s $d$ of
0.36 (Cohen, 1988). The percentage of White students who met criterion on Advanced Placement/International Baccalaureate examinations was approximately two and a half percentage points higher than the percentage of Hispanic students.

In the 2019-2020 school year, a statistically significant difference was yielded, 
\[ t(966) = 10.44, p < .001. \] This difference was a small effect size, Cohen’s \( d \) of 0.34 (Cohen, 1988). The percentage of White students who met criterion on Advanced Placement/International Baccalaureate examinations was approximately two percentage points higher than the percentage of Hispanic students. Descriptive statistics for these analyses are presented in Table 3.6.

**Results for Met Criterion Rates for Advanced Placement/International Baccalaureate Examinations by Economic Status for the 2016-2017 through the 2019-2020 School Years**

In this section, the results for the Advanced Placement/International Baccalaureate examination met criterion rates will be presented by school year and economic status. Findings will be discussed for students who were economically disadvantaged and for all students that met criterion on Advanced Placement/International Baccalaureate examinations. The Texas Academic Performance Reports do not provide a separate variable for students who were not economically disadvantaged. As such, the all student rate variable includes students in poverty. Therefore, any differences present in this study will constitute an underestimate of any real differences that are present regarding Advanced Placement/International Baccalaureate examination performance.
With respect to the Advanced Placement/International Baccalaureate examination met criterion rate comparison for students who were economically disadvantaged and all students for the 2016-2017 school year, a statistically significant difference was present, \( t(1125) = 17.80, p < .001 \). This difference represented a moderate effect size, Cohen’s \( d \) of 0.53 (Cohen, 1988). As delineated in Table 3.7, the percentage of all students who had met criterion on Advanced Placement/International Baccalaureate examinations was approximately three percentage points higher than the percentage of students who were economically disadvantaged.

---

Concerning the 2017-2018 school year, a statistically significant difference was revealed, \( t(1139) = 21.32, p < .001 \). This difference represented a moderate effect size, Cohen’s \( d \) of 0.63 (Cohen, 1988). The percentage of all students who had met criterion on Advanced Placement/International Baccalaureate examinations was approximately three percentage points higher than the percentage of students who were economically disadvantaged.

Regarding the 2018-2019 school year, a statistically significant difference was yielded, \( t(1159) = 17.86, p < .001 \). This difference represented a moderate effect size, Cohen’s \( d \) of 0.52 (Cohen, 1988). The percentage of all students who had met criterion on Advanced Placement/International Baccalaureate examinations was approximately three percentage points higher than the percentage of students who were economically disadvantaged.
In the 2019-2020 school year, a statistically significant difference was present, \( t(1174) = 17.88, \ p < .001 \). This difference represented a moderate effect size, Cohen’s \( d \) of 0.52 (Cohen, 1988). The percentage of all students who had met criterion on Advanced Placement/International Baccalaureate examination was approximately three percentage points higher than the percentage of students who were economically disadvantaged. Descriptive statistics for these analyses are delineated in Table 3.7.

**Discussion**

In this multiyear, statewide investigation, the extent to which differences were present in the percentages of students who met criterion on Advanced Placement/International Baccalaureate examinations as a function of their ethnicity/race and economic status was addressed for the 2016-2017, 2017-2018, 2018-2019, and 2019-2020 school years. The Advanced Placement/International Baccalaureate variables were introduced in the 2016-2017 school year in the Texas Academic Performance Reports as the new College, Career, and Military Ready indicators due to the recent changes in the State of Texas Accountability. In previous years, the Advanced Placement/International Baccalaureate variables only included an all subjects indicator and core subject indicators (i.e., English Language Arts, mathematics, science and social studies). These variables represented the percentages for participation and for met criterion rates on any Advanced Placement/International Baccalaureate examinations. Thus, the results from this study contained the only four years of data available for these new Advanced Placement/International Baccalaureate variables connected with college readiness standards for the State of Texas.
With respect to all four school years, Black students had the lowest percentage of any ethnic/racial group who met criterion on Advanced Placement/International Baccalaureate examinations. These statistics are depicted in Figure 3.1. Asian students had the highest percentages of any ethnic/racial group who met criterion on Advanced Placement/International Baccalaureate examinations. For all four years, the percentages of Asian students who met criterion on Advanced Placement/International Baccalaureate examinations were almost six times higher than the percentages of Black students and over three times higher than the percentages of Hispanic and White students. Regarding Hispanic and White students who had met criterion on the Advanced Placement/International Baccalaureate examinations, these two groups of students had the closest average percentages across all four years and for each year, they had a difference of less than three percentage points.

---------------------------------------------------------
Insert Figure 3.1 about here
---------------------------------------------------------

For all four school years, the percentages of students who had met criterion on Advanced Placement/International Baccalaureate examinations across the four ethnic/racial groups were very consistent. The percentage of Asian students who had met criterion on Advanced Placement/International examinations had the largest change in percentages across all four years, which was 1.32 percentage points between the highest percentage and the lowest percentage. The percentage of Black students who had met criterion on Advanced Placement/International Baccalaureate examinations had the
smallest change in percentages across all four years, which was 0.88 percentage points between the highest percentage and the lowest percentage.

With respect to all four school years, statistically significant differences were yielded in the met criterion comparison rates for Advanced Placement/International Baccalaureate examinations by student economic status. Students who were economically disadvantaged had lower percentages who met criterion on Advanced Placement/International Baccalaureate examinations than their peers. Shown in Figure 3.2 are the statistics for these analyses. All students had higher percentages for met criterion on Advanced Placement/International Baccalaureate examinations, over three percentage points higher, than students who were economically disadvantaged. Lastly, the percentages for students who were economically disadvantaged and for all students remained consistent across all four years and showed little variation over the four-year time span.

Insert Figure 3.2 about here

Connections with Existing Literature

Regarding students who met criterion on Advanced Placement examinations, many positive benefits exist such as higher first-year GPAs in college, higher degree attainment, and higher rates of college graduation in five years or less (Morgan et al., 2007). Of note is that over the past several years, the number of students taking Advanced Placement examinations rose from 1,003,430 in 2013 to 2,642,530 in 2017, and the number of Advanced Placement examinations has increased from 3,153,014 in
2013 to 4,751,957 in 2020 (College Board, 2020). Although the numbers of students and of examinations for Advanced Placement are rising, the percentages of students who had met criterion on Advanced Placement/International Baccalaureate examinations have remained almost stagnant for all groups of students across all four years of this multiyear, statewide study.

With respect to the 2016-2017 through the 2019-2020 school years, Asian students had the highest percentages of students who met criterion on Advanced Placement/International Baccalaureate examinations. These results are congruent with the findings of other researchers (Moore et al., 2010; Shaw et al., 2013). Black students had the lowest percentages of students who met criterion on Advanced Placement/International Baccalaureate examinations across all four years. These findings are also commensurate with the results of previous researchers (Clark et al., 2012; Kettler & Hurst, 2017; Moore & Slate, 2008; Shaw et al., 2013). The percentages of Hispanic and White students who had met criterion on Advanced Placement/International Baccalaureate were closer than the percentages for Hispanic and Black students. Therefore, the gap in percentages between Hispanic and White students was smaller than the gap in percentages between Hispanic and Black students. These findings are consistent with the results from other researchers (Kettler & Hurst, 2017).

**Implications for Policy and for Practice**

Based on the findings of this multiyear, statewide study, several implications for policy and practice can be suggested. Regarding implications for policy, high school principals and district-level administrators need to address the continuing equity gaps for the met criterion rates on Advanced Placement/International Baccalaureate examinations
by student ethnicity/race and economic status. Within this study, Asian student percentages for met criterion rates on Advanced Placement/International examinations were far above the percentages of Black, Hispanic, and White students. To address this continuing disparity, high school principals and school leaders must improve current Advanced Placement/International Baccalaureate policies to support an increased need for diversity in the Advanced Placement/International Baccalaureate courses on high school campuses. Second, state legislators, high school campus administrations and district-level administrators need to mitigate any barriers such as cost of examinations or accessibility due to lack of qualified teachers that would keep students from enrolling in Advanced Placement/International Baccalaureate courses and taking Advanced Placement/International Baccalaureate examinations.

With respect to implications for practice, administrators must strengthen the rigor of the preparatory levels of curriculum within their buildings to prepare and to support their students for Advanced Placement/International Baccalaureate courses and examinations. Further, teachers need to participate in targeted professional development in Advanced Placement/International Baccalaureate course content and instructional differentiation to assist them with the delivery of college-level curriculum to a diverse group of learners. Further, once students are enrolled in Advanced Placement/International Baccalaureate courses, administrators and teachers must maintain accessibility of rigorous study materials for all students who might not have access to costly supplemental Advanced Placement/International Baccalaureate study aides and/or preparatory courses.
**Recommendations for Future Research**

Based on the findings of this multiyear, statewide study, several recommendations can be made for future research. First, this study was restricted to only students in the State of Texas and researchers are recommended to expand this study to other states to ascertain the degree to which the results might be generalizable. Second, the variables within this study were initiated in the 2016-2017 school year due to recent state accountability changes related to the College, Career, and Military Ready standards within the State of Texas. Researchers are encouraged to replicate this study to include future years in this analysis, which could potentially include the years immediately following the worldwide COVID pandemic in the spring of 2020. Third, the only demographic variables that were used in this study were associated with ethnicity/race and economic status. Future researchers are recommended to include in their study other demographic groups such as English Learners, students enrolled in special education, and students in Section 504. Fourth, with the new focus on College, Career, and Military Ready standards within the State of Texas, researchers might expand their study to include other variables such as completion of an On Ramps course or completion of an Industry Based Certification as well as met criterion scores for ACT, SAT, and the TSIA examinations.

**Conclusion**

The purpose of this article was to determine the degree to which differences were present in the percentages of students who had met criterion on Advanced Placement/International Baccalaureate examinations as a function of their ethnicity/race and economic status. For the 2016-2017 through the 2019-2020 school years, statistically
significant differences were revealed. Black students had the lowest percentages of students who had met criterion on Advanced Placement/International Baccalaureate examinations whereas Asian students had the highest percentages of students who had met criterion on Advanced Placement/International Baccalaureate examinations. Asian students who had met criterion on Advanced Placement/International Baccalaureate examinations were over three times higher than the percentages for Hispanic and White students. Students who were economically disadvantaged had lower percentages of met criterion on Advanced Placement/International Baccalaureate examinations than their peers. When observing the trends across all four years of this study, equity gaps still persist across ethnic/racial and economically disadvantaged groups.
References


Phillips, S. F., & Lane, B. (2021). The potential of Advanced Placement to improve college outcomes and narrow racial/ethnic and socioeconomic disparities. *Journal*
of Advanced Academics, 32(4), 469-500.

https://doi.org/10.1177/1932202x211018646


https://doi.org/10.1177/0013164412454291


https://tea.texas.gov/sites/default/files/HB3_Bill_Summary.pdf


Table 3.1

*Descriptive Statistics for the Percentages of Asian and Black Students who Met Criterion on Advanced Placement/International Baccalaureate Examinations for the 2016-2017 Through the 2019-2020 School Years*

<table>
<thead>
<tr>
<th>School Year and Comparison</th>
<th>n of schools</th>
<th>M%</th>
<th>SD%</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016-2017</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>335</td>
<td>46.06</td>
<td>24.73</td>
</tr>
<tr>
<td>Black</td>
<td>656</td>
<td>7.95</td>
<td>12.27</td>
</tr>
<tr>
<td>2017-2018</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>342</td>
<td>45.41</td>
<td>24.83</td>
</tr>
<tr>
<td>Black</td>
<td>674</td>
<td>7.96</td>
<td>12.07</td>
</tr>
<tr>
<td>2018-2019</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>371</td>
<td>45.24</td>
<td>24.90</td>
</tr>
<tr>
<td>Black</td>
<td>699</td>
<td>7.92</td>
<td>12.47</td>
</tr>
<tr>
<td>2019-2020</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>368</td>
<td>46.56</td>
<td>24.54</td>
</tr>
<tr>
<td>Black</td>
<td>697</td>
<td>8.53</td>
<td>13.30</td>
</tr>
</tbody>
</table>

*Note.* The *n* in the table above refers to the number of high schools from which data were obtained.
Table 3.2

Descriptive Statistics for the Percentages of Asian and Hispanic Students who Met Criterion on Advanced Placement/International Baccalaureate Examinations for the 2016-2017 Through the 2019-2020 School Years

<table>
<thead>
<tr>
<th>School Year and Comparison</th>
<th>n of schools</th>
<th>$M%$</th>
<th>$SD%$</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016-2017</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>335</td>
<td>46.06</td>
<td>24.73</td>
</tr>
<tr>
<td>Hispanic</td>
<td>1,079</td>
<td>13.49</td>
<td>15.60</td>
</tr>
<tr>
<td>2017-2018</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>342</td>
<td>45.41</td>
<td>24.83</td>
</tr>
<tr>
<td>Hispanic</td>
<td>1,108</td>
<td>13.56</td>
<td>15.89</td>
</tr>
<tr>
<td>2018-2019</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>371</td>
<td>45.24</td>
<td>24.90</td>
</tr>
<tr>
<td>Hispanic</td>
<td>1,123</td>
<td>14.66</td>
<td>16.38</td>
</tr>
<tr>
<td>2019-2020</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>368</td>
<td>46.56</td>
<td>24.54</td>
</tr>
<tr>
<td>Hispanic</td>
<td>1,145</td>
<td>14.28</td>
<td>16.38</td>
</tr>
</tbody>
</table>

Note. The $n$ in the table above refers to the number of high schools from which data were obtained.
Table 3.3

Descriptive Statistics for the Percentages of Asian and White Students who Met Criterion on Advanced Placement/International Baccalaureate Examinations for the 2016-2017 Through the 2019-2020 School Years

<table>
<thead>
<tr>
<th>School Year and Comparison</th>
<th>n of schools</th>
<th>M%</th>
<th>SD%</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016-2017</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>335</td>
<td>46.06</td>
<td>24.73</td>
</tr>
<tr>
<td>White</td>
<td>962</td>
<td>16.31</td>
<td>17.71</td>
</tr>
<tr>
<td>2017-2018</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>342</td>
<td>45.41</td>
<td>24.83</td>
</tr>
<tr>
<td>White</td>
<td>987</td>
<td>16.48</td>
<td>18.09</td>
</tr>
<tr>
<td>2018-2019</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>371</td>
<td>45.24</td>
<td>24.90</td>
</tr>
<tr>
<td>White</td>
<td>992</td>
<td>17.19</td>
<td>18.81</td>
</tr>
<tr>
<td>2019-2020</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>368</td>
<td>46.56</td>
<td>24.54</td>
</tr>
<tr>
<td>White</td>
<td>1,001</td>
<td>16.40</td>
<td>18.28</td>
</tr>
</tbody>
</table>

Note. The n in the table above refers to the number of high schools from which data were obtained.
Table 3.4

*Descriptive Statistics for the Percentages of Black and Hispanic Students who Met Criterion on Advanced Placement/International Baccalaureate Examinations for the 2016-2017 Through the 2019-2020 School Years*

<table>
<thead>
<tr>
<th>School Year and Comparison</th>
<th>n of schools</th>
<th>M%</th>
<th>SD%</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016-2017</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>656</td>
<td>7.95</td>
<td>12.27</td>
</tr>
<tr>
<td>Hispanic</td>
<td>1,079</td>
<td>13.49</td>
<td>15.60</td>
</tr>
<tr>
<td>2017-2018</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>674</td>
<td>7.96</td>
<td>12.07</td>
</tr>
<tr>
<td>Hispanic</td>
<td>1,108</td>
<td>13.56</td>
<td>15.89</td>
</tr>
<tr>
<td>2018-2019</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>699</td>
<td>7.92</td>
<td>12.47</td>
</tr>
<tr>
<td>Hispanic</td>
<td>1,123</td>
<td>14.66</td>
<td>16.38</td>
</tr>
<tr>
<td>2019-2020</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>697</td>
<td>8.53</td>
<td>13.30</td>
</tr>
<tr>
<td>Hispanic</td>
<td>1,145</td>
<td>14.28</td>
<td>16.38</td>
</tr>
</tbody>
</table>

*Note.* The n in the table above refers to the number of high schools from which data were obtained.
Table 3.5

*Descriptive Statistics for the Percentages of Black and White Students who Met Criterion on Advanced Placement/International Baccalaureate Examinations for the 2016-2017 Through the 2019-2020 School Years*

<table>
<thead>
<tr>
<th>School Year and Comparison</th>
<th>$n$ of schools</th>
<th>$M%$</th>
<th>$SD%$</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016-2017</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>656</td>
<td>7.95</td>
<td>12.27</td>
</tr>
<tr>
<td>White</td>
<td>962</td>
<td>16.31</td>
<td>17.71</td>
</tr>
<tr>
<td>2017-2018</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>674</td>
<td>7.96</td>
<td>12.07</td>
</tr>
<tr>
<td>White</td>
<td>987</td>
<td>16.48</td>
<td>18.09</td>
</tr>
<tr>
<td>2018-2019</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>699</td>
<td>7.92</td>
<td>12.47</td>
</tr>
<tr>
<td>White</td>
<td>992</td>
<td>17.19</td>
<td>18.81</td>
</tr>
<tr>
<td>2019-2020</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>697</td>
<td>8.53</td>
<td>13.30</td>
</tr>
<tr>
<td>White</td>
<td>1,001</td>
<td>16.40</td>
<td>18.28</td>
</tr>
</tbody>
</table>

*Note.* The $n$ in the table above refers to the number of high schools from which data were obtained.
Table 3.6

*Descriptive Statistics for the Percentages of Hispanic and White Students who Met Criterion on Advanced Placement/International Baccalaureate Examinations for the 2016-2017 Through the 2019-2020 School Years*

<table>
<thead>
<tr>
<th>School Year and Comparison</th>
<th>n of schools</th>
<th>M%</th>
<th>SD%</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016-2017</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
<td>1,079</td>
<td>13.49</td>
<td>15.60</td>
</tr>
<tr>
<td>White</td>
<td>962</td>
<td>16.31</td>
<td>17.71</td>
</tr>
<tr>
<td>2017-2018</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
<td>1,108</td>
<td>13.56</td>
<td>15.89</td>
</tr>
<tr>
<td>White</td>
<td>987</td>
<td>16.48</td>
<td>18.09</td>
</tr>
<tr>
<td>2018-2019</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
<td>1,123</td>
<td>14.66</td>
<td>16.38</td>
</tr>
<tr>
<td>White</td>
<td>992</td>
<td>17.19</td>
<td>18.81</td>
</tr>
<tr>
<td>2019-2020</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
<td>1,145</td>
<td>14.28</td>
<td>16.38</td>
</tr>
<tr>
<td>White</td>
<td>1,001</td>
<td>16.40</td>
<td>18.28</td>
</tr>
</tbody>
</table>

*Note.* The n in the table above refers to the number of high schools from which data were obtained.
Table 3.7

Descriptive Statistics for the Percentages of Students who Were Economically Disadvantaged and All Students who Met Criterion on Advanced Placement/International Baccalaureate Examinations for the 2016-2017 Through the 2019-2020 School Years

<table>
<thead>
<tr>
<th>School Year and Comparison</th>
<th>n of schools</th>
<th>M%</th>
<th>SD%</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016-2017</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Economically Disadvantaged</td>
<td>1,126</td>
<td>10.91</td>
<td>14.21</td>
</tr>
<tr>
<td>All Students</td>
<td>1,133</td>
<td>14.03</td>
<td>16.04</td>
</tr>
<tr>
<td>2017-2018</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Economically Disadvantaged</td>
<td>1,140</td>
<td>11.08</td>
<td>14.32</td>
</tr>
<tr>
<td>All Students</td>
<td>1,149</td>
<td>14.36</td>
<td>16.38</td>
</tr>
<tr>
<td>2018-2019</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Economically Disadvantaged</td>
<td>1,160</td>
<td>11.83</td>
<td>14.74</td>
</tr>
<tr>
<td>All Students</td>
<td>1,164</td>
<td>15.05</td>
<td>16.74</td>
</tr>
<tr>
<td>2019-2020</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Economically Disadvantaged</td>
<td>1,175</td>
<td>11.73</td>
<td>14.72</td>
</tr>
<tr>
<td>All Students</td>
<td>1,179</td>
<td>14.98</td>
<td>16.84</td>
</tr>
</tbody>
</table>

Note. The n in the table above refers to the number of high schools from which data were obtained.
Figure 3.1

Mean Percentages of Students who Met Criterion on Advanced Placement/International Baccalaureate Examinations by Ethnicity/race

Note. Asian students, Black students, Hispanic students, and White students for the 2016-2017 through the 2019-2020 school years.
**Figure 3.2**

*Mean Percentages of Students who Met Criterion on Advanced Placement/International Baccalaureate Examinations by Economic Status*

*Note.* All students and students who were economically disadvantaged for the 2016-2017 through the 2019-2020 school years.
CHAPTER IV
DIFFERENCES IN TEXAS STUDENTS’ COMPLETION RATES FOR ASSOCIATE
DEGREE AS A FUNCTION OF GENDER, ETHNICITY/RACE, AND ECONOMIC
STATUS

This dissertation follows the style and format of Research in the Schools (RITS).
Abstract

In this multiyear, statewide investigation, the extent to which differences were present in the percentages of students who completed an Associate degree as a function of their ethnicity/race and economic status was determined for the 2016-2017 through the 2019-2020 school years. Statistically significant differences were revealed in the completion rates for an Associate degree across all four years. Students who were economically disadvantaged had lower completion rates for an Associate degree than their peers. No ethnic/racial differences were present in Associate degree completion. All students, regardless of their ethnicity/race, had very low rates of completing an Associate degree across all four school years. Implications for policy and practice, as well as recommendations for future research, were discussed.

Keywords: Asian; Associate degree; Black; Economically disadvantaged; Ethnicity/race; Hispanic; White
DIFFERENCES IN TEXAS STUDENTS’ COMPLETION RATES FOR ASSOCIATE DEGREE AS A FUNCTION OF GENDER, ETHNICITY/RACE AND ECONOMIC STATUS

With the trend in employment for job seekers to need more than a high school diploma, educational leaders need to find ways to assist students in transitioning from high school to postsecondary education (Camara et al., 2015). One way that high schools might stimulate student interest in higher education is course offerings in dual credit, which are courses that allow students to earn high school credit and college credit simultaneously (Texas Higher Education Coordinating Board, 2018). High school students can begin their college course work early either by taking a mixture of dual-credit courses or by taking a prescribed list of dual-credit courses to obtain an Associate degree. Wang et al. (2015) examined the effect of dual credit enrollment on high school students entering college without any type of delay between high school and 2-year technical colleges in the State of Wisconsin. Dual-credit enrollment increased the likelihood of students entering a 2-year technical college immediately after graduating from high school (Wang et al., 2015).

Another group of researchers, Grubb et al. (2017), assessed the effects of dual-credit coursework on the likelihood of students needing remediation courses as well as graduation rates at a community college in northeast Tennessee. Students who had enrolled in dual credit courses were 9% less likely to need remediation courses, which minimized their need to take additional coursework. Regarding graduation rates at the 2-year college, students who had been enrolled in dual credit were 26% more likely to complete their degree in two years and 28% more likely to complete their degree in three
years than students who had not been enrolled in dual-credit during high school (Grubb et al., 2017).

In other studies, earning college credit while still attending high school had many positive outcomes. In one investigation, students who had been enrolled in dual-credit had higher first-term college GPAs after completing some form of dual-credit coursework while in high school than their nondual-credit peers (Young et al., 2013). An increase in self-confidence was another positive result of taking dual-credit courses in high school (Speroni, 2011). Students at a 4-year Tennessee university who enrolled in at least one dual-credit course while in high school had higher second year college retention rates than students who had not enrolled in any dual-credit courses while in high school (Bowers & Foley, 2018). After controlling for several educational and socioeconomic factors, enrollment at 2-year and 4-year colleges was higher in the State of Illinois for dual-credit students than for nondual-credit students (Lichtenberger et al., 2014).

In another investigation, Struhl and Vargas (2012) examined dual-credit enrollment in Texas for a sample of high school seniors in the 2003-2004 school year and followed them for six years past high school graduation. Students who participated in dual-credit coursework were 2.2 times more likely to enroll in a 2-yr or 4-yr college, 2 times more likely to persist into the second year of college, and 1.7 times more likely to obtain a college degree. Regarding students who were economically disadvantaged, dual-credit enrollment increased their rate of enrollment in college upon high school graduation (Struhl & Vargas, 2012).

Within the State of Illinois, Taylor (2015) analyzed dual-credit enrollment during the 2002-2003 school year. For dual-credit students, 91% enrolled in a college and 52%
earned a college degree whereas for nondual-credit students, only 63% enrolled in a college and only 29% earned a college degree. For students of color who were in dual-credit, 91% enrolled in a college and 43% obtained a college degree. In contrast, 62% of nondual-credit students of color enrolled in college and 23% obtained a college degree (Taylor, 2015). Concerning students who were economically disadvantaged, differences were even greater between dual-credit and nondual-credit students. For college enrollment of these students, 85% of the dual-credit students enrolled in a college whereas only 58% of the nondual-credit enrolled in a college. With respect to earning a college degree, 34% of the dual-credit students were successful and 18% of the nondual-credit students were successful (Taylor, 2015).

Although some high schools across the country participate in dual-credit courses through a partnership with a 2-year or 4-year college, the Early College High Schools followed a different path by having every student focused on college readiness (Edmonds, 2012). In 2002, The Early College High School Initiative originated through the Bill and Melinda Gates Foundation to assist students who were economically disadvantaged by giving them an opportunity to earn an Associate degree while attending high school (Hoffman et al., 2009). The Early College High School campuses often were located on 2-year or 4-year colleges in an attempt to minimize the transition between high school and college (Edmonds, 2012). Another tenet of Early College High Schools was to recruit first-generation college students along with other underrepresented populations such as English Learners, students who were economically disadvantaged, or students of color (Hoffman, 2005). These types of high schools often serve students who were
economically disadvantaged, students of color, and students who were first-generation college students with the opportunity to earn college credit (Seltzer, 2010).

In a qualitative study, Saenz and Combs (2015) interviewed 17 Hispanic students in Grade 12 who were enrolled in an Early College High School. The theme of earning an Associate degree was important in the study, and the ability to obtain 60 hours of college course credit was considered a gift to these students and their families along with other benefits such as scholarship opportunities to 4-year universities. These students developed adult skills such as decision-making, commitment, goal-setting, and responsibility. Another positive outcome in regard to Early College High School was increased social and emotional learning such as self-awareness and self-esteem (Saenz & Combs, 2015).

In another qualitative investigation, Woodcock and Olson Beal (2013) interviewed three Early College High School students to uncover common themes related to their experiences. The students discussed how their attendance in an Early College High School helped them to be successful academically in college. In addition, they reported that having to leave their long-term friendships behind was difficult. However, they were able to develop new friendships through their participation in the Early College High School program. The ability to take college courses prior to entering a 4-year university prepared the students well for the rigor of college-level coursework in the future (Woodcock & Olson Beal, 2013). One student discussed the amount of time needed for studying and for preparing for classes left little time for any other type of extracurricular activities, which were often a part of a traditional high schools within the United States. In regard to social relationships, all three students described having
positive experiences, including building new friendships (Woodcock & Olson Beal, 2013).

Another set of researchers, Edmonds et al. (2020), explored the effects of Early College High Schools on student attainment of postsecondary degrees and their GPAs in 4-year universities. The sample included 4,054 students who participated in Early College High Schools from the 2005-2006 school year through the 2010-2011 school year in rural and urban locations in North Carolina. At the end of four years after high school, 37.8% of students who had attended an Early College High School had obtained a postsecondary degree compared to 22% of students who had not attended an Early College High School (Edmonds et al., 2020). Early College High Schools had a statistically significant effect on 4-year degree attainment for students who were economically disadvantaged, which was consistent with the purpose of an Early College High School’s goal to remove barriers from students who were economically disadvantaged and first-generation college students (Edmonds et al., 2020). In another investigation, Burns et al. (2019) analyzed different Early College High School programs and the time to bachelor’s degree attainment at a metropolitan Midwestern land grant university. With student participation in an Early College High School program, time to graduation with a bachelor’s degree was reduced and probability of attaining a bachelor’s degree was increased (Burns et al., 2019).

In a national longitudinal study, Haxton et al. (2016) focused on a sample of 10 Early College High Schools out of 154 Early College High Schools that enrolled Grades 9 through Grade 12 students between the 2005-2006 school year and the 2007-2008 school year. The Early College High Schools had to use lotteries for admission processes
for incoming Grade 9 students, had at least one year of high school graduates, and retained their lottery records (Haxton et al., 2016). Upon graduation from high school, 80.9% of students who had attended an Early College High School enrolled in a postsecondary setting whereas 72.2% of students who did not attend an Early College High School enrolled in a postsecondary setting. Regarding postsecondary degree attainment, 24.9% of students who had attended an Early College High School earned some form of postsecondary degree compared to only 4.7% of students who had not attended an Early College High School (Haxton et al., 2016). Concerning ethnicity/race, students of color students who had attended an Early College High School were almost 10 times more likely to have earned a college degree than students of color who had not attended an Early College High School. White students who had attended an Early College High School were about four times more likely to earn a college degree compared to students who had not attended an Early College High School. Lastly, students who attended an Early College High School and who were economically disadvantaged were 8.5 times more likely to obtain a college degree than were their non-Early College High School counterparts (Haxton et al., 2016).

**Statement of the Problem**

Many researchers who have examined dual-credit enrollment focused on first-term college GPAs (Young et al., 2013), college enrollment, persistence to stay in college, and the attainment of a postsecondary degree (Struhl & Vargas, 2012; Taylor, 2015). Other researchers (Burns et al., 2019; Edmonds et al., 2020; Haxton, 2016) investigated students who attended an Early College High School and their likelihood of enrollment in college, of persistence in college, and of degree attainment. However, very
few published research articles could be located regarding the attainment of an Associate degree while still enrolled in high school. Therefore, current research in the completion of an Associate degree in high school as a factor of ethnicity/race and economic status in the State of Texas would be a contribution to the current literature.

**Purpose of the Study**

The purpose of this study was to determine the degree to which differences were present in the percentages of students who earned an Associate degree as a function of their ethnicity/race (i.e., Asian, Black, Hispanic, and White) and economic status (i.e., not poor and poor). At the time of the study, the percentages for all four groups of students were compared for four school years (i.e., 2016-2017, 2017-2018, 2018-2019, and 2019-2020) of Texas statewide data. These four years of high school data represented the most recent data available. Due to the COVID-19 pandemic, all campuses and districts received a label of Not Rated: Declared State of Disaster for the 2019-2020 school year, which dramatically affected the availability of data related to Associate degree completions.

**Significance of the Study**

According to the U.S. Bureau of Labor Statistics (2020), adults 25 years and over who have less than a high school diploma had the highest unemployment rate, which was 5.4%, and the lowest median weekly earnings than adults 25 years and over who have at least a high school diploma in 2019. Further, for adults 25 years and over, as the level of educational attainment rises, their level of their income rises and their rate of unemployment decreases (U.S. Bureau of Labor Statistics, 2020). With the ability to increase their earnings potential, high school graduates may benefit from opportunities to
earn an Associate degree while still in high school. Past qualitative research (Saenz & Combs, 2015; Woodcock & Olson Beal, 2013) exists about the themes related to attendance at an Early College High School whereas past quantitative research studies (Burns et al., 2019; Edmonds et al., 2020; Haxton, 2016) are present about comparisons of attainment of postsecondary degrees between students who attended an Early College High School and students who did not attend an Early College High School.

Findings from this study can be used to address gaps in the literature regarding Associate degree attainment for high school students as a factor of ethnicity/race and economic status for the 2016-2017 through the 2019-2020 school years in Texas. Another aspect was an analysis of any trends present in the percentages of students who earned an Associate degree by their ethnicity/race and economic status over the 2016-2017, 2017-2018, 2018-2019, and 2019-2020 school years. Due to recent changes in Texas’s public school accountability ratings and in public school funding, Associate degree completion by high school students constitutes an important topic for high school students, parents, school board members, community stakeholders, college admission officers, and state legislature representatives.

**Research Questions**

The following research questions were addressed: (a) What is the difference in the percentage of students who earned an Associate degree as a function of their ethnicity/race?; (b) What is the difference in the percentage of students who earned an Associate degree as a function of their economic status?; (c) What trend exists in the percentage of students who earned an Associate degree as a function of their ethnicity/race from the 2016-2017 through the 2019-2020 school years?; and (d) What
trend exists in the percentage of students who earned an Associate degree as a function of their economic status from the 2016-2017 through the 2019-2020 school years? The first two research questions were repeated for the 2017-2018, 2018-2019, and 2019-2020 school years and the last two research questions involved all four school years to determine a possible trend in the data. As a result, this empirical study contained 10 research questions.

Method

Research Design

A non-experimental causal-comparative research design was used for this study (Creswell & Creswell, 2018). The Texas Academic Performance Reports from the 2016-2017 through the 2019-2020 school years were used to examine completion rates for Associate degrees in the State of Texas. Because the independent and the dependent variables occurred in the past, they could not be changed or manipulated (Johnson & Christensen, 2019). For this study, the independent variables were ethnicity/race (i.e., Asian, Black, Hispanic, and White) and economic status (i.e., economically disadvantaged and not economically disadvantaged) whereas the dependent variable was the percentage of students who had earned an Associate degree. The Texas Education Agency has rigorous data standards and audit procedures. Accordingly, for this study, the archival data on Texas high schools were assumed to be accurate and free of errors (Texas Education Agency, 2021a).
Participants and Instrumentation

Participants for this study were high school students (i.e., Asian, Black, Hispanic, and White) who had previously earned an Associate degree or who were high school students (i.e., economically disadvantaged or not economically disadvantaged) who had previously earned an Associate degree. The Texas Education Agency, which has data on students who have earned an Associate degree, was the source of the archival data for this study. The Texas Academic Performance Reports provided the data from the 2016-2017, 2017-2018, 2018-2019, and 2019-2020 school years. These reports are available to any public users who want information on high school students in the State of Texas (Texas Education Agency, 2021b).

For this article, two terms need to be defined: (a) Associate degree and (b) economically disadvantaged. An Associate degree is defined as “a grouping of courses designed to lead the individual directly to employment in a specific career or to transfer to an upper-level baccalaureate program (19 Texas Administrative Code §7.3, 2020)”.

These forms of degrees have specific titles that include the Associate of Arts, the Associate of Science, the Associate of Applied Arts, the Associate of Applied Science, and the Associate of Occupational Studies (19 Texas Administrative Code §7.3, 2020). Economically disadvantaged, as defined by the Texas Education Agency (2020), is a student “who is eligible for free or reduced-price meals under the National School Lunch and Child Nutrition Program” (p. 1).
Results

Before conducting inferential statistics to determine whether statistically significant differences were present in the percentages of students who completed an Associate degree as a function of their ethnicity/race and economic status, checks for normalcy were conducted to determine the extent to which these data were normally distributed. Although almost all the assumptions were not met for this study, Field (2018) contends that the parametric independent samples \( t \)-test analysis is sufficiently robust to withstand the violations of its underlying assumptions. Therefore, the parametric samples \( t \)-tests were calculated to answer the prior research questions concerning Associate degree completion rates.

Results for Associate Degree Completion Rates by Ethnicity/Race for the 2016-2017 through the 2019-2020 School Years

In this section, the results for Associate degree completion rates will be presented by school year and by ethnicity/race. The results will be discussed for six different pairs: (a) Asian and Black; (b) Asian and Hispanic; (c) Asian and White; (d) Black and Hispanic; (e) Black and White; and (f) Hispanic and White. With respect to the Associate degree rate comparison between Asian and Black students in the 2016-2017 school year, a statistically significant difference was present, \( r(308) = 2.23, p = .027 \). This difference represented a below small effect size, Cohen’s \( d \) of 0.13 (Cohen, 1988). As delineated in Table 4.1, a statistically significantly higher percentage, 0.30%, of Asian students had obtained an Associate degree than was obtained by Black students.
Concerning the 2017-2018 school year, a statistically significant difference was revealed, \( t(318) = 2.44, p = .015 \). This difference represented a below small effect size, Cohen’s \( d \) of 0.14 (Cohen, 1988). A statistically significantly higher percentage, 0.61%, of Asian students had obtained an Associate degree than was obtained by Black students.

Regarding the 2018-2019 school year, a statistically significant difference was yielded, \( t(345) = 3.07, p = .002 \). This difference represented a below small effect size, Cohen’s \( d \) of 0.16 (Cohen, 1988). A statistically significantly higher percentage, 0.76%, of Asian students had obtained an Associate degree than was obtained by Black students.

In the 2019-2020 school year, a statistically significant difference was present, \( t(342) = 3.20, p = .002 \). This difference was a below small effect size, Cohen’s \( d \) of 0.17 (Cohen, 1988). A statistically significantly higher percentage, 0.98%, of Asian students had obtained an Associate degree than was obtained by Black students. Descriptive statistics for these analyses are delineated in Table 4.1.

With respect to the Associate degree rate comparison between Asian and Hispanic students in the 2016-2017 school year, a statistically significant difference was revealed, \( t(334) = 1.98, p = .048 \). This difference was a below small effect size, Cohen’s \( d \) of 0.11 (Cohen, 1988). As presented in Table 4.2, a statistically significantly higher percentage, 0.34%, of Asian students had obtained an Associate degree than was obtained by Hispanic students.
Concerning the 2017-2018 school year, a statistically significant difference was yielded, $t(341) = 2.63, p = .009$. This difference was a below small effect size, Cohen’s $d$ of 0.14 (Cohen, 1988). A statistically significantly higher percentage, 0.74%, of Asian students had obtained an Associate degree than was obtained by Hispanic students.

Regarding the 2018-2019 school year, a statistically significant difference was present, $t(370) = 3.69, p < .001$. This difference represented a near small effect size, Cohen’s $d$ of 0.19 (Cohen, 1988). A statistically significantly higher percentage, 0.94%, of Asian students had obtained an Associate degree than was obtained by Hispanic students.

In the 2019-2020 school year, a statistically significant difference was revealed, $t(367) = 3.11, p = .002$. This difference represented a below small effect size, Cohen’s $d$ of 0.16 (Cohen, 1988). A statistically significantly higher percentage, 0.96%, of Asian students had obtained an Associate degree than was obtained by Hispanic students.

Contained in Table 4.2 are the descriptive statistics for these analyses.

With respect to the Associate degree rate comparison between Asian and White students in the 2016-2017 school year, a statistically significant difference was not yielded, $t(327) = 1.74, p = .08$. As presented in Table 4.3, a slightly higher percentage, 0.29%, of Asian students had obtained an Associate degree than was obtained by White students.
Concerning the 2017-2018 school year, a statistically significant difference was not present, $t(332) = 1.59, p = .112$. Though not statistically significant, a slightly higher percentage, 0.40%, of Asian students had obtained an Associate degree than was obtained by White students. Regarding the 2018-2019 school year, a statistically significant difference was revealed, $t(360) = 3.13, p = .002$. This difference represented a below small effect size, Cohen’s $d$ of 0.16 (Cohen, 1988). A statistically significantly higher percentage, 0.88%, of Asian students had obtained an Associate degree than was obtained by White students. Readers should note that the average percentage for Asian and White students who had completed an Associate degree was statistically significant, a result in contrast to the previous two years of data.

In the 2019-2020 school year, a statistically significant difference was yielded, $t(359) = 2.47, p = .014$. This difference represented a below small effect size, Cohen’s $d$ of 0.17 (Cohen, 1988). A statistically significantly higher percentage, 0.75%, of Asian students had obtained an Associate degree than was obtained by White students.

Descriptive statistics for these analyses are presented in Table 4.3.

With respect to the Associate degree rate comparison between Black and Hispanic students in the 2016-2017 school year, a statistically significant difference was not present, $t(639) = 1.19, p = .23$. Though not statistically significant, a slightly higher percentage, 0.09%, of Hispanic students had obtained an Associate degree than was
obtained by Black students. Descriptive statistics for this analysis are revealed in Table 4.4.

Concerning the 2017-2018 school year, a statistically significant difference was not revealed, \( t(663) = 0.22, p = .827 \). Though not statistically significant, a slightly higher percentage, 0.04\%, of Hispanic students had obtained an Associate degree than was obtained by Black students. Regarding the 2018-2019 school year, a statistically significant difference was not yielded, \( t(687) = 0.11, p = .914 \). Similar percentages of Black students and Hispanic students had obtained an Associate degree.

In the 2019-2020 school year, a statistically significant difference was present, \( t(685) = 3.00, p = .003 \). This difference represented a below small effect size, Cohen’s \( d \) of 0.12 (Cohen, 1988). A statistically significantly higher percentage, 0.31\%, of Hispanic students had obtained an Associate degree than was obtained by Black students. Readers should note that the average percentage for Black and Hispanic students who had completed an Associate degree were statistically significant, a result in contrast to the three previous years. Descriptive statistics for these analyses are delineated in Table 4.4.

With respect to the Associate degree rate comparison between Black and White students in the 2016-2017 school year, a statistically significant difference was not revealed, \( t(589) = 0.13, p = .897 \). As delineated in Table 4.5, similar percentages of White students and Black students had obtained an Associate degree.
Concerning the 2017-2018 school year, a statistically significant difference was not yielded, $t(615) = 1.26, p = .207$. Similar percentages of White students and Black students had obtained an Associate degree. Regarding the 2018-2019 school year, a statistically significant difference was not present, $t(631) = 0.03, p = .97$. Again, similar percentages of Black students and White students had obtained an Associate degree.

In the 2019-2020 school year, a statistically significant difference was revealed, $t(631) = 3.49, p = .001$. This difference represented a below small effect size, Cohen’s $d$ of 0.14 (Cohen, 1988). A statistically significantly higher percentage, 0.48%, of White students had obtained an Associate degree than was obtained by Black students. Readers should note that the average percentage for Black and White students who had completed an Associate degree was statistically significant, a result in contrast to the three previous years. Table 4.5 contains the descriptive statistics for these analyses.

With respect to the Associate degree rate comparison between Hispanic and White students in the 2016-2017 school year, a statistically significant difference was not yielded, $t(910) = 0.68, p = .498$. As presented in Table 4.6, similar percentages of White students and Hispanic students had obtained an Associate degree. Concerning the 2017-2018 school year, a statistically significant difference was present, $t(945) = 1.99, p = .047$. This difference represented a below small effect size, Cohen’s $d$ of 0.06 (Cohen, 1988). A statistically significantly higher percentage, 0.19%, of White students had obtained an Associate degree than was obtained by Hispanic students.
Regarding the 2018-2019 school year, a statistically significant difference was not revealed, \( t(951) = 1.10, p = .27 \). Similar percentages of White students and Hispanic students had obtained an Associate degree. In the 2019-2020 school year, a statistically significant difference was not yielded, \( t(966) = 1.42, p = .16 \). Again, similar percentages of White students and Hispanic students had obtained an Associate degree. Descriptive statistics for these analyses are presented in Table 4.6.

**Results for Associate Degree Completion Rates by Economic Status for the 2016-2017 through the 2019-2020 School Years**

In this section, the results for Associate degree completion rates will be discussed by school year and economic status. Findings will be discussed for students who were economically disadvantaged and for all students who completed an Associate degree. In the reporting categories of the Texas Academic Performance Reports, a separate variable for students who were not economically disadvantaged is not present. Therefore, the all student rate for students who had completed an Associate degree was used for statistical analyses. Because students who are economically disadvantaged are included in the all student rate variable, any differences present in this study may constitute underestimates of the real differences that are present in Associate degree completion rates.

Regarding the Associate degree completion rate comparison between students who were economically disadvantaged and all students, a statistically significant difference was yielded, \( t(1125) = 3.18, p = .002 \). This difference was a below small
effect size, Cohen’s $d$ of $0.10$ (Cohen, 1988). As revealed in Table 4.7, a statistically significantly higher percentage, $0.07\%$, of all students had obtained an Associate degree than was obtained by students who were economically disadvantaged.

In the 2017-2018 school year, a statistically significant difference was present, $t(1139) = 4.86$, $p < .001$. This difference was a below small effect size, Cohen’s $d$ of $0.14$ (Cohen, 1988). A statistically significantly higher percentage, $0.13\%$, of all students had obtained an Associate degree than was obtained by students who were economically disadvantaged.

With respect to the 2018-2019 school year, a statistically significant difference was revealed, $t(1159) = 6.37$, $p < .001$. This difference was a near small effect size, Cohen’s $d$ of $0.19$ (Cohen, 1988). A statistically significantly higher percentage, $0.29\%$, of all students had obtained an Associate degree than was obtained by students who were economically disadvantaged.

Concerning the 2019-2020 school year, a statistically significant difference was yielded, $t(1174) = 5.69$, $p < .001$. This difference was a below small effect size, Cohen’s $d$ of $0.17$ (Cohen, 1988). A statistically significantly higher percentage, $0.26\%$, of all students had obtained an Associate degree than was obtained by students who were economically disadvantaged. Descriptive statistics for these analyses are delineated in Table 4.7.
Discussion

In this multiyear, statewide investigation, the degree to which differences were present in the percentages of students who had completed an Associate degree as a function of their ethnicity/race and economic status was examined for the 2016-2017, 2017-2018, 2018-2019, and 2019-2020 school years. For the 2016-2017 school year, Associate degree completion variables were unveiled in the Texas Academic Performance Reports as a piece of the College, Career, and Military Ready indicators. In prior years, the State of Texas did not have the completion of an Associate degree as a variable in the Texas Academic Performance Reports, and during those years, the data for Associate degree completion were tracked through data entry on student records in the Public Education Information Management System. Thus, the results from this study consisted of the only four years of data available due to the recent additions in the College, Career, and Military Ready variables in the Texas Academic Performance Reports.

Concerning the 2016-2017 through the 2019-2020 school years, Hispanic students who had completed an Associate degree had the highest percentages of students who had completed an Associate degree as depicted in Figure 4.1. For three out of the four years, White students had the lowest percentages of students who had completed an Associate degree. In the other school year, Black and White students had the same percentages of students who had completed an Associate degree. Across all four years, all students, regardless of ethnicity, had very low rates of completing an Associate degree.
In the four school years, small incremental gains were evident in the percentages of students who had completed an Associate degree across all four ethnic/racial groups. Asian students who had completed an Associate degree had the highest percentage of increase, at 3.31 percentage points. Black students had the lowest percentage of increase, at 2.29 percentage points. The order from the highest change to the lowest change in percentages of students who had completed an Associate degree for all four years was Asian, Hispanic, White, and Black students.

With respect to the 2016-2017 through the 2019-2020 school years, student economic status was statistically significantly related to completion rates of an Associate degree. Students who were economically disadvantaged had lower average percentages for completion of an Associate degree than their peers. Further, students who were economically disadvantaged and all students had very low rates of completion of an Associate degree across all four years. These statistics are depicted in Figure 4.2. Across the four years, incremental gains were present in the percentages of students who had completed an Associate degree.

Insert Figure 4.1 about here

Insert Figure 4.2 about here
Connections with Existing Literature

In this multiyear, statewide study, statistically significant differences were present in some of the comparisons by ethnicity/race. For the 2016-2017, 2017-2018, 2018-2019, and 2019-2020, Hispanic students had the highest percentages of students who had completed an Associate degree. For all four school years, the order of highest percentages to lowest percentages were Hispanic, Asian, Black, and White. Statistically significant differences were also evident by student economic status. For all four years, students who were economically disadvantaged had lower percentages of Associate degree completions than their peers.

Previous researchers (Grubb et al., 2017; Struhl & Vargas, 2012; Taylor, 2015; Wang et al., 2015; Young et al., 2013) focused on the benefits of dual-credit courses and of participation in Early College High Schools. The increased likelihood of entering college after high school graduation (Struhl & Vargas, 2012; Taylor, 2015; Wang et al., 2015), of college degree attainment (Grubb et al., 2017; Sturhl & Vargas, 2012; Taylor, 2015) and of higher first-term GPAs in college (Young et al., 2013) were all benefits for students who had participated in dual-credit courses. Students who graduated from an Early College High School had higher rates of college degree completion (Burns et al., 2019; Edmonds et al., 2020). With the lack of research investigations solely on Associate degree completion as a factor of ethnicity/race, the findings of this study will add to the existing literature that encompasses the topics of dual-credit courses and of Early College High Schools.
Implications for Policy and Practice

Based on the results from this multiyear, statewide investigation, many implications for policy and practice can be recommended. Concerning policy implications, high school principals, district-level school administrators, college administrators, and state legislators need to address the overall low numbers of high school students earning an Associate degree and the ongoing equity gaps across ethnic/racial and economic status characteristics. Current policies within the State of Texas must be changed to enable more high school students to graduate with their Associate degree. Second, district-level administrators, high school principals, and college-level administrators must forge new relationships between high schools and college campuses where currently, students do not have the option to earn an Associate degree. Further, even though the number of Early College High Schools has expanded over the last several years, state legislators and district-level administrators need to encourage more school districts to create Early College High Schools in an effort to increase the overall number of high school students who could earn an Associate degree prior to their high school graduation. Lastly, students must have 60 hours of college credit in order to earn an Associate degree, which can be costly for high school students and for their families. State policymakers, district-level administrators, high school principals, and college-level administrators must find ways to assist with funding for dual-credit courses to ensure all students, regardless of their economic status, are able to earn an Associate degree.

Concerning implications for practice, high school students who earn an Associate degree must be college ready in English and mathematics as young as Grade 9 to
participate in dual-credit courses. College readiness could be a barrier for many students if they want to pursue an Associate degree. Thus, high school principals, district-level administrators, and teachers need to enhance their English and mathematics curriculum in elementary, middle school, and high school settings to increase the ability of high school students to test as college ready during Grade 9 and Grade 10. With the need for more rigorous curriculum at earlier grades, district-level curriculum administrators and instructional coaches must provide teachers with new ways to incorporate college readiness standards into the current scope and sequence of English and mathematics courses. Second, the Texas Success Initiative Assessment 2.0, which is a college readiness test in the State of Texas, was implemented in the spring of 2021, and the reboot of this test resulted in higher college readiness standards for English and mathematics. Further, the SAT, which is another college readiness test, has upcoming changes, which will launch in small test groups in spring of 2022. With these changes, district-level curriculum administrators, instructional coaches, and teachers need to engage in professional development and in curriculum development of English and mathematics courses in order to prepare their students for these upcoming college readiness tests.

Recommendations for Future Research

Many recommendations can be made based on the findings of this multiyear, statewide study. First, this study was restricted to high school students in the State of Texas. Accordingly, researchers are recommended to expand this study to other states to determine the degree to which the results might be generalizable. Second, the variables investigated in this study were newly formed ones because of the recent changes to the
College, Career, and Military Ready indicators in the Texas state accountability system. Researchers are recommended to replicate this study to include future years in their analysis. Third, the variables for ethnicity/race and for economic status were the only demographic variables that were analyzed within this study. Future researchers might extend this study to include other demographic characteristics such as English Learners, students enrolled in special education, and students in Section 504. Fourth, the growth of Early College High Schools has continued to grow in the State of Texas. Researchers might change the focus of this study from high schools with Grade 9 through Grade 12 students to include only Early College High Schools. Lastly, with the new focus on college, career, and military readiness in Texas, future researchers might include other indicators of college readiness such as the completion of On Ramps courses, met criterion scores for ACT, SAT, and TSIA examinations, and completion of Industry Based Certifications.

**Conclusion**

The purpose of this article was to determine the degree to which differences were evident in the percentages of students who completed an Associate degree as a function of their ethnicity/race and economic status. With the low number of students attaining an Associate degree, especially in the 2016-2017 and 2017-2018 school years, the small sample sizes might have been a contributing factor to the lack of statistical significance in several of the comparison groups. White students had the lowest percentages of students who had completed an Associate degree for all four years. Hispanic had the highest percentages of students who had completed an Associate degree across all four years, followed by Asian students, and then by Black students. Due to the growth in Early
College High Schools across the State of Texas, the findings regarding White students had the lowest percentages was not a surprise. Early College High Schools in Texas historically enroll underserved students, which consist of students who are at-risk and students in poverty. Throughout the last two decades, many of the Early College High Schools in Texas have developed in large urban cities and suburbs, which typically have large numbers of students of color and students who are economically disadvantaged (Texas Education Agency, 2022). Thus, due to geographical locations, White students may not be represented in Early College High Schools at the same rate as students of color.

Regarding students who were economically disadvantaged and all students, statistically significant differences were evident in all four school years. Students who were economically disadvantaged had lower percentages of completion rates for an Associate degree than all students. When observing trends for all four years, equity gaps continue to persist across all ethnic/racial and economic status groups of students.
References


https://doi.org/10.1177/0091552115594880

Texas Administrative Code, Title 19, §7.3 (2020).


https://tea.texas.gov/academics/college-career-and-military-prep/early-college-high-school-echs

http://reportcenter.highered.texas.gov/agency-publication/miscellaneous/dual-credit/


Table 4.1

*Descriptive Statistics for the Percentages of Asian and Black Students who Completed an Associate Degree for the 2016-2017 Through the 2019-2020 School Years*

<table>
<thead>
<tr>
<th>School Year and Comparison</th>
<th>n of schools</th>
<th>M%</th>
<th>SD%</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016-2017</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>309</td>
<td>0.81</td>
<td>6.79</td>
</tr>
<tr>
<td>Black</td>
<td>309</td>
<td>0.51</td>
<td>5.30</td>
</tr>
<tr>
<td>2017-2018</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>319</td>
<td>2.25</td>
<td>12.79</td>
</tr>
<tr>
<td>Black</td>
<td>319</td>
<td>1.64</td>
<td>10.73</td>
</tr>
<tr>
<td>2018-2019</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>346</td>
<td>3.50</td>
<td>15.92</td>
</tr>
<tr>
<td>Black</td>
<td>346</td>
<td>2.73</td>
<td>13.88</td>
</tr>
<tr>
<td>2019-2020</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>343</td>
<td>3.54</td>
<td>15.47</td>
</tr>
<tr>
<td>Black</td>
<td>343</td>
<td>2.56</td>
<td>12.87</td>
</tr>
</tbody>
</table>

*Note.* The *n* in the table above refers to the number of high schools from which data were obtained.
Table 4.2

*Descriptive Statistics for the Percentages of Asian and Hispanic Students who Completed an Associate Degree for the 2016-2017 Through the 2019-2020 School Years*

<table>
<thead>
<tr>
<th>School Year and Comparison</th>
<th>$n$ of schools</th>
<th>$M%$</th>
<th>$SD%$</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016-2017</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>335</td>
<td>0.75</td>
<td>6.53</td>
</tr>
<tr>
<td>Hispanic</td>
<td>335</td>
<td>0.41</td>
<td>3.81</td>
</tr>
<tr>
<td>2017-2018</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>342</td>
<td>3.26</td>
<td>15.89</td>
</tr>
<tr>
<td>Hispanic</td>
<td>342</td>
<td>2.52</td>
<td>13.05</td>
</tr>
<tr>
<td>2018-2019</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>371</td>
<td>3.95</td>
<td>17.02</td>
</tr>
<tr>
<td>Hispanic</td>
<td>371</td>
<td>3.01</td>
<td>14.62</td>
</tr>
<tr>
<td>2019-2020</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>368</td>
<td>4.06</td>
<td>16.66</td>
</tr>
<tr>
<td>Hispanic</td>
<td>368</td>
<td>3.10</td>
<td>13.99</td>
</tr>
</tbody>
</table>

*Note.* The $n$ in the table above refers to the number of high schools from which data were obtained.
Table 4.3

Descriptive Statistics for the Percentages of Asian and White Students who Completed an Associate Degree for the 2016-2017 Through the 2019-2020 School Years

<table>
<thead>
<tr>
<th>School Year and Comparison</th>
<th>n of schools</th>
<th>M%</th>
<th>SD%</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016-2017</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>328</td>
<td>0.76</td>
<td>6.60</td>
</tr>
<tr>
<td>White</td>
<td>328</td>
<td>0.47</td>
<td>4.34</td>
</tr>
<tr>
<td>2017-2018</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>333</td>
<td>2.88</td>
<td>15.03</td>
</tr>
<tr>
<td>White</td>
<td>333</td>
<td>2.49</td>
<td>13.07</td>
</tr>
<tr>
<td>2018-2019</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>361</td>
<td>3.57</td>
<td>15.06</td>
</tr>
<tr>
<td>White</td>
<td>361</td>
<td>2.69</td>
<td>13.31</td>
</tr>
<tr>
<td>2019-2020</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>360</td>
<td>3.87</td>
<td>16.06</td>
</tr>
<tr>
<td>White</td>
<td>360</td>
<td>3.12</td>
<td>14.32</td>
</tr>
</tbody>
</table>

Note. The n in the table above refers to the number of high schools from which data were obtained.
<table>
<thead>
<tr>
<th>School Year and Comparison</th>
<th>n of schools</th>
<th>M%</th>
<th>SD%</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016-2017</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>640</td>
<td>1.04</td>
<td>8.21</td>
</tr>
<tr>
<td>Hispanic</td>
<td>640</td>
<td>1.14</td>
<td>8.13</td>
</tr>
<tr>
<td>2017-2018</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>664</td>
<td>2.07</td>
<td>11.06</td>
</tr>
<tr>
<td>Hispanic</td>
<td>664</td>
<td>2.11</td>
<td>10.40</td>
</tr>
<tr>
<td>2018-2019</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>688</td>
<td>3.30</td>
<td>14.77</td>
</tr>
<tr>
<td>Hispanic</td>
<td>688</td>
<td>3.28</td>
<td>14.41</td>
</tr>
<tr>
<td>2019-2020</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>686</td>
<td>3.41</td>
<td>14.45</td>
</tr>
<tr>
<td>Hispanic</td>
<td>686</td>
<td>3.72</td>
<td>14.70</td>
</tr>
</tbody>
</table>

*Note.* The *n* in the table above refers to the number of high schools from which data were obtained.
Table 4.5

Descriptive Statistics for the Percentages of Black and White Students who Completed an Associate Degree for the 2016-2017 Through the 2019-2020 School Years

<table>
<thead>
<tr>
<th>School Year and Comparison</th>
<th>$n$ of schools</th>
<th>$M%$</th>
<th>$SD%$</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016-2017</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>590</td>
<td>0.41</td>
<td>4.73</td>
</tr>
<tr>
<td>White</td>
<td>590</td>
<td>0.42</td>
<td>3.74</td>
</tr>
<tr>
<td>2017-2018</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>616</td>
<td>1.52</td>
<td>9.81</td>
</tr>
<tr>
<td>White</td>
<td>616</td>
<td>1.69</td>
<td>9.06</td>
</tr>
<tr>
<td>2018-2019</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>632</td>
<td>2.27</td>
<td>12.10</td>
</tr>
<tr>
<td>White</td>
<td>632</td>
<td>2.26</td>
<td>11.64</td>
</tr>
<tr>
<td>2019-2020</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>632</td>
<td>2.32</td>
<td>11.77</td>
</tr>
<tr>
<td>White</td>
<td>632</td>
<td>2.80</td>
<td>12.88</td>
</tr>
</tbody>
</table>

Note. The $n$ in the table above refers to the number of high schools from which data were obtained.
Table 4.6

*Descriptive Statistics for the Percentages of Hispanic and White Students who Completed an Associate Degree for the 2016-2017 Through the 2019-2020 School Years*

<table>
<thead>
<tr>
<th>School Year and Comparison</th>
<th>n of schools</th>
<th>M%</th>
<th>SD%</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016-2017</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
<td>911</td>
<td>0.71</td>
<td>6.42</td>
</tr>
<tr>
<td>White</td>
<td>911</td>
<td>0.75</td>
<td>6.58</td>
</tr>
<tr>
<td>2017-2018</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
<td>946</td>
<td>1.93</td>
<td>10.84</td>
</tr>
<tr>
<td>White</td>
<td>946</td>
<td>2.12</td>
<td>11.39</td>
</tr>
<tr>
<td>2018-2019</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
<td>952</td>
<td>2.72</td>
<td>12.85</td>
</tr>
<tr>
<td>White</td>
<td>952</td>
<td>2.86</td>
<td>13.11</td>
</tr>
<tr>
<td>2019-2020</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
<td>967</td>
<td>3.07</td>
<td>13.33</td>
</tr>
<tr>
<td>White</td>
<td>967</td>
<td>3.20</td>
<td>13.74</td>
</tr>
</tbody>
</table>

*Note.* The *n* in the table above refers to the number of high schools from which data were obtained.
Table 4.7

*Descriptive Statistics for the Percentages of Students who were Economically Disadvantaged and all Students who Completed an Associate Degree for the 2016-2017 Through the 2019-2020 School Years*

<table>
<thead>
<tr>
<th>School Year and Comparison</th>
<th>n of schools</th>
<th>M%</th>
<th>SD%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>2016-2017</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Economically Disadvantaged</td>
<td>1,126</td>
<td>1.56</td>
<td>9.85</td>
</tr>
<tr>
<td>All Students</td>
<td>1,126</td>
<td>1.63</td>
<td>9.97</td>
</tr>
<tr>
<td><strong>2017-2018</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Economically Disadvantaged</td>
<td>1,140</td>
<td>3.01</td>
<td>13.62</td>
</tr>
<tr>
<td>All Students</td>
<td>1,140</td>
<td>3.14</td>
<td>13.64</td>
</tr>
<tr>
<td><strong>2018-2019</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Economically Disadvantaged</td>
<td>1,160</td>
<td>3.83</td>
<td>15.46</td>
</tr>
<tr>
<td>All Students</td>
<td>1,160</td>
<td>4.11</td>
<td>15.77</td>
</tr>
<tr>
<td><strong>2019-2020</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Economically Disadvantaged</td>
<td>1,175</td>
<td>4.29</td>
<td>15.78</td>
</tr>
<tr>
<td>All Students</td>
<td>1,175</td>
<td>4.55</td>
<td>16.07</td>
</tr>
</tbody>
</table>

*Note.* The *n* in the table above refers to the number of high schools from which data were obtained.
Figure 4.1

*Mean Percentages of Students who Completed an Associate Degree by Ethnicity/race*

*Note.* Asian students, Black students, Hispanic students, and White students for the 2016-2017 through the 2019-2020 school years.
Figure 4.2

Mean Percentages of Students who Completed an Associate Degree by Economic Status

*Note.* All students and students who were economically disadvantaged for the 2016-2017 through the 2019-2020 school years.
CHAPTER V
DISCUSSION

The purpose of this journal-ready dissertation was to determine college preparedness in the State of Texas through analysis of data regarding students who completed dual-credit coursework; scored at or above the criterion on Advanced Placement/International Baccalaureate examinations; and earned an Associate degree as a function of ethnicity/race and economic status. In the first article, the focus was placed on dual-credit courses in English Language Arts or mathematics as a function of student ethnicity/race and economic status. In the second article, the emphasis was on Advanced Placement/International Baccalaureate examinations as a function of student ethnicity/race and economic status. In the third article, the focus was placed on Associate degree as a function of student ethnicity/race and economic status. Lastly, the final purpose of this journal-ready dissertation was to determine the extent to which trends were present in each of the three articles.

For each study in the journal-ready dissertation, the results are discussed and summarized within this chapter. Then, connections with existing literature and implications for policy and practice will be discussed. Recommendations for future research will be included, and a final summary will conclude the chapter.

Discussion of Article One Results

In the first investigation, the degree to which differences were present in the percentages of students who completed at least three hours of dual-credit courses in English Language Arts or mathematics, or at least nine or more hours of dual-credit courses as a function of their ethnicity/race and economic status was analyzed for the
2016-2017 through the 2019-2020 school years. The dual-credit variables used in the first article were introduced in the 2016-2017 school year as a part of the College, Career, and Military Ready indicators and were obtained from the Texas Academic Performance Reports.

In the 2016-2017 through the 2019-2020 school years, the percentages of Asian and Black students who had completed dual-credit courses were statistically significantly different. The percentages of Asian students who had completed dual-credit courses were more than twice the percentages of Black students across all four years. For the 2016-2017 and 2017-2018 school years, effect sizes were near-large, and for the 2018-2019 and 2019-2020, effect sizes were large (Cohen, 1988). Concerning the 2016-2017 through the 2019-2020 school years, statistically significant differences were yielded between the percentages of Asian and Hispanic students who had completed dual-credit courses. The percentages of Asian students who had completed dual-credit courses were higher than the percentages of Hispanic students for all four years. The effect sizes for three of the years were moderate, and for the 2018-2019 school year, the effect size was near-large (Cohen, 1988).

Regarding the 2016-2017 through the 2019-2020 school years, statistically significant differences were revealed between the percentages of Asian and White students who had completed dual-credit courses. The percentages of White students who had completed dual-credit courses were higher than Asian students for the 2016-2017 and 2017-2018 school years, and the percentages of Asian students who had completed dual-credit courses were higher than White students for the 2018-2019 and 2019-2020 school years. In all four years, effect sizes were small (Cohen, 1988).
With respect to the 2016-2017 through the 2019-2020 school years, statistically significant differences were present between the percentages of Black and Hispanic students who had completed dual-credit courses. The percentages of Hispanic students who had completed dual-credit courses were approximately eight points higher than Black students for all four years. Effect sizes for all four years were small (Cohen, 1988). In the 2016-2017 through the 2019-2020 school years, statistically significant differences were yielded between the percentages of Black and White students who had completed dual-credit courses. The percentages of White students who had completed dual-credit courses were approximately twice the percentages of Black students. For all four years, the effect sizes were large (Cohen, 1988).

Concerning the 2016-2017 through the 2019-2020 school years, statistically significant differences were revealed between the percentages of Hispanic and White students who had completed dual-credit courses. The percentages of White students who had completed dual-credit courses were higher than the percentages of Hispanic students. The effect sizes for all four years were moderate (Cohen, 1988).

Regarding the 2016-2017 through the 2019-2020 school years, statistically significant differences were present in the percentages of students who completed dual-credit courses by their economic status. The percentages of all students who completed dual-credit courses were approximately seven percentage points higher than their peers who were economically disadvantaged. In all four school years, effect sizes were large (Cohen, 1988).
Discussion of Article Two Results

In the second investigation, the extent to which differences were present in the percentages of students who met criterion on Advanced Placement/International Baccalaureate examinations as a function of their ethnicity/race and economic status was addressed for the 2016-2017 through the 2019-2020 school years. For this second study, the met criterion Advanced Placement/International Baccalaureate examination variables were introduced in the 2016-2017 school year as a part of the College, Career, and Military Ready indicators. Archival data were obtained from the Texas Academic Performance Reports.

In the 2016-2017 through the 2019-2020 school years, statistically significant differences were yielded between the percentages of Asian and Black students who had met criterion on Advanced Placement/International Baccalaureate examinations. The percentages of Asian students who met criterion on Advanced Placement/International Baccalaureate examinations were almost six times higher than the percentages of Black students across all four years. For the 2016-2017 through the 2019-2020 school year, effect sizes were large (Cohen, 1988).

Concerning the 2016-2017 through the 2019-2020 school years, statistically significant differences were present between the percentages of Asian and Hispanic students who met criterion on Advanced Placement/International Baccalaureate examinations. The percentages of Asian students who met criterion on Advanced Placement/International Baccalaureate examinations were approximately three times higher than the percentages of Hispanic students. For all four years, effect sizes were large (Cohen, 1988).
Regarding the 2016-2017 through the 2019-2020 school years, statistically significant were revealed between percentages of Asian and White students who met criterion on Advanced Placement/International Baccalaureate examinations. The percentages of Asian students who met criterion on Advanced Placement/International Baccalaureate examinations were almost three times higher than the percentages of White students. Effect sizes were large for all four years (Cohen, 1988).

With respect to the 2016-2017 through the 2019-2020 school years, statistically significant differences were yielded between the percentages of Black and Hispanic students who met criterion on Advanced Placement/International Baccalaureate examinations. The percentages of Hispanic students who met criterion on Advanced Placement/International Baccalaureate examinations were over one and a half times higher than the percentages of Black students. Across all four school years, effect sizes were large (Cohen, 1988).

In the 2016-2017 through the 2019-2020 school years, statistically significant differences were present between the percentages of Black and White students who met criterion on Advanced Placement/International Baccalaureate examinations. The percentages of White students who met criterion on Advanced Placement/International Baccalaureate examinations were approximately two times higher than the percentages of Black students. Effect sizes were large for all four school years (Cohen, 1988).

Concerning the 2016-2017 through the 2019-2020 school years, statistically significant differences were revealed between the percentages of Hispanic and White students who had met criterion on Advanced Placement/International Baccalaureate examinations. The percentages of White students who had met criterion on Advanced
Placement/International Baccalaureate examinations were over two percentage points higher than the percentages of Hispanic students. Effect sizes were small across all four years (Cohen, 1988).

Regarding the 2016-2017 through the 2019-2020 school years, statistically significant differences were yielded between the percentages of students who were economically disadvantaged and all students who met criterion on Advanced Placement/International Baccalaureate examinations. The percentages of all students who met criterion on Advanced Placement/International Baccalaureate examinations was approximately three percentage points higher than the percentages of students who were economically disadvantaged. Effect sizes were moderate in all four school years (Cohen, 1988).

**Discussion of Article Three Results**

In the third investigation, the degree to which differences were present in the percentages of students who completed an Associate degree as a function of their ethnicity/race and economic status was determined for the 2016-2017 through the 2019-2020 school years. Within this second study, the Associate degree completion variables were introduced in the 2016-2017 school year as a component of the College, Career, and Military Ready indicators. Preexisting data were downloaded from the Texas Academic Performance Reports.

In the 2016-2017 through the 2019-2020 school years, statistically significant differences were revealed between the percentages of Asian and Black students who had completed an Associate degree. The percentages of Asian students who had completed
an Associate degree were slightly less than one percentage point higher than the percentages for Black students. Effect sizes were below small (Cohen, 1988).

Concerning the 2016-2017 through the 2019-2020 school years, statistically significant differences were yielded between the percentages of Asian and Hispanic students who had completed an Associate degree. The percentages of Asian students who had completed an Associate degree were almost one percentage point higher than the percentages of Hispanic students. All effect sizes were below small (Cohen, 1988).

Regarding the 2016-2017 and the 2017-2018 school years, similar percentages of Asian and White students had completed an Associate degree. In the 2018-2019 and 2019-2020 school years, statistically significant differences were present between the percentages of Asian and White students who had completed an Associate degree. The percentages of Asian students who had completed an Associate degree was higher than the percentages of White students. The two effect sizes were below small (Cohen, 1988).

With respect to the 2016-2017 through the 2018-2019 school years, similar percentages of Black and Hispanic students had completed an Associate degree. In the 2019-2020 school year, a statistically significant difference was present between the percentage of Black and Hispanic students who had completed an Associate degree. The percentages of Hispanic students who had completed an Associate degree were higher than the percentages of Black students. This effect size was below small (Cohen, 1988).

In the 2016-2017 through the 2018-2019 school years, similar percentages of Black and White students had completed an Associate degree. Regarding the 2019-2020 school year, a statistically significant difference was yielded between the percentages of Black and White students who had completed an Associate degree. The percentages of
White students who had completed an Associate degree were higher than the percentages of Black students. This effect size was below small (Cohen, 1988).

Concerning the 2016-2017, 2018-2019, and the 2019-2020 school years, similar percentages of Hispanic and White students had completed an Associate degree. In the 2017-2018 school year, a statistically significant difference was yielded between the percentages of Hispanic and White students who had completed an Associate degree. The percentages of White students who had completed an Associate degree were higher than the percentages of Hispanic students. This effect size was below small (Cohen, 1988).

With respect to all four school years, statistically significant differences were revealed between all students and students who were economically disadvantaged in their Associate degree completion rates. The percentages of all students who had completed an Associate degree were higher than the percentages of students who were economically disadvantaged. All effect sizes were below small (Cohen, 1988).

**Connections with the Existing Literature**

The findings in all three articles were congruent with previous research investigations already discussed within this journal-ready dissertation. In the first investigation, White students had the highest percentages of students who had completed dual-credit courses for the 2016-2017 and 2017-2018 school years, and Asian students had the highest percentages of students who had completed dual-credit courses for the 2018-2019 and 2019-2020 school years. The order of highest percentages to the lowest percentages of students who had completed dual-credit courses by ethnicity/race for the 2018-2019 and 2019-2020 school years were Asian, White, Hispanic, and Black. These
results are commensurate with the findings of other researchers (Pierson et al., 2017; Young et al., 2013) with respect to ethnic/racial disparities in dual-credit course participation. For the 2016-2017 through the 2019-2020 school years, all students had higher percentages of dual-credit course completion rates than students who were economically disadvantaged. These results are congruent with the findings of researchers (Moreno et al., 2021; Pierson et al., 2017) who had established the negative effects of poverty on dual-credit course participation. As such, the documented disparities in dual-credit course participation by student ethnicity/race and economic status still point to ongoing equity gaps in the State of Texas.

With respect to all four school years in the second investigation, Asian students had the highest percentages of students who met criterion on Advanced Placement/International Baccalaureate examinations. These results are commensurate with the findings of other researchers (Moore et al., 2010; Shaw et al., 2013). Across all four school years, Black students had the lowest percentages of students who met criterion on Advanced Placement/International Baccalaureate examinations, a finding also congruent with prior researchers (Clark et al., 2012; Kettler & Hurst, 2017; Moore & Slate, 2008; Shaw et al., 2013). The difference between the percentages for Hispanic and White students who met criterion on Advanced Placement/International Baccalaureate examinations was smaller than the difference between the percentages for Hispanic and Black students. These results are consistent with the findings of other researchers (Kettler & Hurst, 2017).

Regarding Associate degree completion, Hispanic students had the highest percentages of students who had completed an Associate degree in all four school years.
Across all four school years, the order of highest percentages to lowest percentages were Hispanic, Asian, Black, and White. With respect to economic status, students who were economically disadvantaged had lower percentages who had earned an Associate degree than their peers for all four school years. The overall number of students, regardless of their ethnic/racial or economic status groups, was very low when compared to the overall number of students in Grade 9 through Grade 12 in the State of Texas. With researchers focusing mainly on the participation in Early College High Schools and the benefits of dual-credit enrollment (Grubb et al., 2017; Struhl & Vargas, 2012; Taylor, 2015; Wang et al., 2015; Young et al., 2013), the results from this study will add to the existing literature on Associate degrees.

Implications for Policy and Practice

Based on the findings of the articles in this journal-ready dissertation, several implications for policy and practice can be suggested. Regarding implications for policy, school leaders, college administrators, and state legislators must address the continuing equity gaps for dual-credit completion across ethnic/racial groups and economic status. Students of color and students who are economically disadvantaged are not participating in dual-credit courses at the same rate as Asian and White students. Therefore, school leaders and college administrators need to expand current dual-credit policies to increase the ethnic/racial diversity and to increase the enrollment of students who are economically disadvantaged. Second, state legislatures, school leaders, and college administrators need to forge new relationships between high school and college campuses where students are not able to take dual-credit courses and to ensure the costs of dual-credit do not impede students’ enrollment into dual-credit courses. Third, school leaders,
high school principals, college administrators, and state legislators must write new policies to address the overall low numbers of high school students earning an Associate degree across all ethnic/racial and economic status groups. Because Early College High Schools strive to assist students of color and students who are economically disadvantaged in earning dual-credit, one suggestion might be to increase the number of Early College High Schools across the State of Texas.

Concerning policy implications for the continuing gaps in equity across ethnic/racial and economic status for the met criterion rates on Advanced Placement/International Baccalaureate examinations, school leaders and high school principals need to support policy changes to increase diversity in Advanced Placement/International Baccalaureate courses. Second, state legislators and school leaders must ensure the fees for Advanced Placement/International Baccalaureate examinations do not deter students from Advanced Placement/International Baccalaureate course enrollment. Third, in school districts with a current lack of qualified Advanced Placement/International Baccalaureate teachers, school leaders and state legislators must find ways to enhance the recruitment of highly qualified teachers for all districts.

Concerning practice implications, students must be college ready prior to enrollment into dual-credit courses and Advanced Placement/International Baccalaureate courses. Therefore, school leaders and teachers must ensure a high level of rigor within their curriculum to prepare students at younger grades, especially in English Language Arts and mathematics courses, and teachers need to participate in professional development to address ways to incorporate college readiness into the entry level courses
prior to their enrollment in dual-credit courses and in Advanced Placement/International Baccalaureate courses at the high school level. Further, with the need for showing college readiness while still in high school on state and national standardized tests, high school principals, teachers, and instructional coaches must incorporate test material into their current curriculum scope and sequence.

**Recommendations for Future Research**

Several recommendations can be made based on the findings in the three articles in this journal-ready dissertation. First, because data on only high school students in the State of Texas were analyzed, researchers are recommended to extend this study in other states to determine the degree to which results might be generalizable. Second, the variables analyzed within this dissertation were developed recently due to the recent changes to the College, Career, and Military Ready indicators in the State of Texas accountability system. Researchers might replicate this study by including future years and analyzing any changes in trends across the years. Third, the only demographic characteristics that were analyzed in this dissertation were ethnicity/race and economic status. Future researchers could expand their analyses to include other demographic characteristics such as English Learners, students who are enrolled in special education, and students who are in Section 504. Fourth, with the changes in the College, Career, and Military Ready indicators, researchers might incorporate other indicators of college readiness such as completion of On Ramps courses, met criterion scores on ACT, SAT, and TSIA examinations, and completion of Industry Based Certifications. Lastly, with the growth of Early College High Schools over the last several years in the State of
Texas, researchers might focus solely on Grade 9 through Grade 12 students who are enrolled in an Early College High School.

**Conclusion**

Black students had the lowest percentages of students who had completed dual-credit courses for the 2016-2017 through the 2019-2020 school years. The average percentages of Asian and White students who had completed dual-credit courses were over twice the average percentages of Black students, and the average percentages for Hispanic students who had completed dual-credit courses were almost eight percentage points higher than the average percentages for Black students. Regarding the 2016-2017 through the 2019-2020 school years, Black students had the lowest percentages of students who met criterion on Advanced Placement/International Baccalaureate examinations, and Asian students who had met criterion on Advanced Placement/International Baccalaureate had the highest percentages of students who met criterion on Advanced Placement/International Baccalaureate examinations. Across all four years, Asian students were over six times higher than the percentages for Black students and over three times higher for Hispanic and White students. All students had higher percentages of met criterion on Advanced Placement/International examinations than their peers who were economically disadvantaged.

With respect to the 2016-2017 through the 2019-2020 school years, the number of students earning an Associate degree were very low when compared to the overall number of Grade 9 through Grade 12 high school students in the State of Texas. Therefore, the small sample sizes might have been a contributing factor to the lack of statistical significance in several of the ethnic/racial comparison groups. Across all four
years, White students had the lowest percentages of students who completed an Associate degree. Hispanic students who had completed an Associate degree had the highest percentages, followed by Asian students, and then by Black students. Concerning students who were economically disadvantaged and all students, statistically significant differences were revealed across all four years. Students who were economically disadvantaged had lower percentages of completion rates for Associate degrees than all students. When observing trends across all four years, equity gaps still exist across all ethnic/racial and economic status groups of students for dual-credit completions, met criterion on Advanced Placement/International Baccalaureate examinations, and Associate degree completions.


benefit from the International Baccalaureate Diploma Programme (IBDP).


https://doi.org/10.21061/jcte.v31i1.1496

https://doi.org/10.1177/1932202x211018646


https://www.edweek.org/ew/articles/2010/05/24/3seltzer.h29.html


Texas Administrative Code, Title 19, §7.3 (2020).


Texas Education Agency. (2022). *Early College High School (ECHS).*

https://tea.texas.gov/academics/college-career-and-military-prep/early-college-high-school-echs


https://www.highered.texas.gov/institutional-resources-programs/public-universities-health-related-institutions/transfer-resources/dual-credit-initiatives/


Texas Higher Education Coordinating Board. (2020a). *Overview: 60x30TX Strategic planning and funding.* http://www.60x30tx.com/


Date: Feb 10, 2022 3:42:28 PM CST

TO: Stacey Moseley John Slate
FROM: SHSU IRB
PROJECT TITLE: Differences in Completion Rates for Dual Credit, Advanced Placement/International Baccalaureate, and Associate Degree as a Function of Ethnicity/Race and Economic Status
PROTOCOL #: IRB-2022-25
SUBMISSION TYPE: Initial
ACTION: Exempt
DECISION DATE: February 10, 2022
EXEMPT REVIEW CATEGORY: Category 4. Secondary research for which consent is not required: Secondary research uses of identifiable private information or identifiable biospecimens, if at least one of the following criteria is met:
   (i) The identifiable private information or identifiable biospecimens are publicly available;
   (ii) Information, which may include information about biospecimens, is recorded by the investigator in such a manner that the identity of the human subjects cannot readily be ascertained directly or through identifiers linked to the subjects, the investigator does not contact the subjects, and the investigator will not re-identify subjects;
   (iii) The research involves only information collection and analysis involving the investigator’s use of identifiable health information when that use is regulated under 45 CFR parts 160 and 164, subparts A and E, for the purposes of “health care operations” or “research as those terms are defined at 45 CFR 164.501 or for “public health activities and purposes” as described under 45 CFR 164.512(b); or
   (iv) The research is conducted by, or on behalf of, a Federal department or agency using government-generated or government-collected information obtained for nonresearch activities, if the research generates identifiable private information that is or will be maintained on information technology that is subject to and in compliance with section 208(b) of the E-Government Act of 2002, 44 U.S.C. 3501 note, if all of the identifiable private information collected, used, or generated as part of the activity will be maintained in systems of records subject to the Privacy Act of 1974, 5 U.S.C. 552a, and, if applicable, the information used in the research was collected subject to the Paperwork Reduction Act of 1995, 44 U.S.C. 3501 et seq.

OPPORTUNITY TO PROVIDE FEEDBACK: To access the survey, click here. It only takes 10 minutes of your time and is voluntary. The results will be used internally to make improvements to the IRB application and/or process. Thank you for your time.

Greetings,

Thank you for your submission of Initial Review materials for this project. The Sam Houston State University (SHSU) IRB has determined this project is EXEMPT FROM IRB REVIEW according to federal regulations.

We will retain a copy of this correspondence within our records.

* What should investigators do when considering changes to an exempt study that could make it nonexempt?
It is the PI’s responsibility to consult with the IRB whenever questions arise about whether planned changes to an exempt study might make that study nonexempt human subjects research.

In this case, please make available sufficient information to the IRB so it can make a correct determination.

If you have any questions, please contact the IRB Office at 936-294-4875 or irb@shsu.edu. Please include your project title and protocol number in all correspondence with this committee.

Sincerely,

SHSU Institutional Review Board
VITA

Stacey Marie Moseley

EDUCATIONAL HISTORY
Doctorate of Education – Educational Leadership, August 2022
*Sam Houston University, Huntsville, Texas*
Dissertation: Differences in Completion Rates for Dual Credit, Advanced Placement/International Baccalaureate, and Associate Degree as a Function of Ethnicity/Race and Economic Status

Master of Education, School Counseling, August 1996
*Angelo State University, San Angelo, Texas*
Bachelor of Arts, Mathematics, August 1993
*Angelo State University, San Angelo, Texas*

PROFESSIONAL EXPERIENCE
Associate Principal of Curriculum, The Woodlands High School, Conroe Independent School District, December 2021-present
School Counselor, Lamar Middle School, Temple Independent School District, August 2001-June 2003
School Counselor, Midland High School, Midland Independent School District, August 2000-July2001
School Counselor, Midland High School, Midland Independent School District, August 1998-June 1999
Department Chair, Goddard Junior High School, Midland Independent School District, August 1996-July 1998
PRESENTATIONS AND PUBLICATIONS
Moseley, S. M. (September, 2018). *Differences in the percentages of students enrolled in dual credit mathematics courses over time*. Paper presented at the Graduate Research Exchange/TCPEA Conference, Austin, TX.