2024

# THE IMPACT OF DUAL CREDIT PARTICIPATION ON GRADUATION & EXCESS HOURS

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Digital Object Identifier: https://doi.org/10.13023/etd.2024.191

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Erin Mulligan-Nguyen, Student

Dr. Kelly Bradley, Major Professor

Dr. Jane Jensen, Director of Graduate Studies

# THE IMPACT OF DUAL CREDIT PARTICIPATION ON GRADUATION & EXCESS HOURS

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DISSERTATION

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A dissertation submitted in partial fulfillment of the
requirements for the degree of Doctor of Philosophy in the
College of Education
at the University of Kentucky

By
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2024


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ABSTRACT OF DISSERTATION

# THE IMPACT OF DUAL CREDIT PARTICIPATION ON GRADUATION & EXCESS HOURS

The interest and participation in dual credit programs and courses has grown over the past several decades, especially within Texas; however, there is a lack of research that shows how the participation in dual credit programs and courses has impacted leading and lagging student success metrics once they enroll at a post-secondary institution.

The purpose of this study was to examine the impact dual credit participation had on six-year graduation rates and exceeding excess hours at a public four-year regional university in South Texas. The researcher used a non-experimental quantitative study with ex-post facto student data. The study examined leading and lagging student success measures including transfer hours, first term attempted credit hours, first-year cumulative attempted and earned hours, cumulative attempted and earned hours, first term and cumulative GPA, and graduation rates. The study population included first-time, full-time bachelor's degree seeking students who started in either fall 2015 or 2016.

Utilizing independent sample t-tests, chi-squares, and binary logistic regression to test hypotheses, leading student success measures contributed to six-year bachelor's degree completion and for students who graduated within six-years, those who participated in dual credit were less likely to exceed excess hours. This study compares leading and lagging student success indicators of dual credit programs and courses as possible solutions to accumulating fewer credits to degree, lessening the probability of entering into excess funding hours, and increasing graduation rates at a public, four-year regional university in South Texas.

KEYWORDS: Dual credit or dual enrollment, graduation rates or completion, excess hours, logistic regression

Erin Mulligan-Nguyen

*(Name of Student)*

03/26/2024

Date

# THE IMPACT OF DUAL CREDIT PARTICIPATION ON GRADUATION & EXCESS HOURS

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# DEDICATION

To my grandmother, Martha. The stories you shared about where you grew up, childhood experiences, and transition into young adulthood inspired me. Growing up in Jackson County, Kentucky, your first responsibility was to your family and the farm. I could hear through your stories about how much you enjoyed going to school; however, didn't have the opportunity to go beyond a 6$^{th}$ grade education. As a young adult, you wanted to make a better life for yourself and explore opportunities near the big city. I cannot imagine how scared and excited you must have been moving from Jackson to Covington, Kentucky. One thing I learned from you is that education can provide you with numerous opportunities. I will always remember how proud you were to watch me, the first graduate in our family, to walk across the stage not once but twice, earning both a bachelor's and master's degree. Although you are no longer here with us, I know you will be there in spirit as I finish this journey.

ACKNOWLEDGMENTS

I want to take this opportunity to thank the individuals who have supported and assisted me through my educational journey. There are several people who assisted me throughout my educational journey, and I will acknowledge a few here by name.

Many thanks to Dr. Kelly Bradley, who has taught me a lot about educational leadership both inside and outside the classroom. I appreciated your support, guidance, feedback, suggestions, and overall patience during this journey. Thank you to members of my doctoral committee including Dr. Thelin, Dr. Bathon, Dr. Akers, and Dr. Hutchens. I appreciate the time and effort you took on my behalf to support the completion of this journey.

My family has been the foundation of support throughout my educational journey. My parents, Michael and Teresa exposed me to numerous educational activities that instilled a desire to become a lifelong learner. My husband Joe has been extremely supportive and encouraging throughout the process. I appreciate your support in the multiple career transitions, including a move across the country during this educational process. Your words of encouragement got me through the tough weeks, months, and years. You were my biggest supporter and cheerleader during this journey.

Thank you to my colleagues Whitney and Amanda. I appreciate you stepping in and helping the department when I took time off as well as the texts and phone calls checking in on my progress and encouraging me to continue pushing through.

Lastly, I want to thank my extended family members, friends, and colleagues who supported me near and afar. I am grateful for all who have mentored or supported me during this process.

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# CHAPTER 1. INTRODUCTION

## 1.1 Introduction

Nearly half a century ago, only 28% of the workforce had earned a post-secondary degree. Over the 50-year timespan, the percentage within the workforce who have earned an associate degree has maintained at 12%, bachelor's degree attainment has risen from 9% to 24%, and those who have earned a master's degree or beyond has risen from 7% to 11%. During the last decade, the percentage of first-time, full-time bachelor's degree seeking students who have earned a degree within four years has risen from 39% to 48% and within six years from 59% to 65% (National Center for Education Statistics [NCES], 2021). Although the percentage of the workforce earning a post-secondary degree has risen, to remain competitive within the global economy, 60-65% of the United States workforce will require a post-secondary education and training beyond high school starting in 2020 of which 35% will need to hold at least a bachelor's degree due to the global shift from an industrial to a knowledge economy. (Carnevale, Jayasundera, & Hanson, 2014; Lumina Foundation, 2024). Currently, the attainment of a credential or degree beyond high school is at 56.3% aged 25-34 and 54.3% aged 35-64 nationally (Lumina Foundation, 2024).

Although the national goal is 60-65% of the workforce with a post-secondary degree or credential, Texas has established their own goal. By 2030, the goal is to have 60% of the workforce, aged 25-60, with a post-secondary degree or credential (Texas Higher Education Coordinating Board [THECB], 2022). Given the current national completion rates, it is estimated that the workforce will have a shortfall of approximately five million workers who do not hold a post-secondary education (Carnevale,

Jayasundera, & Hanson, 2014). Within Texas, the percentage of the workforce with a bachelor's degree or higher falls short of the national goal. As of 2022, 35.3% of the Texas workforce aged 25 to 34 and 34.0% of the Texas workforce aged 35-64 held a bachelor's degree or higher (Lumina Foundation, 2024; US Census Bureau, 2022). Since 2009, Texas has seen a decrease in the number of White citizens and an increase in their Hispanic citizens within their population. In 2009, the overall Texas population was around 12.6 million with 33.2% or more having earned a degree. Of those, 6.3 million were White with a degree attainment of 44.0% and 4.2 million who were Hispanic with a degree attainment of 16.5%. The population within Texas grew to 15.4 million in 2022 with 43.1% or more having earned a degree. Of those, 6.2 million were White with a degree attainment of 53.5% and 5.9 million who were Hispanic with a degree attainment of 26.7% (Lumina Foundation, 2024). The Texas Higher Education Coordinating Board (2021) found that there have been improvements in the four through six-year bachelor's degree graduation rates. From the 2012 through 2016 bachelor's degree seeking cohorts the four-year graduation rate increased from 34% to 42% and the six-year graduation rate increased from 59% to 65%. During this same timeframe, the average number of excess semester credit hours acquired at the time of bachelor's degree completion decreased from 14 to 10, signaling that institutions and students are motivated to decrease their time to bachelor's degree completion, accumulation of attempted credit hours, and excess semester credit hours. Although the average number of accumulated excess credit hours has decreased, THECB has a statewide goal to reduce the accumulated excess credit hours at the time of bachelor's degree completion to three credit hours by 2030 (Texas Higher Education Coordinating Board [THECB], 2021).

With the need to increase post-secondary completion rates over the next decade, national and state policies have been creative to address the increasing access to and completion of a post-secondary credential. One such area is the development of accelerated learning program and courses for high school students including dual credit programs and courses. Dual credit programs and courses provide high school students with the opportunity to take post-secondary courses while enrolled in high school that will allow the student to earn both high school and college credit. Dual credit programs have been around for more than 30 years. At the national level, in 2001-02, the National Center for Education Statistics (NCES) estimated that approximately 1.2 million students were enrolled in dual credit courses and the number of high school student participation in dual credit courses almost doubled to two million students by 2010-11 (National Center for Education Statistics [NCES], 2013). Within Texas during the same timeframe, the number of high school students participating in a dual credit program has more than tripled from approximately 23,000 to approximately 95,000 high school students (Texas Higher Education Coordinating Board [THECB], n.d.).

As post-secondary costs have risen, dual credit programs are an economic benefit that allow high school students to earn college credit at no or low cost. Many high school students have sought accelerated programs and courses like dual credit to offset future post-secondary education costs by completing one or more college courses while enrolled in high school. The accelerated and dual credit programs and courses could reduce the number of credits that are needed to complete a post-secondary degree as well as their time to degree which has the potential to reduce the amount of tuition, fees, and auxiliary costs associated with earning a post-secondary degree. Considering dual credit programs

have the potential to reduce tuition and fees associated with the cost of a post-secondary education, many high school students and their families are turning to participation in a dual credit programs and courses. In Texas, state legislation allows high schools and post-secondary education institutions to earn state funding for dual credit course enrollment that will in turn allow post-secondary institutions to offset tuition and fees costs to high school students and their families by reducing tuition and fees and/or providing waivers (Texas Administrative Code Rule §4.85, n.d.). High schools and post-secondary institutions are developing programs that not only allow high school students to earn high school and post-secondary education credit; however, the opportunity to earn a certificate or associate degree prior to earning their high school diploma.

Prior to national and state legislation, academically gifted high school students were the population most likely to participate in accelerated learning programs like dual enrollment. At the national level, when dual credit programs and courses were initially developed, academically gifted students were the first group to enroll in the dual credit courses (Kim, Kirby, & Bragg, 2003). The same demographic phenomenon occurred within Texas. When dual credit programs were first offered in Texas, most of the enrollment was based on White and/or academically gifted students. As Texas state legislation changed, enrollment within dual credit programs became more academically as well as racially diverse. Within a ten-year timespan, from fall 2010 to fall 2020, dual credit participation within Texas increased 103%, with nearly 184,000 high school students participating in a dual credit program or course. During this timeframe, the percent of White high school students participating in dual credit went from 46% to 34%;

whereas, the participation of Hispanic high school students went from 37% to 47% (Texas Higher Education Coordinating Board [THECB], n.d.).

The problem of this study focused on the participation in dual credit hours as a measure of student success at a Texas, public four-year university compared to those who first enroll at the Texas, public four-year university without any dual credit hours and whether students graduate with or without excess hours. The study focuses on the relationship between dual credit enrollment and its impact on leading and lagging student success measures including transfer hours earned prior to the first fall semester, first fall semester attempted credit hours, first year cumulative attempted credit hours, first year cumulative earned credit hours, cumulative attempted credit hours, cumulative earned credit hours, first term GPA, and cumulative GPA. The study examined 3,966 first-time, full-time bachelor's degree students at a public, regional four-year university in Texas which serves on average 12,000 students annually. The university was selected considering the number of students who apply, are admitted, and enroll in the university with dual credit hours; therefore, indicating that there would be an adequate number of students whose data could be utilized within the study.

The researcher focused on first-time, full-time bachelor's degree seeking students who are enrolled in a fall semester, are attempting 12 or more credit hours within their first fall semester, and have never enrolled at another university prior to attending the public, regional four-year university in Texas. Post-secondary students who enroll in their first term as full-time may have the intent to graduate with a bachelor's degree within four years. First-time, part-time bachelor's degree seeking students were not included

within the study as their initial intent may not be to graduate with a bachelor's degree within four to six years due to competing circumstances including familial, work, etc.

## 1.2 Statement of the Problem

In 1995, the 74th Legislative Assembly passed House Bill (HB) 1336 which recognized dual credit for the first time within the state of Texas and allowed for the creation of dual credit programs (Texas Education Agency [TEA], 2011). The purpose of HB 1336 was to ensure that high school students had an educational intervention like dual credit programs that assisted with their transition from high school to a post-secondary institution. Since HB 1336, several legislative changes have occurred, most notably within the 79th legislature. In 2005, the 79th Legislative Assembly passed House Bill (HB) 1 which required all Texas Independent School Districts (ISDs) to offer college ready junior and senior high school students the chance to earn at least 12 college credits through Advanced Placement, International Baccalaureate, or dual credit (Texas Legislature, 2005). During the same session, TEC 54.014 was amended which impacted the number of attempted hours a student could accumulate through their bachelor's degree program which is known as excess hours. Although there have been several legislative additions and modifications, since the implementation of HB 1336, the number of Texas high school students enrolled in a dual credit programs and courses has tripled from 2000 to 2020 (Texas Higher Education Coordinating Board [THECB], n.d.).

In 2005, there were several changes to dual credit programs and excess hours within the 79th Legislative Assembly. Currently, there is a lack of research on how the changes impacted dual credit programs on both leading and lagging student success

metrics including transfer hours earned prior to the first fall semester, first fall semester attempted credit hours, first year cumulative attempted credit hours, first year cumulative earned credit hours, cumulative attempted credit hours, cumulative earned credit hours, first term GPA, and cumulative GPA, bachelor's degree completion, graduation rates, as well as ensuring the student does not reach excess hours. This study fills the gap in the research.

## 1.3 Framework

The researcher studied the impact that of two changes within the 79th Texas Legislative Assembly. After analyzing the research questions and hypotheses, the researcher will use the last stage within Fowler's six stages of public policy for their framework within the conclusions. Fowler's six stages of public policy implementation include: (1) Issue Definition; (2); Agenda Setting; (3) Policy Formation; (4) Policy Adoption; (5) Implementation; and (6) Evaluation. The primary focus will be on the sixth and final stage of Fowler's framework for policy implementation, evaluation, when discussing the impact the two changes within the 79th Legislative Assembly has had on leading and lagging student success outcome measures. The first five stages will not be addressed within the analyses since the policies were formed and adopted by the Texas Legislation and have been implemented by the Texas Higher Education Coordinating Board (THECB).

### 1.3.1 Issue Definition

To start developing a new policy, the first step is to identify and define the issue which takes place through written and verbal processes. Fowler (2013) identified five key

elements for issue definitions including: (1) problem statement, (2) evidence to support the problem claim, (3) propose a realistic solution that includes funding and implementation timelines, (4), engage in effective conversation, and (5) appeal to a broad audience.

### 1.3.2 Agenda Setting

For a problem to become a policy, it needs to become part of an agenda. There are two types of agendas including systematic and governmental. Systematic agenda setting occurs outside of the government and allows the public to bring forth concerns. Governmental agenda setting often determines what will become policy and takes place at different levels including local, state, and federal governments (Fowler, 2013).

### 1.3.3 Policy Formation

The policy formulation process is a long and cumbersome process that involves many stakeholders including interest groups, state leaders, and state legislators. Once policies are formulated, they go through an approval process. Policies that are created by government official can go through a more defined approval process; however, policies may be created by interest groups; however, must have support and approval from legislator's prior to reaching the official government approval process (Fowler, 2013).

### 1.3.4 Policy Adoption

The policy adoption stage is a critical juncture where many bills face significant challenges and may not survive due to support and/or funding. Often, it becomes apparent that a bill lacks sufficient support well before it even reaches a vote by government officials. If a bill manages to become policy or law, it typically undergoes

multiple, substantial revisions along the way. Even if a bill clears all hurdles and gains approval, the availability of funding can be the ultimate obstacle that prevents it from becoming law (Fowler, 2013).

#### 1.3.5 Implementation

Once a policy is adopted by local, state, and/or federal governments, intermediaries are brough in to implement the policy on behalf of the policymakers. Intermediaries can be individuals, groups, or agencies that are tasked with carrying out the policy implementation (Fowler, 2013).

#### 1.3.6 Evaluation

Policy evaluation is a challenging process because it can have political implications that threaten the authority of those who created the policy. Policy evaluation is not a required step within the process; however, highly encouraged. Since policy evaluation is not required, policy evaluation may not occur, may be loosely or strictly monitored. Regardless, Fowler (2013) suggested and identified seven steps to evaluate a policy including: (1) determining the policy goals; (2) selecting key performance indicators; (3) selecting and/or developing data-collection instruments; (4) collecting data; (5) analyzing and summarizing data; (6) writing an evaluation report; and (7) responding to recommendations.

## 1.4 Purpose of the Study

The purpose of the study was to examine, through a comparative lens, the impact dual credit enrollment had on leading student success metrics including transfer hours

earned prior to the first fall semester, first fall semester attempted credit hours, first year cumulative attempted credit hours, first year cumulative earned credit hours, and first term GPA as well as to lagging student success metrics including graduation rates, cumulative attempted credit hours, cumulative earned credit hours, cumulative GPA, and exceeded funding compared to those who did not earn any dual credit enrollment prior to enrolling at a regional, public four-year Texas university. The study will contain first-time, full-time bachelor's degree seeking students who entered the post-secondary institution with or without dual credit. A set of 3,966 students were selected for each group from the entering fall cohorts 2015 and 2016.

## 1.5 Research Questions

The following research questions guided this study:

1. To what extent does transfer hours vary among first-time, full-time bachelor's degree seeking students vary by those who participated or did not participate in dual credit?
2. For those who graduated within six years, to what extent do the cumulative attempted credit hours vary between those who exceeded and did not exceed excess hours?
3. What is the relationship between graduation and whether or not students participated in dual credit including covariates student classification, sex, race/ethnicity, residency, transfer hours earned prior to the first fall semester, first fall semester attempted credit hours, first year cumulative attempted credit hours,

first year cumulative earned credit hours, cumulative attempted credit hours, cumulative earned credit hours, first term GPA, and cumulative GPA?

4. For those who graduated within six-years, what is the relationship between excess hours status and whether or not students participated in dual credit including covariates student classification, sex, race/ethnicity, transfer hours earned prior to the first fall semester, first fall semester attempted credit hours, first year cumulative attempted credit hours, first year cumulative earned credit hours, cumulative attempted credit hours, cumulative earned credit hours, first term GPA, and cumulative GPA?
5. With the quantitative findings above, what might this tell us about the evaluative policy implications from the Texas 79th Legislative assembly?

## 1.6 Significance of the Study

As the number of high school students participating in dual credit programs continues to increase nationally and within Texas, high schools and post-secondary institutions need to demonstrate the value participating in dual credit programs and courses brings to high school students. Post-secondary institutions should be aware of how dual credit participation impacts a student's performance once they arrive at the post-secondary institution and be cognoscente of how the prior participation in the dual credit programs may impact the student's admittance into a major and the appropriate course sequencing to enroll in to ensure a timely post-secondary graduation. Within Texas, students should graduate with a bachelor's degree in a timely manner; otherwise, they have the potential to go into excess hours and be charged a higher tuition rate.

## 1.7 Definition of Term

The following terms were used to guide this study and operationalize study variables:

Academic/Fiscal Year – "12-month period of time generally extending from September to August" (Texas Higher Education Coordinating Board [THECB], 2023, p. 3).

American Indian or Alaskan Native – "A person having origins in any of the original peoples of North and South America (including Central America), and who maintains a tribal affiliation or community attachment" (Texas Higher Education Coordinating Board [THECB], 2023, p. 23).

Asian – "A person having origins in any of the original peoples of the Far East, Southeast Asia, or the Indian subcontinent including, for example, Cambodia, China, India, Japan, Korea, Malaysia, Pakistan, the Philippine Islands, Thailand, and Vietnam (Texas Higher Education Coordinating Board [THECB], 2023, p. 23).

Award – "Award is the credential granted to a student for successful completion of a set curriculum such as a degree or certificate" (Texas Higher Education Coordinating Board [THECB], 2023, p. 12).

Award Date – "Award Date is the four-digit year and two-digit month that a student graduated with a degree, certificate, or occupational skills award (Texas Higher Education Coordinating Board [THECB], 2023, p. 12).

Bachelor's Degree – "An award that normally requires at least 4 but not more than 5 years of full-time equivalent college-level work" (Texas Higher Education Coordinating Board [THECB], 2023, p. 12).

Black or African America – "A person having origins in any of the black racial groups of Africa" (Texas Higher Education Coordinating Board [THECB, 2023, p. 23).

CBM Reports – "CBM Reports are the primary means by which higher education institutions in Texas report data to THECB" (Texas Higher Education Coordinating Board [THECB, 2023, p. 15).

CBM0C1/001 – "Reflects all students enrolled in credit courses at the reporting institution as of the official census date, which is the 12th class day for the Fall and Spring semesters (16-week session) and the 4th class day for each of the summer terms (6-week session)" (Texas Higher Education Coordinating Board [THECB], 2023, p. 16).

CBM009 – "Reflects degrees, certificates, and progress measures conferred during the fiscal year immediately preceding the fall semester in which the report is submitted" (Texas Higher Education Coordinating Board [THECB], 2023, p. 20).

CBM00S – "Reflects individual courses and grades, by student, as of the final day for each semester, and includes only Coordinating Board-approved courses for which semester credit hours are awarded, whether the class is delivered on-campus or off-campus (universities) or in-district or out-of-district (community, technical, and state colleges) or the credit is academic or technical (community, technical, and state colleges). Students who withdraw from a class on or before the official census date are not included in this report" (Texas Higher Education Coordinating Board [THECB], 2023, p. 25).

College Readiness – “Readiness is viewed by participants as their ability to complete rigorous coursework, ability to exhibit high-level thinking, and problem-solving and personal skills, such as time management and discipline” (McDonald and Farrell, 2012, p. 224).

Dual credit – “A process by which a high school student enrolls in a college course and receives simultaneous academic credit for the course from both the college and the high school” Texas Higher Education Coordinating Board [THECB], 2023, p. 43).

Excess hours – “Excess Hours is a funding limit. Effective with students initially enrolling in the fall 1999 semester and subsequent terms, hours, including dual credit hours, attempted by a resident undergraduate student that exceed more than 45 hours of the number of hours required for completion of the degree plan in which the student is enrolled. Effective with students initially enrolling in the fall 2006 semester and subsequent terms, hours, including dual credit hours, attempted by a resident undergraduate student that exceed more than 30 hours of the number of hours required for completion of the degree program in which the student is enrolled. Beginning in fall 2009, dual credit courses are not included in the calculation of excess hours. For purposes of excess hours, resident undergraduate student includes a nonresident student who is permitted to pay resident tuition (Texas Higher Education Coordinating Board [THECB], 2023, p. 45).

First-Time Undergraduate Student – “An undergraduate student entering college for the first-time after graduation from high school or who has never attended any college. It also includes students who entered with advanced standing (college credits

earned before graduation from high school)" (Texas Higher Education Coordinating Board [THECB], 2023, p. 49).

Full-Time Student – "A student who is enrolled in a full or normal workload at the institution during the reporting period. An undergraduate student enrolled in 12 or more semester credit hours in a long semester is considered full-time" (Texas Higher Education Coordinating Board [THECB], 2023, p. 51).

Graduation Rate – "The percentage of a given college-entering cohort of degree-seeking students who graduate in a specific period of time. For undergraduate graduation rates, the cohort consists of fall first-time, full-time undergraduates" (Texas Higher Education Coordinating Board [THECB], 2023, p. 53).

Hispanic or Latino – "A person of Cuban, Mexican, Puerto Rican, South or Central American, or other Spanish culture or origin, regardless of race" (Texas Higher Education Coordinating Board [THECB], 2023, p. 23).

International – "A person who is not a citizen or permanent resident of the United States and who is in this country on a temporary basis and does not have the right to remain indefinitely" (Texas Higher Education Coordinating Board [THECB], 2023, p. 23).

Institution of Higher Education (IHE)/Post-Secondary Institution – "Institution of Higher Education is, as defined in the Texas Education Code (§61.003), any public community college, senior college or university, medical or dental unit, or other agency of higher education, such as the Texas Engineering Extension Service. It also includes

independent junior, senior, and health-related institutions and career schools and colleges." (Texas Higher Education Coordinating Board [THECB], 2023, p. 57).

Native Hawaiian or Other Pacific Islander – "A person having origins in any of the original peoples of Hawaii, Guam, Samoa, or other Pacific Islands" (Texas Higher Education Coordinating Board [THECB], 2023, p. 23).

Race – "A category used to describe a group to which an individual belongs, identifies with, or belongs in the eyes of the community. Race categories do not denote scientific definitions of anthropological origins. A person may be counted in more than one group" (Texas Higher Education Coordinating Board [THECB], 2023, p. 63).

Semester Credit Hour (SCH) – "Semester Credit Hour (SCH) is a unit of measure representing an hour (50 minutes) of instruction over a 15-week period in a semester or trimester system or a 10-week period in a quarter system (Texas Higher Education Coordinating Board [THECB], 2023, p. 78).

Texas Higher Education Coordinating Board (THECB) – "Texas Higher Education Coordinating Board Rules and Regulations are the policies and procedures which regulate the operation of public higher education institutions within the state of Texas." (Texas Higher Education Coordinating Board [THECB], 2023, p. 87).

Texas Success Initiative (TSI) – "Texas Success Initiative (TSI) is a legislatively mandated program effective September 1, 2003. The TSI, which replaced the Texas Academic Skills Program (TASP), gives more flexibility to public higher education institutions in their efforts to ensure that students have the academic skills they need to succeed in higher education. The TSI requires testing of students' academic skills upon

entry into public higher education and appropriate counseling, advice, and opportunities--such as developmental education courses or non-course-based education (e.g., computer-based instruction or tutoring) -- for improving those skills. Each college or university is responsible for determining when students have the appropriate skills to succeed in college." (Texas Higher Education Coordinating Board [THECB], 2023, p. 87).

Undergraduate Student – "Undergraduate is a student enrolled in a four- or five-year bachelor's degree program, an associate's degree program, or a vocational or technical program below the baccalaureate" (Texas Higher Education Coordinating Board [THECB], 2023, p. 89).

Undergraduate Funding Limit – "Undergraduate Funding Limitation is a Legislative limit placed on the number of undergraduate semester credit hours that an undergraduate may attempt and which the state will use in allocating appropriations to an institution. The following limits are currently in place:

• For students who initially entered a higher education institution in fall 1999 to summer 2006, the limit is 45 hours over and above the number of hours in the student's degree program.

• For students who initially entered a higher education institution in fall 2006 to summer 2023, the limit is 30 hours over and above the number of hours in the student's degree program (Texas Higher Education Coordinating Board [THECB], 2023, p. 89)."

Unknown or Not Reported – "The unknown classification should only be used if the student has not selected a racial designation" (Texas Higher Education Coordinating Board [THECB], 2023, p. 23).

White – “A race of a person having origins in any of the original peoples of Europe, the Middle East or North Africa” (Texas Higher Education Coordinating Board [THECB], 2023, p. 91).

## 1.8 Limitations and Delimitations

The following limitations guided this study:

1. The researcher collected only quantifiable statistical data, specifically attempted credit hours, earned credit hours, GPA, degree completion, and average years to bachelor’s degree completion, whether or not the student earned dual credit hours or had zero dual credit hours, and exceeded funding.
2. The researcher collected data from one public, four-year regional university in Texas. The findings from the study cannot be generalized to other public, four-year universities in Texas or nationwide.
3. The researcher examined the first-time, full-time bachelor’s degree seeking students high school transcript data. Data coded as dual enrollment courses were included within the analyses. The university does not indicate type of dual credit work; therefore, the researcher was unable to determine if the dual credit came from participation in a dual credit program or through enrollment at an Early College High School.
4. The researcher categorized students as dual credit students if the students provided the dual credit courses through the admissions process. Students may have omitted reporting dual credit courses during the admissions process.

5. The researcher included transfer hours earned prior to the student's first fall semester. The transfer hours are not able to be categorized as Advanced Placement (AP), International Baccalaureate, etc. The researcher assumed that all earned transfer hours prior to the student's first fall semester were earned through an accelerated learning program prior to high school graduation.
6. The number and type of dual credit courses a student completes during high school could impact the student's post-secondary student success outcomes (Giana, Alexander, & Reyes, 2014). The researcher did not assess the number and type of dual credit courses a student completed during high school.
7. The researcher collected data from two, first-time, full-time bachelor's degree seeking cohorts which include fall semesters 2015 and 2016. A significant change regarding dual credit programs and courses was implemented in fall 2015 based on Texas Legislation that could impact later cohorts.
8. Students from the fall 2015 and 2016 cohorts may have been enrolled during the COVID pandemic. The university changed their grading policy during the early part of the pandemic, within the spring 2020 semester, to pass/fail. The grading policy may have impacted the student's outcome within course(s) and/or their degree completion.
9. The researcher did not include other pre-college characteristic variables that may contribute to degree completion including parental education, family income, high school GPA, and standardized test scores.
10. The researcher did not control for standardized test scores. All high school students who participate in a dual credit program are required to meet Texas

college readiness standards. Texas utilizes the Texas Success Initiative (TSI) standardized test to assess college readiness in Math, Reading, and Writing.

11. Within the 79th Legislative Session, HB 1 was passed included a statewide program called The Texas Success Initiative (TSI) that outlined college readiness standards. High school students participating in dual credit programs were required to be college ready based on TSI standards in English, Math, or Reading based on the college courses they were taking. The researcher assumed that dual credit participants were college ready within this analysis based on their prior dual credit work.
12. There are nine reportable ethnic/racial groups; however, only ethnic/racial groups with small cell sizes were collapsed into a group called "other".
13. The researcher only included student success metrics related to the student's outcome during their first year as well as their semester at graduation. Student success metrics related to the student's academic performance variables between year two up until graduation were not included within the research.
14. The researcher studied the post-secondary student success outcomes for first-time, full-time bachelor's degree-seeking students at a regional, public four-year university in Texas. Students who did not graduate at the regional, public four-year university in Texas were designated as 'did not graduate'; however, these students may have transferred to another in- or out-of-state college or university to pursue a degree or certificate. This is a significant limitation given a specific student population that the university serves as a part of a system initiative, Program for System Admission (PSA).

15. The researcher did not assess the financial impact excess hours has on graduation outcomes. Students who go into excess hours may be charged up to the non-resident tuition rate. The researcher had access to know whether or not the students went into excess funding; however, did not have access to student tuition and fee data.

## 1.9 Assumptions

The researcher has made a few assumptions. The first is that the secondary data provided by the Office of Planning, Analytics, Institutional Research, and Strategic Initiatives (PAIRS) is accurate and valid considering they are the university reporting officials to the Texas Higher Education Coordinating Board (THECB). The second assumption is that the sample would represent the population.

# CHAPTER 2. LITERATURE REVIEW

## 2.1 Introduction

Dual credit, also known as dual enrollment or concurrent enrollment, refers to high school students participating in post-secondary courses (Kleiner and Lewis, 2005). Dual credit programs allow high school students, usually junior or seniors, to take post-secondary courses while in high school for high school and college credit. Dual credit programs have existed in the United States for the past three decades; however, the programs have gained popularity in the last two decades (Lekes et al., 2007). The number of dual credit programs and high school student participation is expected to increase (Finken, 2003). High school students and their families are likely to choose dual credit programs given several of the program benefits including earning post-secondary credit while enrolled in high school, reducing the time it takes to earn a post-secondary degree or certificate, and saving money on tuition and fees. Dual enrollment programs are only one form of accelerated learning programs; however, several have existed decades prior to the introduction of dual credit.

## 2.2 History of Accelerated Learning Programs

According to Krueger (2006), there are several approaches to accelerated learning programs. Since the 20$^{th}$ century, five forms of accelerated learning have emerged including Advanced Placement, International Baccalaureate, dual enrollment, Middle College High Schools, and Early College High Schools. From the college perspective, there are three programs including dual enrollment, middle colleges, and early college high schools that are distinct. Krueger (2006) defined the three programs as:

- Dual enrollment programs can be provided in one of three venues including high school classrooms, at a post-secondary institution, or through distance-learning (e.g. online, two-way interactive, etc.). Most dual enrollment programs target high school juniors and seniors (Hoffman, 2005).
- Middle college high schools are high schools, often public, that are located on a post-secondary institution campus. Middle college high schools enroll students who are from low-income, minority, underserved, and/or academically at-risk students.
- Early college high schools are designed to blend public high school and post-secondary organizational structures and curriculums to provide an accelerated program that will allow a student, primarily geared to underserved students within higher education, to graduate with a high school diploma and with at least one year of college credit or associate's degree within four years (Bragg et. al, 2006).

Four of the five forms of accelerated learning programs that emerged during the 20th century will be examined from a historical perspective on when they started, their features, and where they stand today.

### 2.2.1 Advanced placement

The Advanced Placement (AP) program started in 1952 through the College Board. The purpose of AP courses was to allow high school students who are considered academically high achieving to take college level curriculum within the high school setting that will allow the student to earn college credit from a post-secondary institution (College Board, n.d.) Depending on the high school scheduling policy, students can either take the AP course for a semester or an entire academic year. At the end of each AP

course, students have the option to pay an examination fee and take an AP examination for that course. The AP examination provides a score ranging from one to five. Students earn a passing score for the examination if they earned a score of three, four, or five. Although students may earn a passing score, post-secondary institutions can develop an admissions policy that determines which AP scores are passing for that institution and/or within the course and which courses the passing score is articulated to (College Board, n.d.). Many post-secondary institutions use AP scores for course placement and choose not to award college credit towards the student's degree (Hoffman, 2005). In 1952, eleven subjects were offered to high school students; whereas, at the beginning of 2019, there are 36 subjects that are offered (College Board, n.d.).

Although students can earn college credit AP examinations and scores, the process itself is not a dual credit program or course. Although AP and dual credit programs and courses have similar processes and outcomes, researchers have studied students who participated in AP and dual credit courses and have found no significant differences in students' retention and graduation rates (Speroni, 2011).

### 2.2.2 International baccalaureate

In 1968, the International Baccalaureate (IB) Diploma program began in Geneva, Switzerland to serve internationally mobile high school students who were interested in preparing for post-secondary education during their last two years of high school. The IB is a two-year diploma program offered to high school students between the ages of 16-19 years old. At the end of the second year, students may take an examination for a fee. Students who pay for and take the examination will be awarded a score. Post-secondary

institutions can utilize the IB score and award college credit to be used towards and undergraduate degree (International Baccalaureate Organization, n.d.).

### 2.2.3 Early College High School

In the 1930s and 1940s, Leonard Koos, developed the idea of the 6-4-4 academic plan (Kisker, 2006). The academic plan placed students in an elementary school from grades 1 through 6, from grades 7 through 10 in a junior high school, and grades 11 through 14 in a junior or community college. Koos promoted the 6-4-4 academic plan in school districts within various states including California, Kansas, Missouri, Oklahoma, and Mississippi. Koos believed that the last two years of high school curriculum and the first two years of post-secondary curriculum were similar in the core curriculum taught. The last two years of post-secondary education focused on curriculum specialized to the major of interest (Kisker, 2006). At the time, Koo's 6-4-4 academic plan was met with resistance by local communities across the nation. During the early twentieth century, local communities were looking to build junior/community colleges that were independent from local secondary schools (Pedersen, 2000; Kisker, 2006). Although the 6-4-4 academic plan did not take hold at either the state or national levels, the concept of early college resurfaced in the mid-twentieth century.

During the mid-twentieth century, the early college model started with two schools in Northeastern United States (Webb, 2014). In 1966, Simon's Rock Early College, was founded in Great Barrington, Massachusetts. Simon's Rock Early College was a small, private high school that offered both high school and college courses to high academically achieving high school juniors and seniors. The high school juniors and seniors that took college courses could earn an associate degree or up to two years of

college credit upon high school graduation. Today, Simon's Rock is a part of Bard College (known as Bard College at Simon's Rock) and offers the opportunity to high performing 16- and 17-year-old students to enroll in college early (Webb, 2014). The second early college model targeted academically at-risk high school students. In 1974, the Middle College High School emerged as a partnership between New York City public high schools and LaGuardia Community College. Middle College High School was located on LaGuardia's campus in Queens, New York. On LaGuardia's campus, Middle College High School was able to offer small class sizes, college courses, and student support programs to students who were at-risk of stopping out of high school or completing high school with no ambition to pursue a post-secondary degree (Webb, 2014).

The concept of early colleges reemerged for a third time under different circumstances. In 2002, several national foundations, including the Bill and Melinda Foundation, Carnegie Corporation, Ford Foundation, and the Kellogg Foundation, developed a $40 million dollar grant that would support the development of Early College High Schools (ECHS) (Jobs for the Future, 2006). Within five years, three other major foundations, including the Walton Family, Lumina, and Dell foundations, provided additional start-up funds. The ECHS movement began in 2002 with three schools and by 2016 nearly 300 ECHS were operating across the United States that were serving approximately 80,000 high school students (Hoffman, 2016; Webb, 2014; Edmunds et al., 2010).

Jobs for the Future was tasked by the foundations to coordinate the ECHS initiative and since 2002 have created the vision, mission, strategies, and core principles

(Webb, 2014). Five core principals were developed to outline the ECHS mission. The five core principals include:

1. serving underrepresented students in post-secondary education;
2. joint partnership between a local education agency, a post-secondary institution, and the local community to ensure all entities are responsible for student success within the post-secondary environment;
3. the ECHS and post-secondary institution collaborate to develop an integrated academic curriculum program between the two entities to ensure high school students can either earn at least one to two years of transferable college credit or an associate's degree by the time the student would graduate from the ECHS;
4. develop a support system that develops academic and social skills within the ECHS students that extend beyond the ECHS experience and into their post-secondary matriculation and completion; and
5. continuous assessment to ensure the ECHS model and policies are effective (American Institutes for Research, n.d.).

In addition to the core principles, several strategies were put into place by Jobs for the Future to ensure that the ECHS grants provided to the schools would allow for several benefits to the students including small classroom sizes, learning, and adapting to the academic rigor associated with taking college courses, and waiving tuition for all college courses (Jobs for the Future, 2010).

With funding from the Bill and Melinda Gates foundation, intermediary organizations were incorporated into the ECHS initiatives. The purpose of the

intermediary organizations was to assist the local school districts, post-secondary institutions, and community organizations (e.g. United Way) to implement new early college schools. The intermediary organizations would provide technical support, financial guidance, and professional development to all three entities during and after the implementation of a new ECHS. Since 2002, a total of 13 intermediary organizations have been created in various states across the United States including the Center for Native Education, City University of New York, Educate Texas, Foundation for California Community Colleges, Gateway to College National Network, Knowledge Works Foundation, Middle College National Consortium, National Council of La Raza, North Carolina New Schools, SECME, Inc., University System of Georgia Board of Regents, Utah Partnership Foundation, and Woodrow Wilson National Fellowship Foundation.

### 2.2.4 Dual credit programs

To date there is no national policy associated with dual credit programs. In 1985, Minnesota was the first state to offer a dual enrollment program within the United States (Krueger, 2006). The program, known as the *Postsecondary Enrollment Options Program,* allowed high school students to take up to two years of college curriculum apart from developmental or remedial coursework. Since 1985, several states have begun to offer dual credit programs. Dual credit program features and policies vary by state. There are varying features within each state's policies and regulations including oversight of the policies, target student populations, admissions requirements, program/course location, student mix, instructor eligibility, course content, method of credit earning, program financing, and program intensity (Karp et. al., 2004).

There are six qualities to consider when offering dual credit programs including the location of classes, course offerings, student mix, type of credit, course timing, and instructor type. The six qualities will intersect with one another.

Dual enrollment courses are often taught in one of three modalities including the high school campus, college campus, or online. First, the course is offered at the high school and taught by either a high school teach or university faculty member. Second, the course is taught at a post-secondary institution by a university faculty member. If a high school student takes a course at the post-secondary institution, the institution can choose to either enroll only dual credit students in a course or create student mix by enrollment both traditional college students and high school dual credit students in one course with the goal of enhancing the college experience for the high school students. Finally, dual credit courses are offered through distance learning or satellite campuses which is more often found in rural areas (Lerner and Brand, 2006).

Hanover Research (2012) found that dual credit courses that are offered at the high school and taught by high school faculty may experience challenges. The high school faculty need the appropriate credentials to teach the curriculum as well as may need additional professional development to develop and implement the college-level curriculum in the classroom.

States that offer dual credit programs often have academic requirements high school students need to meet to participate in a dual credit program including high school GPA, standardized test scores (e.g. SAT, ACT), standardized placement tests (e.g. ACCUPLACER), and/or end of course high school exams (Hoffman, 2005).

#### 2.2.4.1 Dual enrollment programs serving underrepresented populations

Dual enrollment is a secondary and post-secondary educational strategy used to offer high achieving academic students the opportunity to access post-secondary education offerings earlier. Researchers have sought to link dual enrollment participation to post-secondary success including retention, persistence, and completion outcomes.

More underrepresented and underserved populations are attending post-secondary institutions; however, the completion and graduation rates of these populations are not increasing (Hirsch, 2008). Over the last two decades, students who are historically underserved in higher education including minority and first-generation students have been targeted within dual enrollment strategies to increase their college accessibility and attending (An, 2013; Bragg et al., 2006; Hughes et al., 2012). Ishitani (2003) found that first-generation students were 71% likely to withdraw from a post-secondary institution than students who come from homes where both parents have a post-secondary degree. Considering that first-generation students are more likely to withdraw; fewer first-generation students earn a post-secondary degree. Engle & Tinto (2008) found that 34% of low-income, first-generation students at a four-year post-secondary institution earned a bachelor's degree within six years. They found that when a low-income first-generation student attempted and completed academically challenging courses in high school, the student was more likely to attend a post-secondary institution upon high school graduation.

#### 2.2.4.2 Dual enrollment programs in Texas

To date, there are no national policies surrounding dual credit access and administration of programs. Zinth (2016) reviewed state policies and regulations regarding dual credit programs within the United States and found that states varied in how they implemented the programs. Karp et. al. (2004) found that many states, approximately 40, had dual credit legislative or regulatory policies. Although not found in all states, there were several policy features that arose, often including whether or not offering the dual credit programs or courses are mandatory or voluntary, the target student population, admission requirements including student level and academic courses, student mix including if high school students are concurrently enrolled with traditional aged post-secondary students, where the dual credit programs or courses are located, instruction responsibility, program course content and delivery, tuition and fees, and program financing or funding (Karp et. al., 2004). Karp et. al. (2004) found that the policy feature that could be found in most states included admission requirements; however, program structure was the least regulated.

## 2.3 Texas Higher Education Coordinating Board Strategic Plans

### 2.3.1 Texas 60X30

In 2015, Texas developed the 60x30 higher education plan (Texas Higher Education Coordinating Board [THECB], 2019). The plan has four main goals with additional targets. The four main goals to be achieved by 2030 including:

1. At least 60% of Texans between ages 25-34 will have a post-secondary certificate or associate, bachelor's, master's, professional, or doctoral degree.

2. More than 550,000 students will complete a certificate, associate, bachelor's, or master's degree from a Texas post-secondary institution in 2030.
3. All post-secondary graduates will graduate with programs that have marketable skills.
4. Undergraduate student loan debt will not be greater than 60% of first-year wages after graduating from a Texas public university.

Significant progress has been made in the percentage of Texas aged 25-34 who have earned a post-secondary certificate or degree. In 2017, 43.5% of Texas between 25-34 had a post-secondary certificate or degree (Texas Higher Education Coordinating Board [THECB], 2019). Most of the increase can be accounted for by those earning associate and bachelor's degrees.

The second goal is looking to increase completion rates. Within the second goal, there are completion targets for four underserved and underrepresented student populations including Hispanic, African American, economically disadvantaged, and males. Additionally, there is a target that addresses high school graduates enrolling in a post-secondary institution after graduation. The target is to have 65% of high school graduates enroll in a Texas post-secondary institution the fall after they graduate from high school. The second target addressing enrolling in a post-secondary institution upon graduation has not made progress since 2015. The rate of direct enrollment has decreased since 2015 from 52.7% to 51.6% in 2018 (Texas Higher Education Coordinating Board [THECB], 2019).

Within the student debt goal, there are additional targets. The first additional target is that less than half of undergraduate students earning a certificate, associate, or

bachelor's degree graduate with debt (Texas Higher Education Coordinating Board [THECB], 2019). According to 60x30 Progress Report, the percent of undergraduate students graduating with debt has gone down from 47.2% to 45.8% from 2017 to 2018 (Texas Higher Education Coordinating Board [THECB], 2019). Students who are pursuing a bachelor's degree are more likely to incur debt compared to those who are pursuing a certificate or associate degree (Texas Higher Education Coordinating Board [THECB], 2019). Students who are underrepresented or underserved in post-secondary education may be more likely to take on debt of finance their post-secondary education. The second additional target is that the number of excess semester credit hours (SCH) will decline to an average of 3 SCH for associate and bachelor's degree earners by 2030 (Texas Higher Education Coordinating Board [THECB], 2019). THECB found that the average number of excess SCH has declined for both associate and bachelor's degree earners between 2015 and 2018 from 14 to 12 SCH and 28 to 24 SCH respectively.

### 2.3.2 Building a Talent Strong Texas

In 2022, the Texas Higher Education Coordinating Board approved an updated strategic plan, Building a Talent Strong Texas. The plan includes three goals. The first goal is focused on expanding those with a post-secondary credential of value to include working adults within the workforce. By 2030, the goal is to have 60% of Texans aged 25-64 with a post-secondary education. The second goal is to provide post-secondary credentials of value that are aligned with workforce development, raise income, while reducing student debt. Over 550,000 students will earn a post-secondary degree or certificate annually and 95% of associate and bachelor's degree graduates will graduate with no student loan debt or manageable levels of debt in relation to their potential

earnings within their field of study. The third goal is focused on research, development, and innovation. The expectation is that 7,500 research doctorates will be awarded annually and there will be a $1billion increase in annual and private research expenditures by 2030 (Texas Higher Education Coordinating Board, 2022).

## 2.4 Development on Dual Credit in Texas & Subsequent Legislative Changes

The Texas Administrative Code, Title 19, Part I, Chapter 4, Subchapter D, Rule 4.83, defines dual credit education as "a process by which a high school student enrolls in a college course and receives simultaneous academic credit for the course from both the college and the high school." Since the development of the Texas Administrative Code, the policies surrounding dual credit within Texas have changed over the last decade.

In 1995, the 74th Legislative Assembly passed House Bill (HB) 1336 which recognized dual credit for the first time within the state of Texas and allowed for the creation of dual credit programs (Texas Education Agency [TEA], 2011). The purpose of HB 1336 was to ensure that high school students had an educational intervention like dual credit programs that assisted with their transition from high school to a post-secondary institution. Although HB 1336 allowed for the creation of dual credit programs, the Texas Higher Education Coordinating Board did not start tracking dual credit enrollment until fall 1999. In fall 1999, 11,921 high school students were enrolled in Texas dual credit programs or courses and all enrollments were accounted for within public community and technical colleges. During fall 1999, most high school students who participated in dual credit programs or courses were White (71%) and an additional 22% of participants were Hispanic. Several legislative changes have been brought

forward since the implementation of HB 1336 and the creation of dual credit programs and courses in Texas which has increased the number of high school students who participate in dual credit programs and courses. As of fall 2020, there were 183,726 high school students who participated in dual credit programs or courses with 94% of enrollments at public community and technical colleges and 6% at public, four-year universities. The racial and ethnic demographics of who participated at each institution type varied. Hispanic high school students were more likely to enroll in a dual credit program or course at a public community or technical college compared to a four-year university. Hispanic high school students accounted for 47% of the total dual credit enrollment at public community and technical colleges and 42% and public, four-year universities; whereas, White high school students accounted for 33% of the total dual credit enrollment at public community and technical colleges and 44% and public, four-year universities (Texas Higher Education Coordinating Board [THECB], n.d.).

In 2003, the Texas lawmakers passed HB 415 which allowed high school and post-secondary institutions to receive funding for dual credit courses and the costs associated with the faculty instruction. Texas legislation funds both post-secondary and public high schools for dual credit courses; however, the post-secondary institution will only receive funding for dual credit courses that are within the core curriculum and career and technical education. In 2009-2010 the American Institute for Research (AIR) found that Texas K-12 and post-secondary institutions spent $32 million to fund dual credit programs. Although K-12 and post-secondary institutions spent $32 million to fund dual credit programs, the post-secondary institutions receive formula funding through state appropriations. THECB (2012) indicated that dual credit accounted for approximately 8%

of the total undergraduate enrollment in fall 2010 and that the post-secondary institutions received more than $50 million in formula funding for the dual credit course enrollment.

Although post-secondary institutions receive per-credit hour funding from state appropriations, the state legislation allows post-secondary institutions to charge tuition and fees to participate in dual credit courses (Texas Administrative Code, n.d.). In the 2009-2010 AIR study, they found that high school students and their parents/guardians spent over $33 million in tuition, fees, and textbooks for their participation in dual credit programs. Post-secondary institutions have the choice to provide waivers based on institutional policy. If the student applied for, was admitted into, and registered for dual courses without an institutional waiver, the costs associated with tuition and fees fall on the participant and their family (Texas Administrative Code, n.d.). Within the 2009-2010 AIR study, they found that overall, $63.3 million were waived by Texas public, post-secondary institutions; however, Hoffman (2016) found that Texas community colleges were more likely to waive tuition and fees than four-year universities.

In 2005, the 79th Texas Legislative Assembly passed House Bill (HB) 1 which required all Texas Independent School Districts (ISDs) to offer junior and senior high school students the chance to earn at least 12 college credits through Advanced Placement, International Baccalaureate, or dual credit (Texas Legislature, 2005). Although HB 1 require Texas ISDs to offer accelerated forms of learning, high school students are required to meet college readiness standards (Jobs for the Future, 2006). HB 1 included a statewide program called The Texas Success Initiative (TSI) that outlined college readiness standards. The TSI test students in several academic areas including English, Reading, and Math, etc. (Jobs for the Future, 2006). The Texas Administrative

Code, rule 4.85 outlines dual credit eligibility requirements under the provisions of the TSI (Texas Administrative Code, n.d.). In addition to meeting the statewide dual credit eligibility requirements, post-secondary institutions may impose additional requirements high school students must meet to apply and enroll in dual credit programs or courses (Texas Administrative Code, n.d.). High school students who participate in early TSI testing and meet college readiness standards are then qualified to enroll in dual credit courses or programs. The eligibility requirements of both HB1 and the individual post-secondary institutions could serve to exclude historically underserved students including minority and first-generation students. The TSI accounts for academic college readiness; however, does not account for non-academic areas related to college readiness. Texas legislation, to date, does not consider non-academic areas. Edmunds (2012) indicated that "academic study skills, time management, and the ability to self-monitor quality of work are other core components of college readiness" (p.5).

Within the 84th Legislative Assembly, House Bill (HB) 505 was introduced and took effect in September 2015. HB 505 stated that beginning within the 2015-2016 academic year, high school students who participated in dual credit programs and courses may not be limited on the number of dual credit courses or hours that the high school student may enroll in during each semester, academic year. Prior legislation restricted dual credit participation to only high school juniors and seniors; however, HB 505 opened the possibility for all high school students, regardless of grade level to participate in dual credit programs and courses given that they meet college readiness standards. High school students may not be prohibited to participate in dual credit programs and courses based on their high school grade level (LegiScan, 2015). Since the

implementation of HB 505, the number of dual credit hours high school students are attempting has increased. In fall 2015, at Texas public community and technical colleges a total of 559,448 dual credit hours were generated with an average of 5.3 dual credit hours taken by each high school student and by fall 2020, the dual credit attempted hours increased to 2,202,394 with an average of 5.8 dual credit hours taken by each high school student. During that same timeframe, Texas public four-year universities experienced that same growth in dual credit hours and average hours taken per semester. In fall 2015, a total of 38,658 dual credit hours were generated with an average of 5.2 dual credit hours taken by each high school student and by fall 2020, the dual credit attempted hours increased to 116,698 with an average of 5.5 dual credit hours taken by each high school student (Texas Higher Education Coordinating Board [THECB], n.d.).

## 2.5 Excess Hours in Texas

During the 75th Texas Legislature, Texas Education Code 54.014 was passed. Texas Education Code (TEC) 54.014 established a maximum number of attempted credit hours an undergraduate resident or non-resident student may attempt while paying Texas resident tuition. Undergraduate students who go beyond the maximum number of attempted credit hours, may be charged, at the discretion of the higher education institution, to charge student's a higher tuition rate up to the non-resident tuition rate. TEC 54.014 went into effect in fall 1999. Undergraduate students whose first semester in a Texas four-year public university prior to fall 1999 are exempt. Beginning in fall 1999 through summer 2006, undergraduate students whose first semester fell in that range at a Texas four-year public university were allowed to go up to 45 attempted credit hours over their degree program hour requirements before they could be charged a higher tuition rate

for going into excess hours. TEC 54.014 was amended in the 79th Texas Legislative session and impacted the number of attempted hours a student could accumulate beyond their degree program. With the amended changes, undergraduate students whose first semester was fall 2006 to date at a Texas public four-year university are allowed to up to 30 attempted credit hours over their degree program requirements before they could be charged a higher tuition rate for going into excess hours (Texas Education Code, n.d.). Undergraduate students who attempt more than one major, degree, or minor are not permitted to extend the maximum attempted hours limit based on their primary degree program.

TEC 54.014 outlines which attempted hours are included or excluded within the calculation of when a student enters into excess hours. Attempted hours included within the calculation include those courses where a student earned hours including passing grades, courses where a student did not earn a passing grade, withdrawn courses including administrative withdrawals, and repeated courses. There are several courses and hours that are excluded from the excess hours' calculation. Hours excluded include several that a student may earn prior to being a first-time student at a post-secondary institution including hours that are earned by examination including AP, IB, CLEP, etc. and hours that were taken dual credit prior to earning their high school diploma. Once an undergraduate is a first-time student at a Texas public four-year university, there are several types of courses and/or hours that are not counted towards excess which includes credit from remedial and/or developmental courses and credits that were earned prior to the election of an Academic Fresh Start, and transfer attempted credit hours from either a private post-secondary institution or an out-of-state public or private post-secondary

institution. Finally, students who have earned a bachelor's degree and come back to pursue additional bachelor's degree are not subject to excess hours after the completion of their initial bachelor's degree (Texas Education Code, n.d.).

## 2.6 Texas A&M University: Program for System Admission

The Texas public, regional, four-year university that was utilized for this research is a regional university associated with Texas A&M University. Texas A&M University offers a Program for System Admission (PSA) for first-time in college undergraduate students that apply to Texas A&M University; however, are not admitted to Texas A&M University during their first-year in college. Students who are selected within the PSA program are offered the opportunity to enroll in a participating regional, Texas A&M system school. After completing one year at the regional Texas A&M school, students are then guaranteed transfer admission back to Texas A&M University to complete their bachelor's degree (Texas A&M University, n.d.).

To be eligible for guaranteed transfer admission back to Texas A&M University, there are several requirements that PSA students must meet. First, the student must earn at least 24 credit hours at one single regional Texas A&M school during the fall and spring semesters. Second, most majors require the student to maintain at least a 3.0 cumulative GPA at the regional Texas A&M school as well as maintain at least a 3.0 cumulative GPA on all transferable work includes dual credit courses taken during high school. Engineering students are required to maintain at least a 3.25 cumulative GPA at the regional Texas A&M school and the cumulative GPA is the same as the other majors (Texas A&M University, n.d.). The Texas public, regional, four-year university often

serves more than 250-400 PSA students within their fall cohorts and on average 25% of PSA students retain at the regional university for their second fall semester while the majority decided to transfer out of the regional university.

## 2.7 Student Success Outcomes

### 2.7.1 Value of a College Education

Within the workforce, several jobs require a college degree or credential. There are several career paths that require a bachelor's degree as well as a graduate degree. Both students and employers benefit from an educated workforce. Students who complete their undergraduate degree or credential can increase their earning potential. Employers are more likely to perceive those with a post-secondary degree or credential as able to learn quickly, accomplish tasks, and achieve personal and professional goals as well as more motivated (Dohm & Wyatt, 2002).

In addition to monetary benefits, students who complete their post-secondary education are more likely to experience life improvements. The life improvements include lifestyle, leisure, and health care advantages (Porter, 2002). Porter (2002) found that children who were born to a parent(s) with a college degree were more likely to have greater access to and better health than those whose children whose parents did not have a post-secondary degree.

### 2.7.2 Leading and Lagging Student Success Outcomes for Dual Enrollment Students

Students participating in dual enrollment programs and courses are more likely to be academically and socially ready for post-secondary education compared to students

who enter post-secondary traditionally. One way to measure academic preparedness is to measure course success. The Florida Community and College Systems commissioned a study to assess course success (Florida Board of Education, 2003). In addition to academic preparedness, dual credit students are more likely to be socially ready for post-secondary education. Karp (2012) found that dual credit students were more likely to benefit from observing and imitating academic and social behaviors of current college students that demonstrate student success.

#### 2.7.2.1 Leading Student Success Outcome: College Choice and Transition

For most college bound students, the family plays an important role in discussing and developing their students' educational goals. Napolitano et al. (2014) found that middle-income parents have a strong desire for their children to earn a degree to be hired into a career that is profitable. Studies have explored outcomes by varying demographics. Hispanic parents value their children's outcomes (Durand & Perez, 2013) and will begin shaping their children's educational aspirations for a degree as early as elementary school (Goldenberg et al., 2001). By the time the student reaches the collection selection process, the family members and their bonds play a significant role in the student's choice (Carey, 2016). For many Hispanic students, two choices, including proximity and finances influence them and their family's decision on where they may choose to attend a post-secondary institution. Hispanic students often select post-secondary institutions that are inexpensive (O'Connor, Hammack, & Scott, 2010) and that are relatively close to their home so that they may have the option to live at home while attending the post-secondary institution.

#### 2.7.2.2 Leading Student Success Outcome: Grade Point Averages (GPA)

O'Connor and Justice (2008) found that high school students who completed a dual credit course were more likely to have a higher first semester GPA and accelerate their time to degree completion. Fike and Fike (2012) studied the first semester GPAs of Hispanic students at a Hispanic-Serving Institution (HSI) and found that high school students who completed a dual credit course had higher first semester GPA than those who did not enroll in a dual credit course.

#### 2.7.2.3 Leading Student Success Outcome: Credit Hour Accumulation

Several studies have found that the participation in dual credit programs and accumulating college credit while in high school is linked to student success (Adelman, 2006). In one study, Allen and Dadgar (2012) found that dual credit students who attempted and completed dual credit courses were more likely to attempt and earn more credit hours during their first year in post-secondary education. To see if the type of post-secondary institution had an effect, Radunzel, Nobel, and Wheeler (2014), found that it did not matter if a high school student took dual credit courses at either a community and technical college or a university. Dual credit students had comparable student success outcomes for those who attended either institution type.

#### 2.7.2.4 Lagging Student Success Outcome: Time to Degree Completion & Graduation Rates

Dual credit students who can utilize the dual credit earned while enrolled in high school and apply that to their two or four-year degree plan and enroll in post-secondary

education as a full-time student are more likely to shorten their post-secondary enrollment by one or more years. Several researchers have assessed the impact dual credit has on time to degree.

Westcott (2009) tracked students for six-years and found that dual credit students had a significantly higher rate of degree completion and shorter time to degree completion compared to those who did not participate in dual credit. Adelman (2006) utilized data from the National Longitudinal Studies from 1972-2000 and found that dual credit students who earned nine or more post-secondary credit while enrolled in high school where more likely to decrease their time to graduation for a bachelor's degree. Dual credit students were more likely to graduate in 4.25 years whereas those students who entered in a post-secondary cohort with no dual credit were more likely to graduate in 4.75 years. There is a limitation to Adelman's (2005) study because dual credit was associated and considered alongside other forms of accelerated credit including Advanced Placement (AP) and College Level Examination Program (CLEP) which means the true impact of dual credit on time to graduation cannot be inferred.

Swanson (2008) utilized the same dataset as Adelman's study; however, wanted to delineate the impact dual credit had on time to degree and was able to remove other forms of accelerated course program data (e.g. AP, CLEP) from the dataset. When only mining for dual credit enrollment, Swanson (2008) found that dual credit students were likely to earn a bachelor's degree in 4.56 years which is not statistically significant from the time to degree for those who entered in a post-secondary cohort with no dual credit. Non-dual enrollment students were more likely to graduate in 4.75 years.

## 2.8 Summary

This chapters provided a review of current literature relevant to this study by focusing on the following topics: history of accelerated learning programs, development of dual credit enrollment programs in Texas and the legislation that started the dual credit program and continued its evolution, and student success outcomes that are focused on leading and lagging student success measures that may impact those who do and do not participate in dual credit courses and programs.

# CHAPTER 3. METHODOLOGY

## 3.1 Introduction

The purpose of this study is to examine the impact the participation in dual credit programs and courses have on students who enroll at a regional, public four-year university in South Texas looking at both leading and lagging student success metrics compared to those who do not participate in dual credit programs and courses. The researcher sought to determine if there are differences in the student success outcome measures for students who start as first-time in college at the university using fall cohorts 2015 and 2016.

## 3.2 Research Questions

The researcher utilized the following research questions and hypotheses when assessing the leading and lagging student success outcome measures for those who participate in dual credit program or courses to those who did not participate in a dual credit program or course.

1. To what extent does transfer hours vary among first-time, full-time bachelor's degree seeking students vary by those who participated or did not participate in dual credit?
2. For those who graduated within six years, to what extent do the cumulative attempted credit hours vary between those who exceeded and did not exceed excess hours?
3. What is the relationship between graduation and whether or not students participated in dual credit including covariates student classification, sex,

race/ethnicity, residency, transfer hours earned prior to the first fall semester, first fall semester attempted credit hours, first year cumulative attempted credit hours, first year cumulative earned credit hours, cumulative attempted credit hours, cumulative earned credit hours, first term GPA, and cumulative GPA?

4. For those who graduated within six-years, what is the relationship between excess hours status and whether or not students participated in dual credit including covariates student classification, sex, race/ethnicity, residency, first term GPA, transfer hours earned prior to the first fall semester, first fall semester attempted credit hours, first year cumulative attempted credit hours, first year cumulative earned credit hours, cumulative attempted credit hours, cumulative earned credit hours, first term GPA, and cumulative GPA?

5. With the quantitative findings above, what might this tell us about the evaluative policy implications from the Texas 79th legislative assembly?

The remainder of the chapter will focus on two areas including design and data. The first area will focus on the resign design which will discuss the methodology and the independent and dependent variables. The second area will focus on the data utilized within the study including the population sample, data collection, and data analysis procedures.

## 3.3 Research Design

### 3.3.1 Methodology

This study used both descriptive and inferential statistics as the researcher wanted to describe the population and their student success outcomes as well as make inferences about the data. To address the inferential statistics, the researcher used a quantitative research approach while using a comparative analysis design with secondary data utilized from a regional, public four-year university in South Texas. The researcher sought to compare student success outcome measures with two different groups including those who participated in dual credit programs and/or courses prior to high school graduation to those who did not participate in dual credit programs and/or courses prior to high school graduation. The variables utilized included first-time, full-time bachelor's degree seeking cohort status, dual credit program and/or course participation, transfer hours earned prior to their first fall semester, attempted credit hours during their first fall semester, cumulative attempted credit hours during their first year, cumulative earned credit hours during their first year, cumulative attempted credit hours, cumulative earned credit hours, first fall semester GPA, cumulative GPA, bachelor's degree graduation term, excess hour status, student classification, sex, race/ethnicity, residency, and PSA status. The study report on the comparisons between the two groups including those who participated in dual credit programs and/or courses prior to high school graduation and those who did not participate in dual credit programs and/or courses prior to high school graduation and the student success outcomes for each of the comparison groups.

### 3.3.2 Variables

The researcher sought to compare the results of different student success outcomes. The student success outcomes included attempted credit hours during their first fall semester, cumulative attempted credit hours during their first year, cumulative earned credit hours during their first year, cumulative attempted credit hours, cumulative earned credit hours, first fall semester GPA, cumulative GPA, bachelor's degree graduation term, and excess hour status.

To create the comparison groups, the researcher created a group designation. Those who participated in dual credit programs and/or courses prior to high school graduation were coded as 1 and those who did not participate in in dual credit program and/or courses prior to high school graduation were coded as 0. Additionally, to assess the outcomes over time, the researcher utilized first-time, full-time bachelor's degree seeking cohorts including fall 2015 and fall 2016. The first-time, full-time bachelor's degree seeking cohort designation were coded 20159 and 20169. Students were included in the first-time in college cohort if they attempted a full-time course load during their first semester which is 12 or more credit hours. Table 3.1 shows the list of variables used in the study.

## 3.4 Data Collection

### 3.4.1 Population and Sample

The population for this study consisted of first-time, full-time bachelor's degree seeking students from a Texas public four-year university who started in either Fall 2015 or Fall 2016 ($N$=4,591). The researcher found that two individuals who had started within

the cohorts had passed away. They were removed from the population. The researcher decided to remove students who were coded as a PSA student. The purpose of the PSA program is to allow students who apply to Texas A&M University and are not admitted to apply at a regional institution and attend for one year with the intent to reapply to Texas A&M University the following year. The regional Texas A&M University that is being used for this study retains on average 25% of the students who start in the PSA program to their second year; therefore, since their intent is not to graduate at the regional Texas A&M University, they were removed from the analysis. A total of 508 students were identified as PSA and removed from the population. The PSA program has the potential to impact retention and graduation outcomes within participating Texas A&M System schools that participate in the program. Nine regional Texas A&M Universities participate in the PSA program including Prairie View A&M University, Tarleton State University, Texas A&M International University, Texas A&M University-Commerce, Texas A&M University-Corpus Christi, Texas A&M University-Kingsville, Texas A&M University-San Antonio, Texas A&M University-Texarkana, and West Texas A&M University (Texas A&M University, n.d.). Table 3.2 shows the first fall to second fall retention rates for the Texas A&M Universities that participate in the PSA program (Texas A&M University, n.d.). For the fall 2015 and 2016 cohorts, the average first fall to second fall retention rate for all regional, Texas A&M Universities participating in PSA was 65.0% and 66.4% respectively. The first fall to second fall retention rate for the fall 2015 and 2016 cohorts at the regional, Texas A&M universities participating in the PSA program is lower compared to the national average for public four-year universities which was 69.7% for fall 2015 and 71.2% for fall 2016 (Decker, n.d.). Table 3.3 shows

the six-year graduation rates for the Texas A&M Universities that participate in the in the PSA program (Texas A&M University, n.d.). For the fall 2015 and 2016 cohorts, the average six-year graduation rate for all regional, Texas A&M Universities participating in PSA was 41.2% and 40.5% respectively. The six-year graduation rate for the fall 2015 and 2016 cohorts at the regional, Texas A&M universities participating in the PSA program is lower compared to the national average for public four-year universities which was 62.2% for fall 2015 and 62.3% for fall 2016 (Decker, n.d.).

From there, the researcher examined the data set for missing values. Missing values can impact the outcomes of your analyses (George and Mallory, 2003). The researcher found that two variables had missing values. The first variable showing missing values was the first term GPA. A total of 128 students did not complete their first fall semester and did not have a first term GPA. Only 120 students were removed since eight were previously removed as a PSA student. The second variable that resulted in missing values was the cumulative GPA. A total of 32 students did not have a cumulative GPA. Only three records were removed since 29 were previously removed since they also did not have a valid first term GPA. In total, 633 records were removed from the population resulting in a sample of 3,966. Of the 3,966 students within the 2015 and 2016 cohorts, 2,407 (60.7%) were female, 2,059 (51.9%) were Hispanic, 3,832 (96.6%) were from Texas, 641 (16.2%) transferred in one or more dual credit courses, 188 (4.7%) entered first-time above a freshman classification, and 1,548 (39.0%) graduated with a bachelor's degree within six years as seen in Table 3.4.

Table 3.5 shows the descriptive statistics for those within the sample that participated in dual credit compared to those who did not participate in dual credit. Those

who participated in at least one dual credit course prior to starting as a first-time student within the fall 2015 or 2016 cohort were more likely to be female (63.7%), Hispanic (59.0%), enter with enough credit to be a first-time sophomore or junior (12.4%), and graduate with a bachelor's degree within six-years (50.5%). Tables 3.6 and 3.7 show the leading and lagging student success metrics for those within the sample that participated in dual credit compared to those who did not participate in dual credit. Those who participated in at least one dual credit course prior to starting as a first-time student within the fall 2015 or 2016 cohort were more likely to bring in more transfer hours prior to starting as a first-time student (16.0), have a higher first fall semester GPA (2.7), have more cumulative attempted and earned hours throughout their time at the university at 104.5 and 92.3, respectively, and have a higher cumulative GPA (2.9) throughout their time at the university.

Table 3.8 shows the descriptive statistics for those within the sample that exceeded excess hours compared to those who did not exceed excess hours. Those who were more likely to exceed excess hours within the fall 2015 or 2016 cohort were more likely to be female (58.0%), Hispanic (56.9%), and graduate with a bachelor's degree within six-years (66.1%). Tables 3.9 and 3.10 show the leading and lagging student success metrics for those within the sample that exceeded excess hours compared to those who did not exceed excess hours. Those who exceeded excess hours within the fall 2015 or 2016 cohort were more likely to bring in more transfer hours prior to starting as a first-time student (6.1), have a higher first fall semester GPA (2.9), have more cumulative attempted and earned hours throughout their time at the university at 174.7 and 136.2,

respectively, and have a higher cumulative GPA (2.8) throughout their time at the university.

The researcher drew the population and sample from various data sources. Table 3.11 shows the variables pulled and the data source the variables were extracted from. Data were extracted from various sources using SQL and exported to Excel before processing in SPSS. The university's student information system (SIS) is Banner with data processed in Oracle. Both Banner and Oracle contain a student identifier which are called Banner A# and PIDM, respectively. Once the researcher extracted the data from the SIS system, a unique student identifier for the purposes of the research was created.

The researcher created and coded other variables. To determine the first-time in college cohort by year, each first-time in college cohort was coded with their starting year and with a nine to indicate they started at the university in a fall semester which follows the same terminology in the university's SIS. For example, those who were first-time in college in Fall 2015 were coded as 20159. Those who did not participate in dual credit program and/or courses prior to high school graduation were coded as 0 and those who did participate in a dual credit program and/or course prior to high school graduation were coded as 1. Student classifications were coded based on their first fall semester. Students entering as a freshman were coded as 1, sophomores as 2, and juniors as 3. Students self-reported sex was coded with males as 0 and females as 1. Race/ethnicities were coded by transforming the numerical codes within the CBM0C1 to one of three groups. Given that the institution being studied is an HSI (Hispanic Serving Institution), ethnicities were coded by showing Hispanics as three. Two other categorized including White, non-Hispanic students as 1and all others coded as 0. The codes of 1 and 3 were

chosen specifically as they are used within the CBM0C1. Student's residencies were coded with Texas as 0, out of state as 1, and international as 2. Additionally, to calculate graduation rates, first-time in college semester was subtracted from their graduation term. The time to earning their bachelor's degree was then converted to a year. The graduation rate was further coded to show student bachelor's degree completion where a student who had earned their bachelor's degree was coded as a 1 and a non-completer was coded as a 0.

### 3.4.2 Data Collection

The first step in the data collection process was to obtain approval from the administration at the regional, public four-year university in South Texas to utilize the data for the research study. Once the researcher had approval, the next step was to obtain approval from the Institutional Review Board (IRB). After obtaining IRB approval, the research extracted the data from the various data sources including the university's SIS as well as from the Office of Planning, Analytics, Institutional Research, and Strategic Initiatives (PAIRS). The researcher developed SQL queries to extract Banner data from Oracle and to extract data from the THECB tables. Data was extracted into Microsoft Excel. Once the individual files were extracted, the data was imported into Microsoft Access to create one table from the multiple data sources. The data was then extracted into Microsoft Excel and analyzed using SPSS.

The procedures used within the study include the following strategies:

1. The student data would only include those who were first-time, full-time in college students from the regional, public four-year university in South Texas.

2. The student demographic would include two fall semester cohorts including fall 2015 and fall 2016.
3. Student success outcome data would be tracked for six years. For example, a first-time, full-time in college student who started in fall 2015 would be tracked with the student success outcome variables through summer 2022.
4. The researcher would utilize Microsoft Excel and SPSS to analyze the data.

The researcher will store the data, results, and communications on a personal Microsoft One Drive for five years.

## 3.5 Data Analyses

Once the data was acquired and extracted, the researcher recoded, organized, and analyzed the data.

The researcher performed both descriptive and inferential statistical analyses with the dataset. With the descriptive analyses, the researcher assessed measures of central tendencies including the mean and standard deviation, measures of variability including the range and variance, as well as correlations. The researcher used different inferential statistical analyses including t-test and chi-squares to test the five hypotheses. The purpose of utilizing these statistical techniques was based on the fact that the research is interested in studying the student success outcomes for two comparative groups including those who participated in dual credit programs and/or courses prior to high school graduation and those who did not participate in dual credit programs and/or courses prior to high school graduation. Table 3.12 shows the hypotheses and inferential statistical tests utilized.

## 3.6 Summary

In summary, the purpose of this study was to examine the impact dual credit course/program participation has on student success outcomes including early momentum metrics including cumulative attempted and earned first-year credit hours, first-year completion ratio as well as longer term student success outcomes including exceeding funding and graduation outcomes. The research used secondary data from the PAIRS Office which encompassed two years' worth of first-time, full-time bachelor-degree seeking cohort data. The researcher reported on the comparison between two groups including those who participated in dual credit courses/programs prior to high school graduation and those that did not participate in dual credit courses/programs prior to high school graduation by using quantitative research methods that measured various student success outcome measures.

Table 3.1

*Study Independent and Dependent Variables*

| Independent and Dependent Variables | |
|---|---|
| Dual Credit Participation | Dual Credit Participant & Non-Dual Credit Participant |
| Leading/Early Momentum Student Success Metrics | Transfer Earned Credit Hours Prior to Their First Fall Semester, First Fall Semester Attempted Credit Hours, First Year Cumulative Attempted Credit Hours, First Year Cumulative Earned Credit Hours, and First Fall Semester GPA |
| Lagging Student Success Metrics | Cumulative Attempted Credit Hours, Cumulative Earned Credit Hours, Cumulative GPA, Graduation Term, Graduation Years, and Exceeded Funding Status |
| Demographics | Student Classification, Sex, Race/Ethnicity, Residency, and PSA |

Table 3.2

*Texas A&M University Regional Schools First Fall to Second Fall Retention Rates*

| | Fall 2015 Cohort | | | Fall 2016 Cohort | | |
|---|---|---|---|---|---|---|
| University | Cohort | Retained to Second Fall | Retention Rate | Cohort | Retained to Second Fall | Retention Rate |
| Prairie View | 1,607 | 1,113 | 69.3% | 1,821 | 1,290 | 70.8% |
| Tarleton | 1,831 | 1,295 | 70.7% | 2,043 | 1,372 | 67.2% |
| International | 789 | 682 | 77.6% | 1,010 | 768 | 76.0% |
| Commerce | 984 | 615 | 62.5% | 990 | 663 | 67.0% |
| Corpus Christi | 2,228 | 1,298 | 58.3% | 2,380 | 1,344 | 56.5% |
| Kingsville | 1,263 | 902 | 71.4% | 1,199 | 816 | 68.1% |
| San Antonio | | | | 435 | 310 | 71.3% |
| Texarkana | 156 | 70 | 44.9% | 199 | 113 | 56.8% |
| West Texas | 1,382 | 899 | 65.1% | 1,304 | 834 | 64.0% |

Table 3.3

*Texas A&M University Regional Schools Six Year Graduation Rates*

| | Fall 2015 Cohort | | | Fall 2016 Cohort | | |
|---|---|---|---|---|---|---|
| University | Cohort | Graduated with Bachelor's in Six Years | Graduation Rate | Cohort | Graduated with Bachelor's in Six Years | Graduation Rate |
| Prairie View | 1,625 | 676 | 41.6% | 1,840 | 763 | 41.5% |
| Tarleton | 1,831 | 894 | 48.8% | 2,041 | 935 | 45.8% |
| International | 963 | 468 | 48.6% | 1,096 | 542 | 49.5% |
| Commerce | 1,006 | 421 | 41.8% | 1,011 | 432 | 42.7% |
| Corpus Christi | 2,227 | 800 | 35.9% | 2,364 | 829 | 35.1% |
| Kingsville | 1,263 | 549 | 43.5% | 1,199 | 528 | 44.0% |
| San Antonio | | | | 484 | 152 | 31.4% |
| Texarkana | 156 | 37 | 23.7% | 197 | 59 | 29.9% |
| West Texas | 1,382 | 631 | 45.7% | 1,304 | 587 | 45.0% |

Table 3.4

*Sample*

| Variable | Fall 2015 Cohort (*n*=1,946) | Fall 2016 Cohort (*n*=2,020) | Total (*n*=3,966) |
|---|---|---|---|
| *Sex* | | | |
| Male | 746 | 813 | 1,559 |
| Female | 1,200 | 1,207 | 2,407 |
| *Ethnicity/Race* | | | |
| Hispanic | 1,003 | 1,056 | 2,059 |
| White, Non-Hispanic | 650 | 655 | 1,305 |
| Other | 293 | 309 | 602 |
| *Residency* | | | |
| Texas | 1,867 | 1,965 | 3,832 |
| Out of State | 37 | 28 | 65 |
| International | 42 | 27 | 69 |
| *Student Classification* | | | |
| Freshman | 1,873 | 1,905 | 3,778 |
| Sophomore | 46 | 82 | 128 |
| Junior | 27 | 33 | 60 |
| *Dual Credit* | | | |
| Dual Credit | 271 | 370 | 641 |
| Non-Dual Credit | 1,675 | 1,650 | 3,235 |

Table 3.4 (continued)

*Sample*

| Variable | Fall 2015 Cohort (*n*=1,946) | Fall 2016 Cohort (*n*=2,020) | Total (*n*=3,966) |
|---|---|---|---|
| *Exceeded Excess Hours* | | | |
| Exceeded Excess Hours | 177 | 106 | 283 |
| Did Not Exceed Excess Hours | 1,769 | 1,914 | 3,683 |
| *Bachelor Graduate* | | | |
| Graduated | 761 | 787 | 1,548 |
| Did Not Graduate | 1,185 | 1,233 | 2,418 |

Table 3.5

*Dual Credit Participant Demographic Comparison*

| | Dual Credit Participant (*n*=641) | | Non-Dual Credit Participant (*n*=3,325) | |
|---|---|---|---|---|
| Variable | Count | % | Count | % |
| *Sex* | | | | |
| Female | 408 | 63.7 | 1,999 | 60.1 |
| Male | 233 | 36.4 | 1,326 | 39.9 |
| *Student Classification* | | | | |
| Freshman | 562 | 87.7 | 3,216 | 96.7 |
| Sophomore | 51 | 8.0 | 77 | 2.3 |
| Junior | 28 | 4.4 | 32 | 1.0 |
| *Race/Ethnicity* | | | | |
| Hispanic | 378 | 59.0 | 1,681 | 50.6 |
| White, Non-Hispanic | 204 | 31.8 | 1,101 | 33.1 |
| Other | 59 | 9.2 | 543 | 16.3 |
| *Residency* | | | | |
| Texas | 641 | 100.0 | 3,191 | 96.0 |
| Out of State | | | 65 | 2.0 |
| International | | | 69 | 2.1 |

Table 3.5 (continued)

*Dual Credit Participant Demographic Comparison*

| | Dual Credit Participant (*n*=641) | | Non-Dual Credit Participant (*n*=3,325) | |
|---|---|---|---|---|
| Variable | Count | % | Count | % |
| *Six Year Graduate* | | | | |
| Graduated | 324 | 50.5 | 1,224 | 36.8 |
| Did Not Graduate | 317 | 49.5 | 2,101 | 63.2 |

Table 3.6

*Dual Credit Participant Leading/Early Momentum Student Success Outcomes Comparison*

| | Dual Credit Participant (*n*=641) | | Non-Dual Credit Participant (*n*=3,325) | |
|---|---|---|---|---|
| Variable | *M* | *SD* | *M* | *SD* |
| Transfer Earned Credit Hours | 16.0 | 15.9 | 4.9 | 10.3 |
| First Fall Attempted Credit Hours | 13.4 | 1.1 | 13.5 | 1.2 |
| First Year Cumulative Attempted Credit Hours | 27.2 | 5.2 | 27.0 | 5.3 |
| First Fall Semester GPA | 2.9 | 1.0 | 2.7 | 1.0 |

Table 3.7

*Dual Credit Participant Lagging Student Success Outcomes Comparison*

| | Dual Credit Participant (*n*=641) | | Non-Dual Credit Participant (*n*=3,325) | |
|---|---|---|---|---|
| Variable | Mean | Std. Deviation | Mean | Std. Deviation |
| Cumulative Attempted Credit Hours | 104.5 | 49.8 | 87.9 | 55.3 |
| Cumulative Earned Credit Hours | 92.3 | 48.7 | 72.6 | 52.4 |
| Cumulative GPA | 2.9 | 0.8 | 2.5 | 1.0 |

Table 3.8

*Exceeded Excess Hours Demographic Comparison*

| | Exceeded Excess Hours (*n*=283) | | Did Not Exceed Excess Hours (*n*=3,683) | |
|---|---|---|---|---|
| Variable | Count | % | Count | % |
| *Sex* | | | | |
| Female | 164 | 58.0 | 2,243 | 60.9 |
| Male | 119 | 42.0 | 1,440 | 39.1 |
| *Student Classification* | | | | |
| Freshman | 266 | 94.0 | 3,512 | 95.4 |
| Sophomore | 10 | 3.5 | 118 | 3.2 |
| Junior | 7 | 2.5 | 53 | 1.4 |
| *Race/Ethnicity* | | | | |
| Hispanic | 161 | 56.9 | 1,898 | 51.5 |
| White, Non-Hispanic | 79 | 27.9 | 1,226 | 33.3 |
| Other | 43 | 15.2 | 559 | 15.2 |

Table 3.8 (continued)

*Exceeded Excess Hours Demographic Comparison*

| | Exceeded Excess Hours (*n*=283) | | Did Not Exceed Excess Hours (*n*=3,683) | |
|---|---|---|---|---|
| Variable | Count | % | Count | % |
| *Residency* | | | | |
| Texas | 281 | 99.3 | 3,551 | 96.4 |
| Out of State | 2 | 0.7 | 63 | 1.7 |
| International | | | 69 | 1.9 |
| *Six Year Graduate* | | | | |
| Graduated | 187 | 66.1 | 1,361 | 37.0 |
| Did Not Graduate | 96 | 33.9 | 2,322 | 63.0 |

Table 3.9

*Exceeded Excess Hours Leading/Early Momentum Student Success Outcomes Comparison*

| | Exceeded Excess Hours (*n*=283) | | Did Not Exceed Excess Hours (*n*=3,683) | |
|---|---|---|---|---|
| Variable | Mean | Std. Deviation | Mean | Std. Deviation |
| Transfer Earned Credit Hours | 6.1 | 13.5 | 5.9 | 12.1 |
| First Fall Attempted Credit Hours | 13.7 | 1.3 | 13.5 | 1.1 |
| First Year Cumulative Attempted Credit Hours | 29.3 | 4.5 | 26.9 | 5.3 |
| First Fall Semester GPA | 2.9 | 0.7 | 2.7 | 1.0 |

Table 3.10

*Exceeded Excess Hours Lagging Student Success Outcomes Comparison*

| | Exceeded Excess Hours (*n*=283) | | Did Not Exceed Excess Hours (*n*=3,683) | |
|---|---|---|---|---|
| Variable | Mean | Std. Deviation | Mean | Std. Deviation |
| Cumulative Attempted Credit Hours | 174.7 | 17.5 | 84.1 | 51.2 |
| Cumulative Earned Credit Hours | 136.2 | 22.8 | 71.1 | 51.0 |
| Cumulative GPA | 2.8 | 0.4 | 2.7 | 1.0 |

Table 3.11

*Data Sources & Variables*

| Data Source | Variable | Description | Format |
|---|---|---|---|
| THECB CBM0C1 | Student ID | PIDM | # |
| | Class | Student Classification | Freshman (1)<br>Sophomore (2)<br>Junior (3) |
| | Sex | Self-reported sex | Male/Female |
| | Race/Ethnicity | Self-reported race/ethnicity | White (1)<br>Black or African American (2)<br>Hispanic (3)<br>Asian (4)<br>American Indian or Alaskan Native (5)<br>International (6)<br>Unknown (7)<br>Native Hawaiian or Other Pacific Islander (8)<br>Two or More Races (M) |
| | Residency | Student's Texas county, state, or country of origin | ### |
| THECB CBM00S | Attempted credit hours | Sum of attempted credit hours during their first fall semester | ## |

Table 3.11 (continued)

*Data Sources & Variables*

| Data Source | Variable | Description | Format |
|---|---|---|---|
| THECB CBM009 | Successful completion of bachelor's degree | The semester in which the student earned their first bachelor's degree | YYYY & semester code (e.g. 20229) |
| | Degree level | The level in which the degree was awarded | Level=2 |
| Banner SPAIDEN | Deceased date | Date in which a student has been reported as passing away | MM/DD/YYYY |
| Banner SZASSTD | Excess hours | Indicator if the student exceeded funding | Y |
| Banner SHATERM | First Term GPA | The grade point average earned for courses taken during the first fall semester | #.## |
| | Cumulative GPA | The grade point average for all transfer and institutional courses taken through their last semester or through graduation | #.## |
| | Transfer hours | The sum of all transfer hours earned prior to their first fall semester. Will include AP and dual credit transfer work | ### |

Table 3.11 (continued)

*Data Sources & Variables*

| Data Source | Variable | Description | Format |
|---|---|---|---|
| Banner SHATERM | Cumulative attempted credit hours | The sum of institutional and transfer hours attempted up until graduation | ### |
| | Cumulative earned credit hours | The sum of institutional and transfer hours earned up until graduation | ### |
| Banner SZAHSTR | Dual credit coursework | Includes dual credit course and indication if grade is earned | Course=D |
| Banner SGASADD | Cohort code | PSA status | Cohort code=PSA |

Table 3.12

*Analysis Techniques*

| Research Question | Student Success Measure | Analysis Technique |
|---|---|---|
| RQ1 | Transfer hours | Independent Samples T-Test |
| RQ2 | Excess hours | Independent Samples T-Test |
| RQ3 | Graduation status | Chi-Square & Logistic Regression |
| RQ4 | Excess hours status | Chi-Square & Logistic Regression |

# CHAPTER 4. ANALYSIS

## 4.1 Introduction

The purpose of the study was to examine, through a comparative lens, the impact dual credit enrollment had on leading student success metrics including transfer hours earned prior to the first fall semester, first fall semester attempted credit hours, first year cumulative attempted credit hours, first year cumulative earned credit hours, and first term GPA as well as to lagging student success metrics including graduation rates, cumulative attempted credit hours, cumulative earned credit hours, cumulative GPA, and exceeded funding compared to those who did not earn any dual credit enrollment prior to enrolling at a regional, public four-year Texas university.

## 4.2 Research Questions and Hypotheses

To guide the researcher, the following research questions, null hypotheses, and alternative hypotheses were used:

RQ1: To what extent does transfer hours vary among first-time, full-time bachelor's degree seeking students vary by those who participated or did not participate in dual credit?

$H_0$1: There is no significant difference in transfer hours between first-time, full-time bachelor's degree-seeking students who participated in dual credit and those who did not participate.

$H_a$1: There is a significant difference in transfer hours between first-time, full-time bachelor's degree-seeking students who participated in dual credit and those who did not participate.

RQ2: For those who graduated within six years, to what extent do the cumulative attempted credit hours vary between those who exceeded and did not exceed excess hours?

$H_0$2: There is no significant difference in cumulative attempted credit hours between those who exceeded excess hours and those who did not exceed excess hours among those who graduated within six years.

$H_a$2: There is a significant difference in cumulative attempted credit hours between those who exceeded excess hours and those who did not exceed excess hours among those who graduated within six years.

RQ3: What is the relationship between graduation and whether or not students participated in dual credit including covariates student classification, sex, race/ethnicity, residency, transfer hours earned prior to the first fall semester, first fall semester attempted credit hours, first year cumulative attempted credit hours, first year cumulative earned credit hours, cumulative attempted credit hours, cumulative earned credit hours, first term GPA, and cumulative GPA?

$H_0$3: The odds of graduation are the same for students who participated in dual credit and those who did not, including covariates student classification, sex, race/ethnicity, residency, transfer hours earned prior to the first fall semester, first fall semester attempted credit hours, first-year cumulative attempted credit hours, first-year cumulative earned credit hours, cumulative attempted credit hours, cumulative earned credit hours, first term GPA, and cumulative GPA.

$H_a3$: The odds of graduation are higher for students who participated in dual credit compared to those who did not, including covariates student classification, sex, race/ethnicity, residency, transfer hours earned prior to the first fall semester, first fall semester attempted credit hours, first-year cumulative attempted credit hours, first-year cumulative earned credit hours, cumulative attempted credit hours, cumulative earned credit hours, first term GPA, and cumulative GPA..

RQ4: For those who graduated within six-years, what is the relationship between excess hours status and whether or not students participated in dual credit including covariates student classification, sex, race/ethnicity, transfer hours earned prior to the first fall semester, first fall semester attempted credit hours, first year cumulative attempted credit hours, first year cumulative earned credit hours, cumulative attempted credit hours, cumulative earned credit hours, first term GPA, and cumulative GPA?

$H_0 4$: There is no significant association between excess hours status and dual credit participation among those who graduated within six years, including covariates student classification, sex, race/ethnicity, transfer hours earned prior to the first fall semester, first fall semester attempted credit hours, first-year cumulative attempted credit hours, first-year cumulative earned credit hours, cumulative attempted credit hours, cumulative earned credit hours, first term GPA, and cumulative GPA.

$H_a 4$: There is a significant association between excess hours status and dual credit participation among those who graduated within six years, even after including covariates student classification, sex, race/ethnicity, transfer hours earned prior to the first fall semester, first fall semester attempted credit hours, first-year cumulative attempted credit

hours, first-year cumulative earned credit hours, cumulative attempted credit hours, cumulative earned credit hours, first term GPA, and cumulative GPA.

## 4.3 Data Analysis Overview

### 4.3.1 Research Question 1

To answer the first research question, an independent samples t-test was utilized by analyzing the relationship of the dependent variable, dual credit participation, and the independent variable, transfer hours earned prior to their first fall semester. The sample, *n=3,966*, was utilized for this question meaning that the two cohort years, fall 2015 and fall 2016, were analyzed in aggregate. Prior to independent samples t-test, the researcher ensured that four assumptions were met including a continuous dependent variable, categorical independent variable, independence of observations, and normal distribution of the dependent variable for each group (Spata, 2003).

#### 4.3.1.1 Assumption 1: Continuous Dependent Variable

To meet this assumption, the dependent variable must be continuous. For this research question, the dependent variable, transfer hours, is continuous and falls on a ratio scale with 0 indicating that the student did not bring in any transfer hours prior to their first fall semester at their initial university and anything greater than 0 indicating that the student did bring in transfer hours prior to their first fall semester.

#### 4.3.1.2 Assumption 2: Categorical Independent Variable

To meet this assumption, the independent variable must be categorical with only two groups. For this research question, the independent variable, dual credit participation,

is categorical. Students who did not participate in dual credit are indicated as 0 and students who did participate in dual credit prior to their first fall semester are indicated as 1.

#### 4.3.1.3 Assumption 3: Independence of Observations

The third assumption is that the observations are independent of each other. Within the sample, each row of data represents one student with a unique outcome. Students are not allowed to be reported as a first-time student at the same degree level. The researcher did a data quality check to ensure that no student was reported in both the fall 2015 and fall 2016 cohort.

#### 4.3.1.4 Assumption 4: Normal Distribution of the Dependent Variable for Each Group

The fourth assumption is that there is normal distribution of the dependent variable for each group. Figure 4.1 shows a histogram with the transfer hours for those who did not participate in dual credit. Figure 4.1 shows that many of the students did not participate in dual credit since their transfer hours were 0 prior to their first fall semester. Ther were a few students who did bring in transfer work prior to their first fall semester that could all under other accelerated learning programs (e.g. AP or IB). The mean transfer hours for non-dual credit participants were 3.91 with a standard deviation of 10.3. Figure 4.2 shows a histogram with the transfer hours for those who did participate in dual credit. Figure 4.2 shows that there were several students who were identified as being dual credit; however, the college coursework did not provide any earned credits meaning the number of transfer hours were at 0. The mean transfer hours for dual credit participants were 15.07 with a standard deviation of 15.9.

#### 4.3.1.5 Independent Samples T-Test Analysis

An independent samples t-test was conducted to compare the transfer hours earned before their first fall semester for those who participated in dual credit and those who did not participate in dual credit. Table 4.1 shows that there were significant differences ($t(745.988) = -18.478$, $p = <.001$) in the scores with the mean score for non-dual credit participants ($M = 3.91$, $SD = 10.253$) was lower than dual credit participants ($M = 15.97$, $SD = 15.887$). The magnitude of the difference in the means (mean difference = -13.331, 95% *CI*: -13.331 to -10.771) was significant. Thus, the null hypothesis was rejected since there was significant difference in transfer hours between first-time, full-time bachelor's degree-seeking students who participated in dual credit and those who did not participate.

### 4.3.2 Research Question 2

To answer the second research question, an independent samples t-test was utilized by analyzing the relationship of the dependent variable, exceeded excess hours, and the independent variable, cumulative attempted credit hours. The sample, *n=1,473*, was utilized for this question meaning that the two cohort years, fall 2015 and fall 2016, were analyzed in aggregate. Prior to independent samples t-test, the researcher ensured that four assumptions were met including a continuous dependent variable, categorical independent variable, independence of observations, and normal distribution of the dependent variable for each group (Spata, 2003).

#### 4.3.2.1 Assumption 1: Continuous Dependent Variable

To meet this assumption, the dependent variable must be continuous. For this research question, the dependent variable, cumulative attempted credit hours, is continuous and falls on a interval scale. The sample includes those who only graduated with a bachelor's degree within six years of their initial first fall semester; therefore, we can anticipate that the attempted credit hours will be greater than 90 due to the university's graduation residency requirement.

#### 4.3.2.2 Assumption 2: Categorical Independent Variable

To meet this assumption, the independent variable must be categorical with only two groups. For this research question, the independent variable, exceeded excess hours, is categorical. Students who did not exceed excess hours are indicated by a 0 and students who did exceed excess hours are indicated by a 1.

#### 4.3.2.3 Assumption 3: Independence of Observations

The third assumption is that the observations are independent of each other. Within the sample, each row of data represents one student with a unique outcome. Students are not allowed to be reported as a first-time student at the same degree level. Students who earned more than one bachelor's degree during the six-year timeframe were only counted once with their first bachelor's degree being counted towards the timeframe. The researcher did a data quality check to ensure that no student was reported in both the fall 2015 and fall 2016 cohort.

#### 4.3.2.4 Assumption 4: Normal Distribution of the Dependent Variable for Each Group

The fourth assumption is that there is normal distribution of the dependent variable for each group. Figure 4.3 shows a histogram with the cumulative attempted credit hours for those who did not did not exceed excess hours. The mean cumulative attempted credit hours for those who did not exceed excess hours was 139.68 with a standard deviation of 14.89. Figure 4.4 shows a histogram with the cumulative attempted credit hours for those who did exceed excess hours. The mean cumulative attempted credit hours for those who did exceed excess hours was 175.19 with a standard deviation of 15.846.

#### 4.3.2.5 Independent Samples T-Test Analysis

An independent samples t-test was conducted to compare the cumulative attempted credit hours for those who exceed excess hours and those who did not exceed excess hours. Table 4.2 shows that there were significant differences ($t(1,471) = - 30.151$, $p = <.001$) in the scores with the mean score for did not exceed excess hours ($M =$ 139.68*, SD* =14.890) was lower than those who exceeded excess hours ($M = 175.19$*, SD* =15.846). The magnitude of the difference in the means (mean difference = -37.820, 95% *CI*: -37.820 to -33.200) was significant. Thus, the null hypothesis was rejected since there was significant difference in cumulative attempted credit hours between those who exceeded excess hours and those who did not exceed excess hours among those who graduated within six years.

### 4.3.3 Research Question 3

#### 4.3.3.1 Chi Square Test

To answer the third research question, a Pearson chi-square test was utilized. The chi-square test was used to examine the relationship between dual credit participation and graduation. The relationship between the variables was statistically significant, $\chi 2$ (1, $N$=3,966) = 42.60, $p$<.001; $V$=.10, a small effect size. Students who participated in dual credit were more likely to graduate (50.5%) than those with no dual credit (49.5%) as shown below in Table 4.315.

Next, a binary logistic regression was ran to look at the relationship between students completing their bachelor's degree and whether or not students participated in dual credit including covariates student classification, sex, race/ethnicity, residency, transfer hours earned prior to the first fall semester, first fall semester attempted credit hours, first year cumulative attempted credit hours, first year cumulative earned credit hours, cumulative attempted credit hours, cumulative earned credit hours, first term GPA, and cumulative GPA. The sample, *n=3,966*, was utilized for this question meaning that the two cohort years, fall 2015 and fall 2016, were analyzed in aggregate. The researcher utilized a binary, logistic regression to analyze the relationship between the dependent variable, graduation, and the independent (predictor) variables including dual credit, student classification, sex, race/ethnicity, residency, first term GPA, transfer hours earned prior to the first fall semester, first fall semester attempted credit hours, first year cumulative attempted credit hours, first year cumulative earned credit hours, cumulative attempted credit hours, cumulative earned credit hours, first term GPA, and cumulative

GPA. Prior to running the binary logistic regression, the researcher ensured that six assumptions were met including variable type, independence of observations, no multicollinearity, no extreme outliers, linear relationship between independent variables and log odds, and sample size (Mendenhall & Sincich, 2003).

#### 4.3.3.2 Assumption 1: Variable Type

To meet this assumption, the dependent variable must be dichotomous. For this research question, the dependent variable, graduation, is dichotomous with 1 indicating that the student graduated with a bachelor's degree at their initial university within six years of their first fall semester and 0 indicating that the student did not graduate with a bachelor's degree at their initial university.

#### 4.3.3.3 Assumption 2: Independence of Observations

The second assumption is that the observations are independent of each other. Within the sample, each row of data represents one student with a unique outcome. Students are not allowed to be reported as a first-time student at the same degree level. The researcher did a data quality check to ensure that no student was reported in both the fall 2015 and fall 2016 cohort.

#### 4.3.3.4 Assumption 3: No Multicollinearity

The third assumption is that there is no multicollinearity among the predictor variables. Multicollinearity occurs when two or more predictor variables are highly correlated to each other, meaning they may not provide unique information within the regression model. If the degree of correlation is high between the predictor variables, this may cause problems with the model fit or interpretation of the model. To test this

assumption, the researcher ran a bivariate correlation and set a cutoff score of 0.7. The researcher found that there were five instances of high correlations including the student classification and transfer hours earned before first semester, cumulative GPA to the first-year cumulative earned credit hours, first term GPA to first year cumulative earned credit hours, cumulative attempted credit hours to cumulative earned credit hours, and first term GPA to cumulative GPA as seen in Table 4.4. Based on the correlation results, four predictor variables were removed including student classification, first-year cumulative earned credit hours, cumulative earned credit hours, and cumulative GPA. To further check for multicollinearity, the researcher ran a linear regression on the continuous variables and reviewed the collinearity tolerance. The remaining continuous variables were greater than 0.1 meaning the assumption of no multicollinearity has been met.

From here, the researcher assessed the skewness and kurtosis for the remaining continuous predictor variables including transfer hours earned prior to the first fall semester, first fall semester attempted credit hours, first year cumulative attempted credit hours, cumulative attempted credit hours, and first term GPA. The researcher ran histograms with normal distribution curves to visually assess the skewness and kurtosis as seen in Table 4.5. Figures 4.5-4.9 show the histograms for each predictor variable. Additionally, non-parametric one sample K-S test was run on all five-predictor variables to assess the skewness and kurtosis significance All five predictor variables were found to be significant meaning they are not normally distributed. To address this, all five predictor variables were converted to z-scores to normalize the distribution.

#### 4.3.3.5 Assumption 4: No Extreme Outliers

The fourth assumption is that there are no extreme outliers. To check this assumption, the Cook's distance was calculated for each observation. Within SPSS, the calculated variable, COO_1, was then visually assessed in a descending manner. The researcher used a cutoff score within COO_1 of 0.5 or greater to determine if there was an outlier. No outliers were found.

#### 4.3.3.6 Assumption 5: Linear Relationship Between Independent Variables and Log Odds

The fifth assumption is that there is a linear relationship between the predictor variables and the logit of the response variable. To check this assumption, the researcher used the Box-Tidewell test. Using the remaining five continuous, predictor variables including transfer hours earned prior to the first fall semester, first fall semester attempted credit hours, first year cumulative attempted credit hours, cumulative attempted credit hours, and first term GPA, each predictor variable had a computed variable created looking at the log odds (e.g. lnFirstTermGPA). An exploratory binary logistic regression was run with the continuous, predictor variables and their computed log odds variables to determine if any of the continuous predictor variables were significant meaning that the variable is not linear. Using the Box-Tidwell test, the predictor variable, cumulative attempted credit hours, was removed as it was found to not be linear.

#### 4.3.3.7 Assumption 6: Sample Size

Finally, binary logistic regression requires a large sample size. To meet this assumption, a minimum of 10 cases with the least frequent outcome for each independent

variable is required (Mendenhall & Sincich, 2003). The descriptive statistics in Table 4 show that this assumption has been met.

#### 4.3.3.8 Research Question 3 After Assumption Testing

Based on the assumption testing, the researcher had to modify the research question. The third research question was modified to assess the relationship between students completing their bachelor's degree and whether students participated in dual credit including covariates student classification, sex, race/ethnicity, residency, first term GPA, transfer hours earned prior to the first fall semester, first fall semester attempted credit hours, cumulative earned credit hours, and first term GPA. Using the modified research question, the researcher ran a binary logistic regression within SPSS.

There are five common methods of entering the variables into the logistic regression equation including enter, forward, backward, stepwise, and remove. Since this is an exploratory research study, the researcher utilized the *Enter* method which would force SPSS to enter all variables into the regression equation regardless of significance level. The alpha was set at 0.5.

#### 4.3.3.9 Research Question 3 Results

The model using the z-scores for continuous variables was found to be statistically significant $\chi 2$ (8, N=3,966) = 1,108.89, p<.001. Although the model was found to be statistically significant compared to the null model, the Hosmer and Lemeshow test was significant ($p$=0.036), indicating that the data may not be a good fit for the model. The model explained between 24.4% (Cox & Snell R square) and 33.1% (Nagelkerke R square) of the variance in the dependent variable and correctly classified

71.7% of cases. As shown in Table 4.6, transfer hours earned prior to the first fall semester, first fall semester attempted credit hours, cumulative earned credit hours, and first term GPA, but not dual credit participation, sex, race/ethnicity, and residency significantly contributed to the model. The transfer hours before first semester odds ratio of 1.358 suggests that for each increase in transfer hours, participants were 1.358 times more likely to graduate. The first fall attempted credit hours odds ratio of .866 suggest that for each increase in first fall attempted credit hours that participants were less likely to graduate. The first-year cumulative attempted credit hours odds ratio of 1.835 suggest that for each increase in first year cumulative attempted credit hours that participants were more likely to graduate. The first term GPA odds ratio of 3.229 suggest that for each increase in first term GPA suggests that participants were more likely to graduate.

A review of standardized residual values at the value of 0.25 revealed that there were 31 outliers which were kept in the dataset. The analysis may be limited because it contains outliers.

### 4.3.4 Research Question 4

#### 4.3.4.1 Chi Square Test

To answer the fourth research question, a Pearson chi-square test was utilized. The chi-square test was used to examine the relationship between dual credit participation and exceeded excess hours for those who graduated. The relationship between the variables was statistically significant, $\chi 2$ (1, $N$=1,473) = 11.51, $p$<.001; $V$=.09, a small effect size. Students who participated in dual credit were less likely to graduate with excess hours (7.1%) than those with no dual credit (14.2%) as shown below in Table 4.7.

The fourth research question assessed the relationship between excess hours status and whether or not students participated in dual credit including covariates student classification, sex, race/ethnicity, residency, transfer hours earned prior to the first fall semester, first fall semester attempted credit hours, first year cumulative attempted credit hours, first year cumulative earned credit hours, cumulative attempted credit hours, cumulative earned credit hours, first term GPA, and cumulative GPA for those who graduated. The sample included both cohort years, fall 2015 and 2016, those who had graduated with a bachelor's degree, and were from Texas which resulted. These criteria resulted a sample of *n=1,473*, for this question. The student's residency for this question is important to assess since only students who are from Texas can be coded as exceeding excess hours. The researcher utilized a binary logistic regression to analyze the relationship between the dependent variable, exceeded excess hours, and the independent (predictor) variables including dual credit, student classification, sex, race/ethnicity, first term GPA, transfer hours earned prior to the first fall semester, first fall semester attempted credit hours, first year cumulative attempted credit hours, first year cumulative earned credit hours, cumulative attempted credit hours, cumulative earned credit hours, first term GPA, and cumulative GPA. Prior to running the binary logistic regression, the researcher ensured that six assumptions were met including variable type, independence of observations, no multicollinearity, no extreme outliers, linear relationship between independent variables and log odds, and sample size (Mendenhall & Sincich, 2003).

#### 4.3.4.2 Assumption 1: Variable Type

To meet this assumption, the dependent variable must be dichotomous. For this research question, the dependent variable, exceed excess hours, is dichotomous with 1 indicating that the student exceeded excess hours and 0 indicating that the student did not exceed excess hours.

#### 4.3.4.3 Assumption 2: Independence of Observations

The second assumption is that the observations are independent of each other. Within the sample, each row of data represents one student with a unique outcome. Students are not allowed to be reported as a first-time student at the same degree level. The researcher did a data quality check to ensure that no student was reported in both the fall 2015 and fall 2016 cohort.

#### 4.3.4.4 Assumption 3: No Multicollinearity

The third assumption is that there is no multicollinearity among the predictor variables. Multicollinearity occurs when two or more predictor variables are highly correlated to each other, meaning they may not provide unique information within the regression model. If the degree of correlation is high between the predictor variables, this may cause problems with the model fit or interpretation of the model. To test this assumption, the researcher ran a bivariate correlation and set a cutoff score of 0.7. The researcher found that there were three instances of high correlations including the student classification and transfer hours earned before first semester, first-year cumulative attempted credit hours to first-year cumulative earned credit hours and cumulative attempted credit hours to cumulative earned credit hours as seen in Table 4.8. Based on the correlation results, three predictor variables were removed including student

classification, first-year cumulative attempted credit hours, and cumulative earned credit hours. To further check for multicollinearity, the researcher ran a linear regression on the continuous variables and reviewed the collinearity tolerance. The remaining continuous variables were greater than 0.1 meaning the assumption of no multicollinearity has been met.

From here, the researcher assessed the skewness and kurtosis for the remaining predictor variables including transfer hours earned prior to the first fall semester, first fall semester attempted credit hours, first-year cumulative attempted credit hours, cumulative attempted credit hours, first term GPA, and cumulative GPA. The researcher ran histograms with normal distribution curves to visually assess the skewness and kurtosis as seen in Table 4.9. Additionally, non-parametric one sample K-S test was run on all six-predictor variables to assess the skewness and kurtosis significance. All six predictor variables were found to be significant meaning they are not normally distributed. Figures 4.10-4.15 show the histograms for each predictor variable. To address this, all six predictor variables were converted to z-scores to normalize the distribution.

#### 4.3.4.5 Assumption 4: No Extreme Outliers

The fourth assumption is that there are no extreme outliers. To check this assumption, the Cook's distance was calculated for each observation. Within SPSS, the calculated variable, COO_1, was then visually assessed in a descending manner. The researcher used a cutoff score within COO_1 of 0.5 or greater to determine if there was an outlier. Two cases were found to be outliers; however, given the small number of outliers compared to the sample size, they were not removed from the analyses.

#### 4.3.4.6 Assumption 5: Linear Relationship Between Independent Variables and Log Odds

The fifth assumption is that there is a linear relationship between the predictor variables and the logit of the response variable. To check this assumption, the researched used the Box-Tidewell test. Using the remaining six continuous, predictor variables including transfer hours earned prior to the first fall semester, first fall semester attempted credit hours, first-year cumulative attempted credit hours, cumulative attempted credit hours, first term GPA, and cumulative GPA, each predictor variable had a computed variable created looking at the log odds (e.g. lnFirstTermGPA). An exploratory binary logistic regression was run with the continuous, predictor variables and their computed log odds variables to determine if any of the continuous predictor variables were significant meaning that the variable is not linear. Using the Box-Tidwell test, the predictor variable cumulative attempted credit hours was removed as it was found to not be linear.

#### 4.3.4.7 Assumption 6: Sample Size

Finally, binary logistic regression requires a large sample size. In order to meet this assumption, a minimum of 10 cases with the least frequent outcome for each independent variable is required (Mendenhall & Sincich, 2003). The descriptive statistics in Table 4 show that this assumption has been met.

#### 4.3.4.8 Research Question 4 After Assumption Testing

Based on the assumption testing, the researcher had to modify the research question. The sixth research question was modified to assess the relationship between

excess hours status and whether or not students participated in dual credit including covariates sex, race/ethnicity, transfer hours earned prior to the first fall semester, first fall semester attempted credit hours, first year cumulative earned credit hours, first term GPA, and cumulative GPA for those who graduated. Using the modified research question, the researcher ran a binary logistic regression within SPSS.

There are five common methods of entering the variables into the logistic regression equation including enter, forward, backward, stepwise, and remove. Since this is an exploratory research study, the researcher utilized the *Enter* method which would force SPSS to enter all variables into the regression equation regardless of significance level. The alpha was set at 0.5.

#### 4.3.4.9 Research Question 4 Results

The model using the z-scores for continuous variables was found to not be statistically significant $\chi 2$ (8, N=1,473) = 133.53, p<.001. Although the model was found to be statistically significant compared to the null model, the Hosmer and Lemeshow test was non-significant ($p$=0.739), indicating that the data may be a good fit for the model. The model explained between 8.7% (Cox & Snell R square) and 16.3% (Nagelkerke R square) of the variance in the dependent variable and correctly classified 87.6%. As shown in Table 4.10, dual credit participation, first fall attempted credit hours, and cumulative GPA, but not sex, race/ethnicity, transfer hours earned before first semester, first year cumulative earned SCH, and first term GPA, significantly contributed to the model. The dual credit participation odds ratio of .522 suggests that students who participated in dual credit were less likely to exceed excess hours. The first fall attempted credit hours odds ratio of 1.265 suggests that for each increase in first fall

attempted credit hours that participants were more likely to exceed excess hours. The cumulative GPA odds ratio of .384 suggests that for each increase in cumulative GPA that participants were less likely to exceed excess hours.

A review of standardized residual values at the value of 0.25 revealed that there were 71 outliers which were kept in the dataset. The analysis may be limited because it contains outliers.

Table 4.1

*Independent Samples T-Test of Dual Credit Participation and Transfer Hours*

| | Non-Dual Credit | | Dual Credit | | *t*(3,964) | *p* | *CI* | | Cohen's d |
|---|---|---|---|---|---|---|---|---|---|
| | *M* | *SD* | *M* | *SD* | | | *LL* | *UL* | |
| Transfer Hours Earned Before First Semester | 3.91 | 10.25 | 15.97 | 15.89 | -18.48 | <.001 | -13.33 | -10.77 | 11.35 |

Table 4.2

*Independent Samples T-Test of Exceeded Excess Hours and Cumulative Attempted Credit Hours*

| | Did Not Exceed Excess Hours | | Exceeded Excess Hours | | *t*(1,471) | *p* | *CI* | | Cohen's d |
|---|---|---|---|---|---|---|---|---|---|
| | *M* | *SD* | *M* | *SD* | | | *LL* | *UL* | |
| Cumulative Attempted Credit Hours | 139.68 | 14.89 | 175.19 | 15.85 | -30.15 | .20 | -37.82 | -33.2 | 15.01 |

Table 4.3

*Chi-Square Test: Dual Credit Participation and Graduation*

| | Did Not Graduate | | | Graduated | | | |
|---|---|---|---|---|---|---|---|
| Dual Credit Participation | Observed | Expected | Residual | Observed | Expected | Residual | Total |
| Did Not Participate in Dual Credit | 2,101 | 2,027 | 74 | 1,224 | 1,298 | -74 | 3,325 |
| Percentage | 63.2% | | | 36.8% | | | |
| Dual Credit Participant | 317 | 391 | -74 | 324 | 250 | 74 | 641 |
| Percentage | 49.5% | | | 50.5% | | | |

Table 4.4

*Correlation Matrix for Research Question 3*

| Variable | *M* | *SD* | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|---|
| Dual Credit | .16 | .37 | - | .15** | .03 | .07** | -.08** | .36** |
| Student Classification | 1.06 | .30 | .15** | .07** | .05** | .06** | -.03* | .78** |
| Sex | .61 | .49 | .03 | .05** | - | .06** | -.06** | .07** |
| Race/Ethnicity | 1.89 | 1.20 | .07** | .06** | .06** | - | -.22** | .07** |
| Residency | .05 | .29 | -.08** | -.03* | -.06** | -.22** | - | -.05** |
| Transfer Hours Before First Semester | 5.86 | 12.19 | .36** | .78** | .07** | .07** | -.05** | - |
| First Fall Attempted Credit Hours | 13.52 | 1.16 | -.03* | -.08** | -.05* | -.09** | .05** | -.11** |
| First Year Cumulative Attempted Credit Hours | 27.06 | 5.30 | .01 | -.04* | .03 | -.06** | .08** | -.03* |
| First Year Cumulative Earned Credit Hours | 22.15 | 8.55 | .07** | .00 | .11** | -.10** | .10** | .06** |
| Cumulative Attempted Credit Hours | 90.57 | 54.74 | .11** | .16** | .05** | .02 | .04* | .24** |
| Cumulative Earned Credit Hours | 75.79 | 52.32 | .14** | .18** | .08** | -.01 | .06** | .27** |

Table 4.4 (continued)

*Correlation Matrix for Research Question 3*

| Variable | *M* | *SD* | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|---|
| First Fall GPA | 2.69 | 1.02 | .10** | .02 | .16** | -.08** | .08** | .11** |
| Cumulative GPA | 2.60 | .95 | .14** | .10** | .17** | -.10** | .10** | .21** |

Table 4.4 (continued)

*Correlation Matrix for Research Question 3*

| Variable | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
|---|---|---|---|---|---|---|---|
| Dual Credit | -.03* | .01 | .07** | .11** | .14** | .10** | .14** |
| Student Classification | -.08** | -.04* | .00 | .16** | .18** | .02 | .10** |
| Sex | -.05** | .03 | .11** | .05** | .08** | .16** | .17** |
| Race/Ethnicity | -.09** | -.06** | -.10** | .02 | -.01 | -.08** | -.10** |
| Residency | .05** | .08** | .10** | .04* | .06** | .08** | .10** |
| Transfer Hours Before First Semester | -.11** | -.03* | .06** | .24** | .27** | .11** | .21** |
| First Fall Attempted Credit Hours | - | .32** | .16** | .03* | .03* | .04** | .03* |
| First Year Cumulative Attempted Credit Hours | .32** | - | .68** | .40** | .38** | .34** | .30** |
| First Year Cumulative Earned Credit Hours | .16** | .68** | - | .54** | .62** | .74** | .73** |
| Cumulative Attempted Credit Hours | .03* | .40** | .54** | - | .96** | .45** | .52** |
| Cumulative Earned Credit Hours | .03* | .38** | .62** | .96** | - | .54** | .64** |

Table 4.4 (continued)

*Correlation Matrix for Research Question 3*

| Variable | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
|---|---|---|---|---|---|---|---|
| First Fall GPA | .04** | .34** | .74** | .45** | .54** | - | .83** |
| Cumulative GPA | .03* | .30** | .73** | .52** | .64** | .83** | - |

Note: ** denotes that the correlation is significant at the 0.01 level (2-tailed) and * denotes that the correlation is significant at the 0.05 level (2-tailed).

Table 4.5

*Predictor Variables Descriptive Statistics*

| Variable | Range | *M* | *SD* | Skewness | Kurtosis |
|---|---|---|---|---|---|
| Transfer Hours Before First Fall | 0-75 | 5.86 | 12.19 | 2.96 | 9.72 |
| First Fall Attempted Credit Hours | 12-22 | 13.52 | 1.16 | 1.26 | 1.86 |
| First Year Cumulative Attempted Credit Hours | 12-56 | 27.06 | 5.30 | -0.74 | 2.23 |
| Cumulative Attempted Credit Hours | 12-229 | 90.57 | 54.74 | 0.11 | -1.41 |
| First Term GPA | 0.00-4.00 | 2.69 | 1.02 | -0.95 | 0.36 |

Table 4.6

*Logistic Regression Predicting the Likelihood of Six-Year Graduation*

| | *B* | *SE* | *df* | *p* | OR | 95% CI OR | |
|---|---|---|---|---|---|---|---|
| | | | | | | *LL* | *UL* |
| Dual Credit Participation | .135 | .108 | 1 | .208 | 1.145 | .927 | 1.414 |
| Sex | -.019 | .079 | 1 | .815 | .982 | .841 | 1.146 |
| Race/Ethnicity | .031 | .032 | 1 | .340 | 1.031 | .968 | 1.099 |
| Residency | .255 | .132 | 1 | .054 | 1.291 | .996 | 1.674 |
| Transfer Hours Before First Semester | . 306 | .042 | 1 | <.001 | 1.358 | 1.250 | 1.475 |
| First Fall Attempted Credit Hours | -.144 | .041 | 1 | <.001 | .866 | .800 | .938 |
| First Year Cumulative Attempted Credit Hours | .607 | .052 | 1 | <.001 | 1.835 | 1.656 | 2.033 |
| First Term GPA | 1.172 | .056 | 1 | <.001 | 3.229 | 2.893 | 3.604 |
| Constant | -.803 | .089 | 1 | <.001 | .448 | | |

Table 4.7

*Chi-Square Test: Dual Credit Participation and Exceeded Excess Hours*

| | Did Not Exceed Excess Hours | | | Exceed Excess Hours | | | |
|---|---|---|---|---|---|---|---|
| Dual Credit Participation | Observed | Expected | Residual | Observed | Expected | Residual | Total |
| Did Not Participate in Dual Credit | 986 | 1,004 | -18 | 163 | 145 | 18 | 1,149 |
| Percentage | 85.8% | | | 14.2% | | | |
| Dual Credit Participant | 301 | 283 | 18 | 23 | 41 | -18 | 324 |
| Percentage | 92.9% | | | 7.1% | | | |

Table 4.8

*Correlation Matrix for Research Question 4*

| Variable | *M* | *SD* | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|---|
| Dual Credit | .22 | .41 | - | .15** | .01 | .07* | .36** | -.43 |
| Student Classification | 1.10 | .38 | .15** | - | .05 | .06* | .78** | -.08** |
| Sex | .66 | .47 | .01 | .05 | - | .06* | .06* | .00 |
| Race/Ethnicity | 1.92 | 1.17 | .07* | .06* | .06* | - | .08** | -.10** |
| Transfer Hours Before First Semester | 13.53 | 1.17 | .36** | .78** | .06* | .08** | - | -.12** |
| First Fall Attempted Credit Hours | 28.75 | 4.13 | -0.43 | -.08** | .00 | -.10** | -.12** | - |
| First Year Cumulative Attempted Credit Hours | 27.03 | 4.67 | -.16 | -.04 | .05 | -.06* | -.07** | .44** |
| First Year Cumulative Earned Credit Hours | 27.03 | 4.67 | .04 | -.04 | .07** | -.09** | -.03 | .35** |
| Cumulative Attempted Credit Hours | 144.17 | 19.09 | -.03 | .18** | -.02 | .05 | .16** | .10** |
| Cumulative Earned Credit Hours | 131.93 | 13.61 | .06* | .28** | .01 | .02 | .31** | .10** |
| First Fall GPA | 3.23 | .61 | .11** | .02 | .15** | -.02 | .11** | .04 |
| Cumulative GPA | 3.20 | .43 | .10** | .06* | .21** | -.04 | .12** | .05 |

Table 4.8 (continued)

*Correlation Matrix for Research Question 4*

| Variable | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|
| Dual Credit | -.16 | .04 | -.03 | .06* | .11** | .10** |
| Student Classification | -.04 | -.04 | .18** | .28** | .02 | .06* |
| Sex | .05 | .07** | -.02 | .01 | .15** | .21** |
| Race/Ethnicity | -.06* | -.09** | .05 | .02 | -.02 | -.04 |
| Transfer Hours Before First Semester | -.07** | -.03 | .16** | .31** | .11** | .12** |
| First Fall Attempted Credit Hours | .44** | .35** | .10** | .10** | .04 | .05 |
| First Year Cumulative Attempted Credit Hours | - | .81** | .13** | .13** | .11** | .06* |
| First Year Cumulative Earned Credit Hours | .81** | - | -.06** | .15** | .34** | .26** |
| Cumulative Attempted Credit Hours | .13** | -.06** | - | .74** | -.17** | -.30** |
| Cumulative Earned Credit Hours | .13** | .15** | .74** | - | .14** | .14** |

Table 4.8 (continued)

*Correlation Matrix for Research Question 4*

| Variable | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|
| First Fall GPA | .11** | .34** | -.17** | .14** | - | .62** |
| Cumulative GPA | .06* | .26** | -.30** | .14** | .62** | - |

Note: ** denotes that the correlation is significant at the 0.01 level (2-tailed) and * denotes that the correlation is significant at the 0.05 level (2-tailed).

Table 4.9

*Predictor Variables Descriptive Statistics*

| Variable | Range | *M* | *SD* | Skewness | Kurtosis |
|---|---|---|---|---|---|
| Transfer Hours Before First Fall | 0-74 | 8.59 | 14.39 | 2.30 | 5.39 |
| First Fall Attempted Credit Hours | 12-22 | 13.53 | 1.17 | 2.60 | 2.60 |
| First Year Cumulative Earned Credit Hours | 9-50 | 27.03 | 4.67 | .26 | 1.77 |
| Cumulative Attempted Credit Hours | 119-226 | 144.17 | 19.09 | 1.17 | 1.22 |
| First Term GPA | .50-4.00 | 3.23 | .61 | -.76 | .29 |
| Cumulative GPA | 2.05-4.00 | 3.20 | .43 | -.23 | -.74 |

Table 4.10

*Logistic Regression Predicting the Likelihood of Exceeding Excess Hours*

| | *B* | *SE* | *df* | *p* | OR | 95% CI OR | |
|---|---|---|---|---|---|---|---|
| | | | | | | *LL* | *UL* |
| Dual Credit Participation | -.650 | .256 | 1 | .011 | .522 | .316 | .862 |
| Sex | .168 | .176 | 1 | .339 | 1.183 | .838 | 1.670 |
| Race/Ethnicity | .007 | .071 | 1 | .917 | 1.007 | .877 | 1.157 |
| Transfer Hours Before First Semester | .090 | .092 | 1 | .328 | 1.094 | .914 | 1.309 |
| First Fall Attempted Credit Hours | .235 | .079 | 1 | .003 | 1.265 | 1.074 | 1.476 |
| First Year Cumulative Attempted Credit Hours | .043 | .091 | 1 | .639 | 1.044 | .873 | 1.247 |
| First Term GPA | .098 | .099 | 1 | .326 | 1.102 | .908 | 1.339 |
| Cumulative GPA | -.958 | 1.07 | 1 | <.001 | .384 | .311 | .473 |
| Constant | -2.239 | .206 | 1 | <.001 | .107 | | |

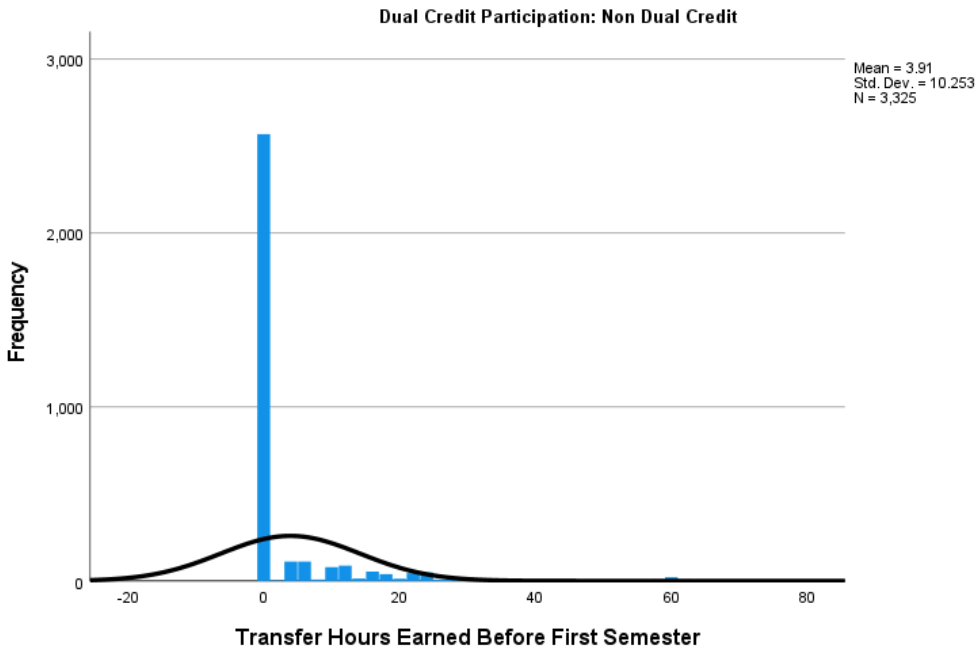


Figure 4.1

*Histogram of Transfer Hours for Non-Dual Credit Participants*

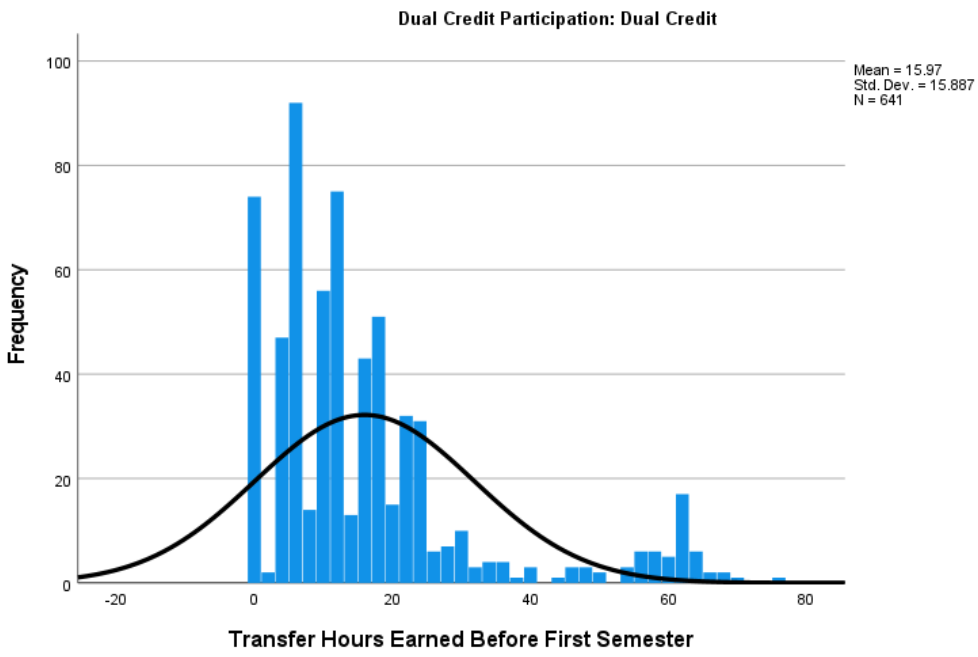


Figure 4.2

*Histogram of Transfer Hours for Dual Credit Participants*

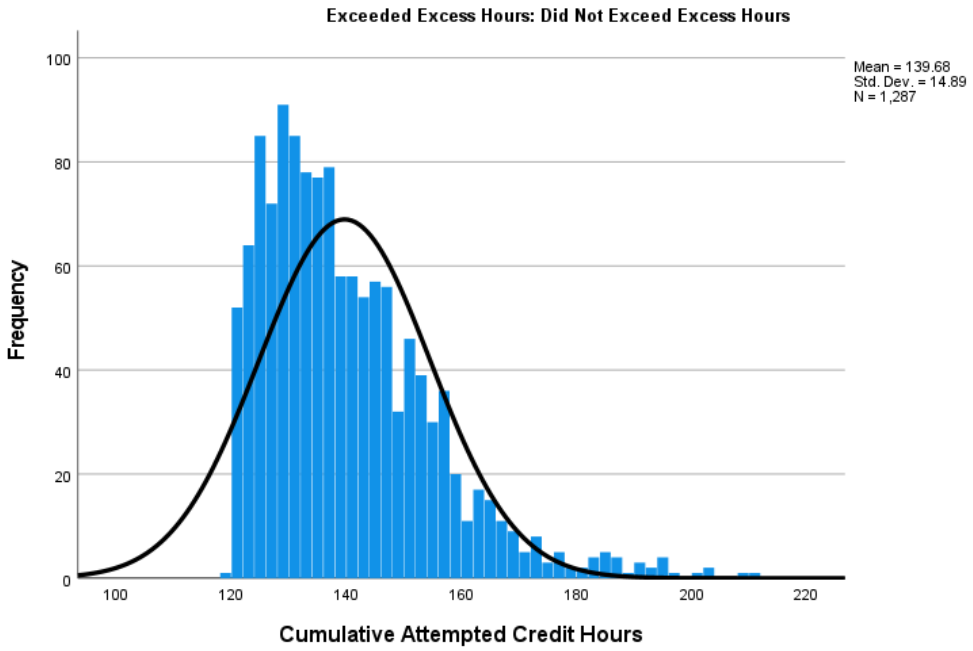


Figure 4.3

*Histogram of Cumulative Attempted Credit Hours for Those Who Did Not Exceed Excess Hours*

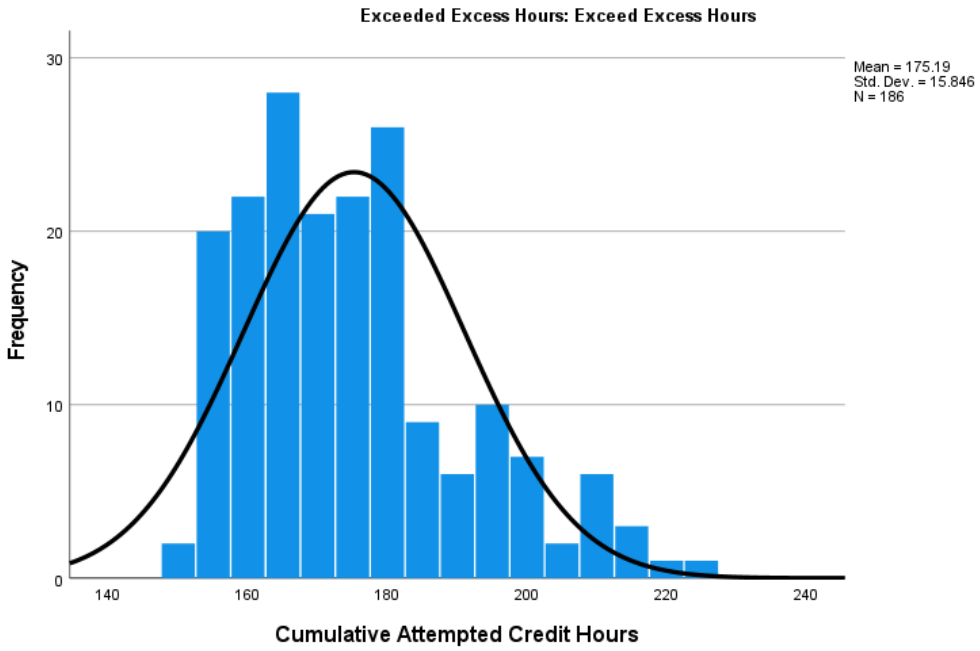


Figure 4.4

*Histogram of Cumulative Attempted Credit Hours for Those Who Did Exceed Excess Hours*

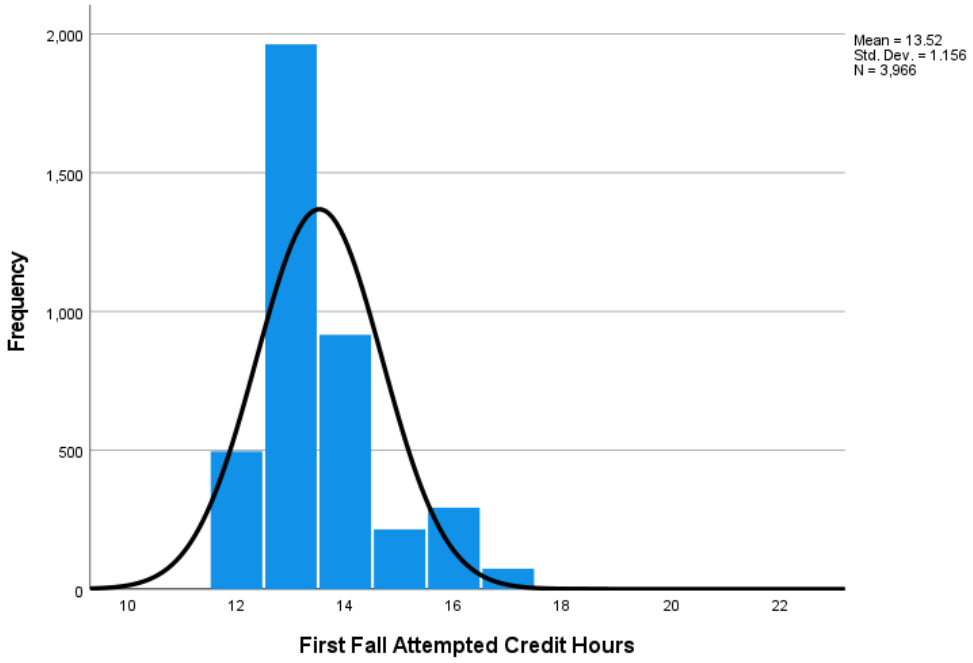


Figure 4.5

*Histogram of Cumulative Attempted Credit Hours*

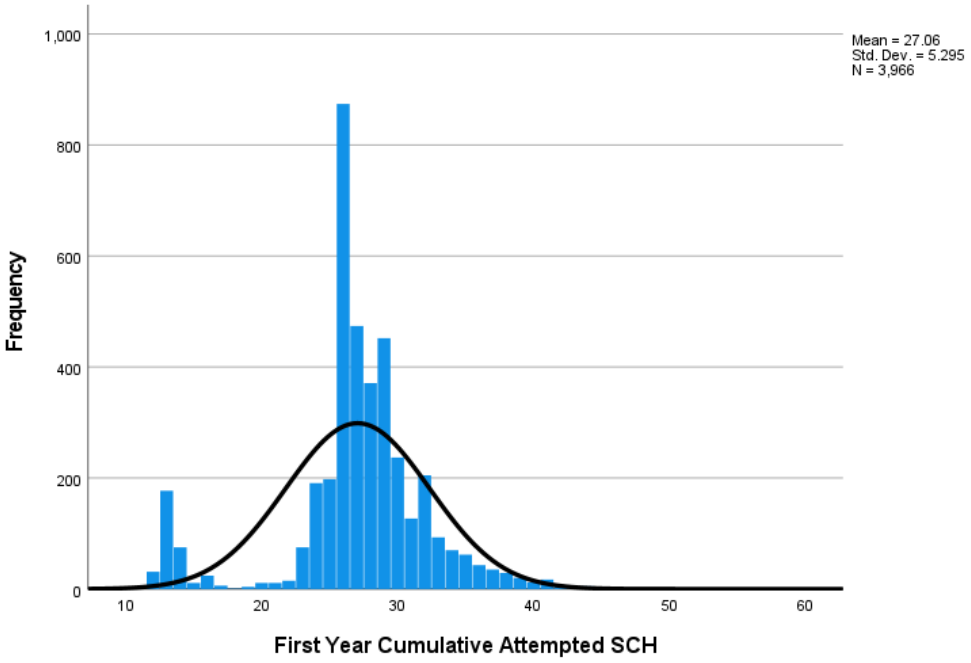


Figure 4.6

*Histogram of First Year Cumulative Attempted Credit Hours*

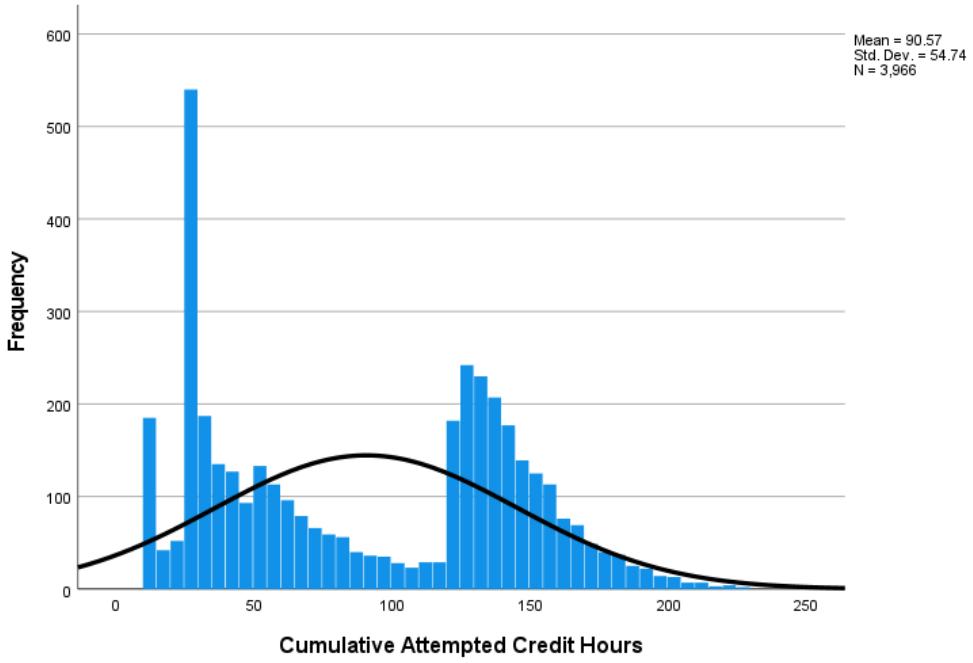


Figure 4.7

*Histogram of Cumulative Attempted Credit Hours*

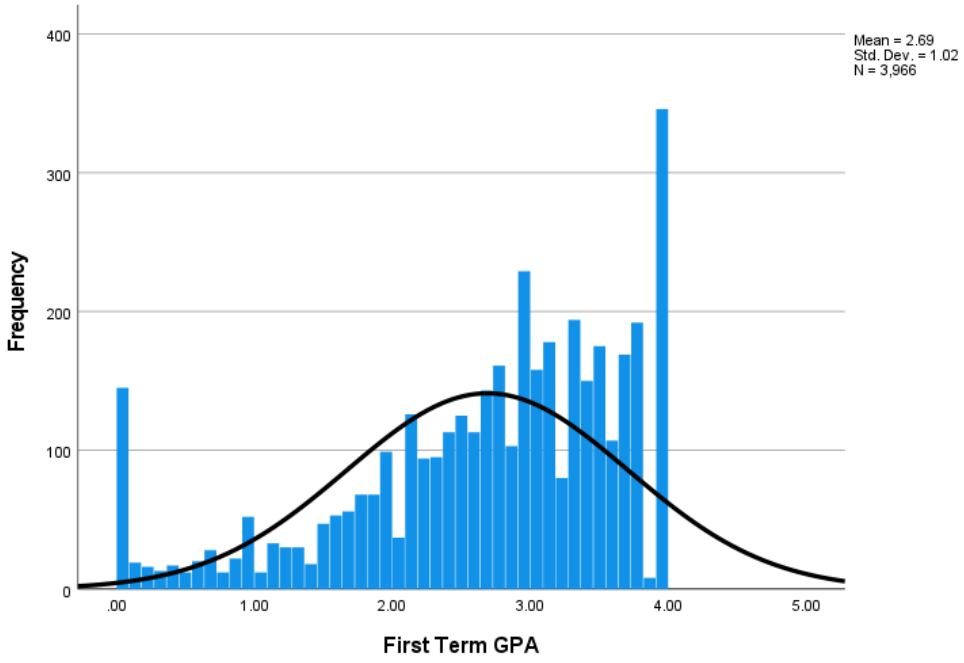


Figure 4.8

*Histogram of First Fall GPA*

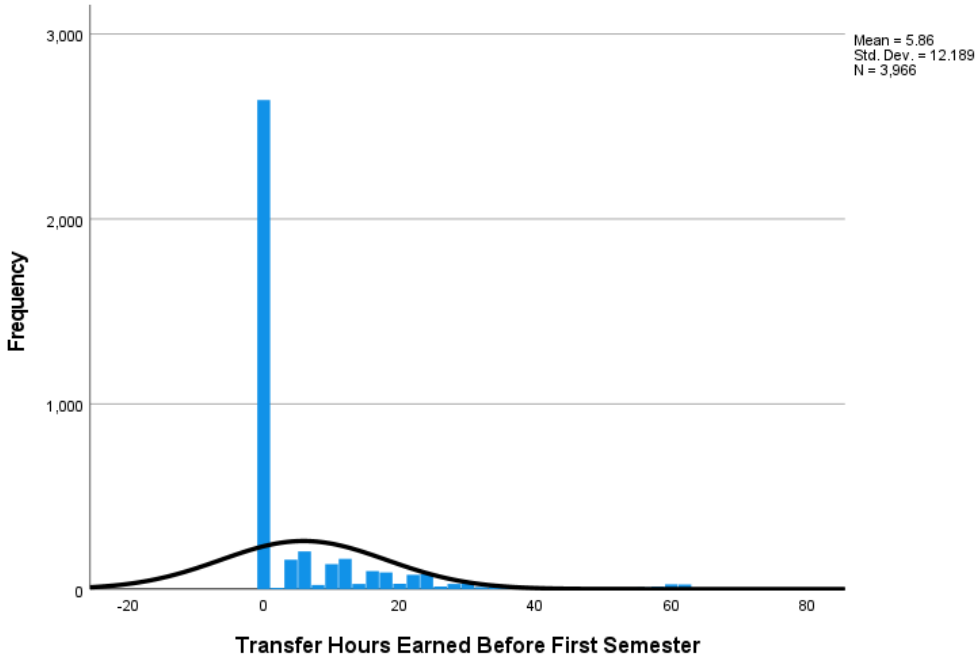


Figure 4.9

*Histogram of Transfer Hours Earned Before First Fall Semester*

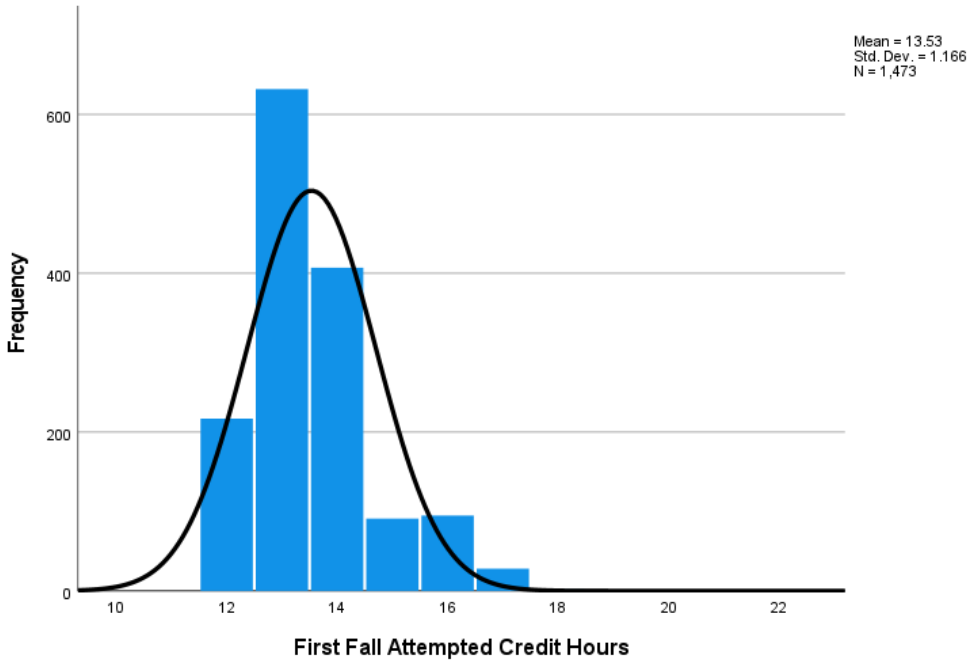


Figure 4.10

*Histogram of First Fall Attempted Credit Hours*

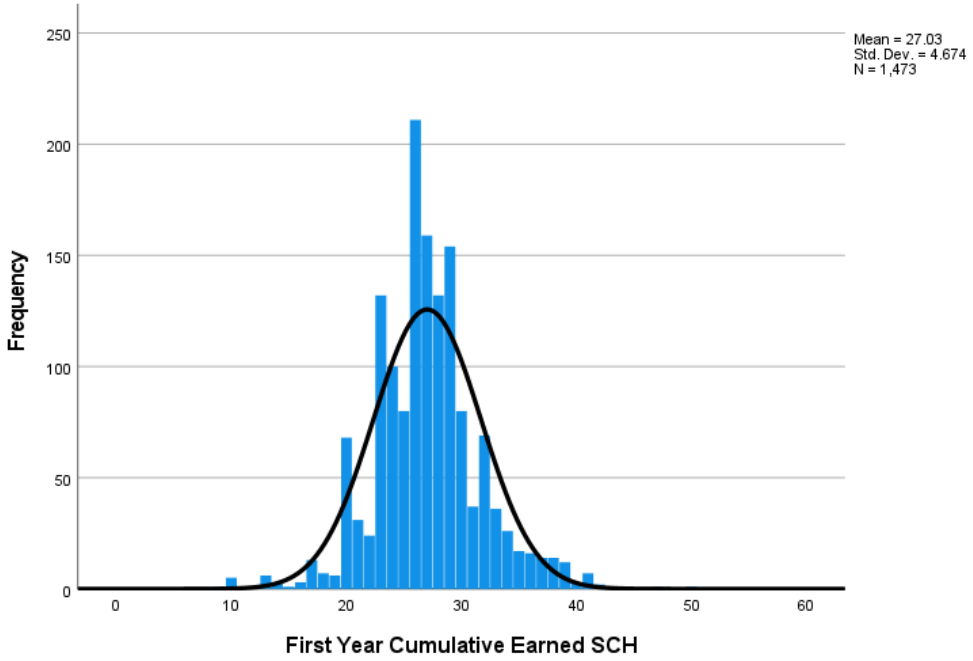


Figure 4.11

*Histogram of First Year Cumulative Earned Credit Hours for Graduates*

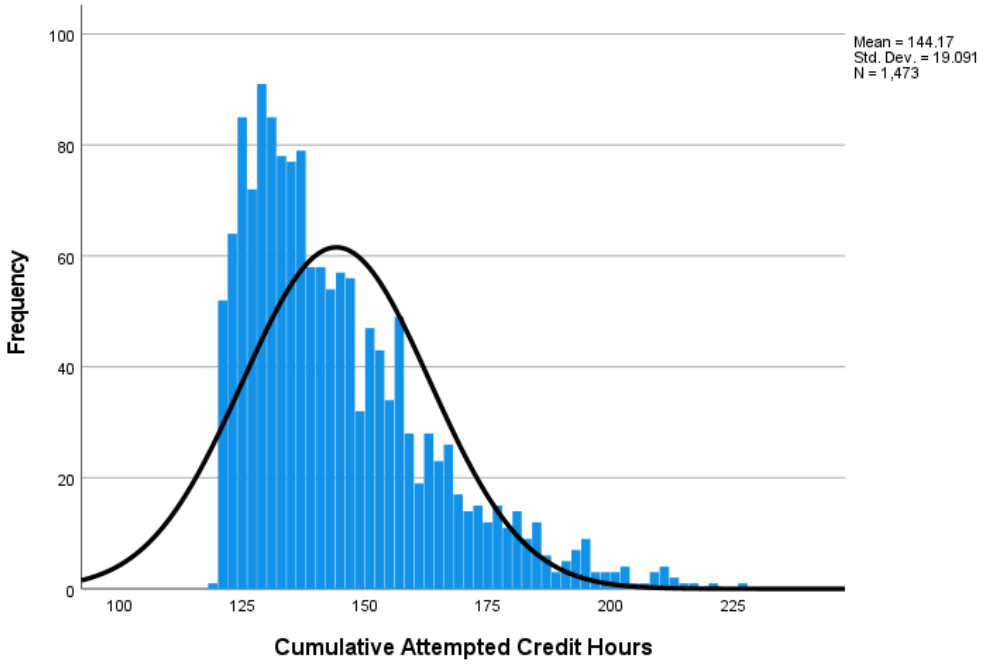


Figure 4.12

*Histogram of Cumulative Attempted Credit Hours for Graduates*

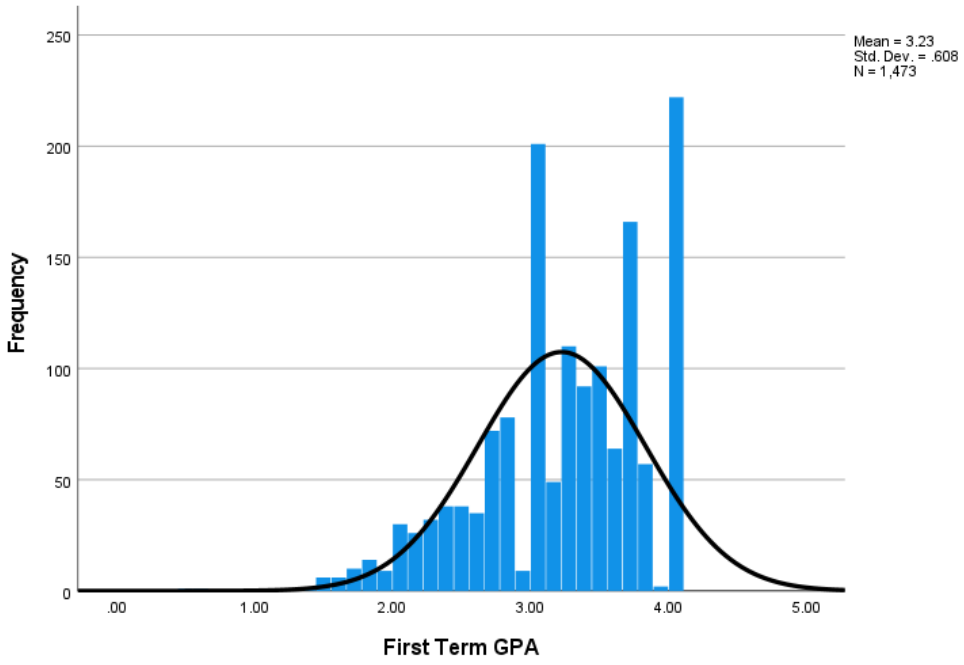


Figure 4.13

*Histogram of First Fall GPA for Graduates*

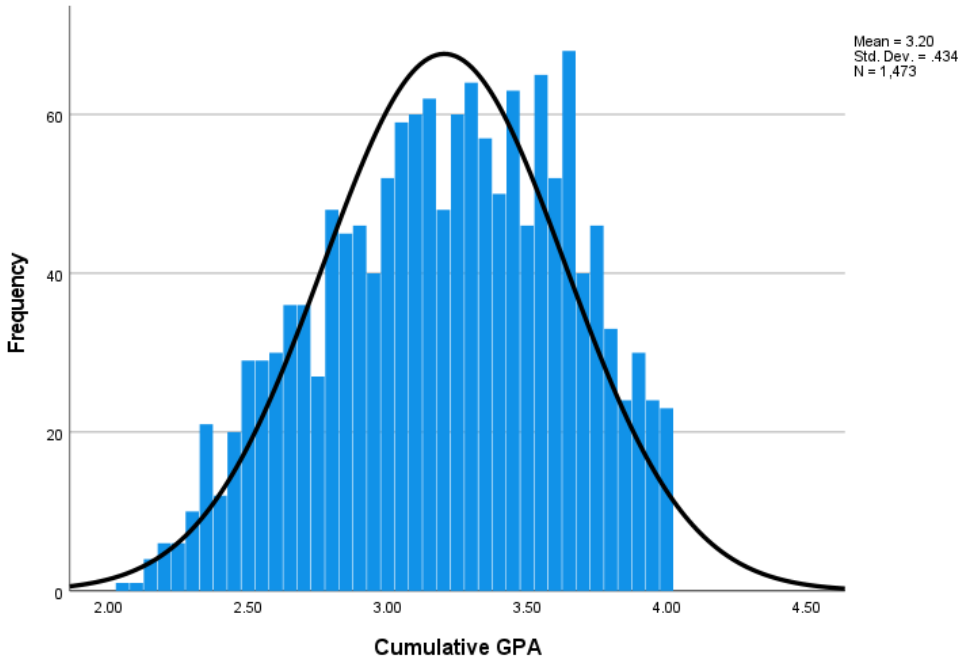


Figure 4.14

*Histogram of Cumulative GPA for Graduates*

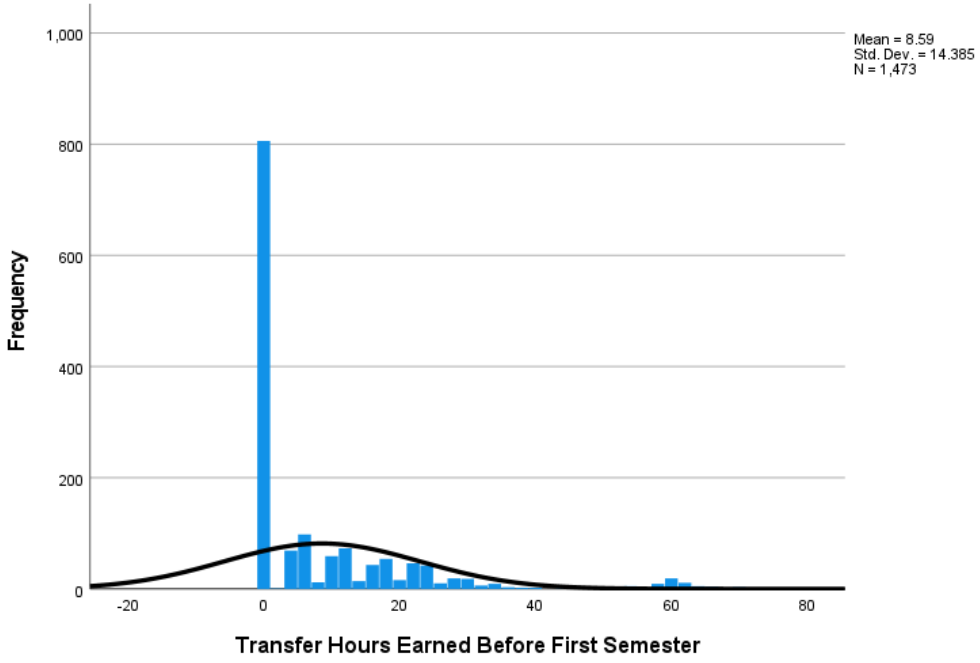


Figure 4.15

*Histogram of Transfer Hours Earned Before First Fall Semester for Graduates*

# CHAPTER 5. CONCLUSIONS, FINDINGS, AND SUGGESTIONS FOR FUTURE RESEARCH

## 5.1 Introduction

The purpose of this study was to examine the impact dual credit participation had on the and six-year bachelor's degree graduation rates and exceeding excess hours at a public four-year regional university in South Texas. The researcher used a non-experimental quantitative study using secondary, historical student data. This chapter includes a summary of the findings and the implications. Conclusions pertaining to each research question have been derived from the completed statistical analyses. The four research questions statistically assessed were:

1. To what extent does transfer hours vary among first-time, full-time bachelor's degree seeking students vary by those who participated or did not participate in dual credit?
2. For those who graduated within six years, to what extent do the cumulative attempted credit hours vary between those who exceeded and did not exceed excess hours?
3. What is the relationship between graduation and whether or not students participated in dual credit including covariates student classification, sex, race/ethnicity, residency, first term GPA, transfer hours earned prior to the first fall semester, first fall semester attempted credit hours, first year cumulative attempted credit hours, first year cumulative earned credit hours, cumulative attempted credit hours, cumulative earned credit hours, first term GPA, and cumulative GPA?

4. For those who graduated within six-years, what is the relationship between excess hours status and whether or not students participated in dual credit including covariates student classification, sex, race/ethnicity, residency, first term GPA, transfer hours earned prior to the first fall semester, first fall semester attempted credit hours, first year cumulative attempted credit hours, first year cumulative earned credit hours, cumulative attempted credit hours, cumulative earned credit hours, first term GPA, and cumulative GPA?

## 5.2 Summary of Findings

### 5.2.1 Research Question 1

RQ1: To what extent does transfer hours vary among first-time, full-time bachelor's degree seeking students vary by those who participated or did not participate in dual credit?

$H_a1$: There is a significant difference in transfer hours between first-time, full-time bachelor's degree-seeking students who participated in dual credit and those who did not participate.

The results of the independent samples t-test showed that students who participated in dual credit had statistically significant differences in their transfer hours earned prior to their first fall semester compared to those who did not participate in dual credit. Students who participated in dual credit brought in average of 16 earned transfer hours prior to their first fall semester compared to students who did not participate in dual credit. Students who did not participate in dual credit brought in an average of four earned transfer hours prior to their first fall semester.

### 5.2.2 Research Question 2

RQ2: For those who graduated within six years, to what extent do the cumulative attempted credit hours vary between those who exceeded and did not exceed excess hours?

$H_a2$: There is a significant difference in cumulative attempted credit hours between those who exceeded excess hours and those who did not exceed excess hours among those who graduated within six years.

The results of the independent samples t-test showed the results for students who graduated with a bachelor's degree within six-years. Students who exceeded excess hours had statistically significant differences in their cumulative attempted credit hours compared to those who did not exceed excess hours. Students who exceeded excess hours had an average cumulative attempted credit hours of 175 hours at graduation compared to students who did not exceed excess hours. Students who did not exceed excess hours had an average of 140 cumulative attempted credit hours at graduation.

### 5.2.3 Research Question 3

RQ3: What is the relationship between graduation and whether or not students participated in dual credit including covariates student classification, sex, race/ethnicity, residency, first term GPA, transfer hours earned prior to the first fall semester, first fall semester attempted credit hours, first year cumulative attempted credit hours, first year cumulative earned credit hours, cumulative earned credit hours, and first term GPA?

$H_a3$: The odds of graduation are higher for students who participated in dual credit compared to those who did not, including covariates student classification, sex,

race/ethnicity, residency, first term GPA, transfer hours earned prior to the first fall semester, first fall semester attempted credit hours, first year cumulative attempted credit hours, first year cumulative earned credit hours, cumulative earned credit hours, and first term GPA.

The results of the chi-square test showed that the relationship between the independent and dependent variables were statistically significant; however, there was a small effect size. Students who participated in dual credit were more likely to earn a bachelor's degree within six-years compared to those who did not participate in dual credit. After assumption testing, a binary logistic regression was completed to determine if the covariates of dual credit participation, student classification, sex, race/ethnicity, residency, first term GPA, transfer hours earned prior to the first fall semester, first fall semester attempted credit hours, first year cumulative attempted credit hours, first year cumulative earned credit hours, cumulative earned credit hours, and first term GPA impacted the six-year graduation rate. The model was statistically significant, indicating that it could distinguish between those who graduated within six-years and those who did not. Not all predictor variables were adding significance to the model. The predictor variables of transfer hours earned prior to the first fall semester, first fall semester attempted credit hours, cumulative earned credit hours, and first term GPA significantly contributed to the model. Students who brought in transfer hours before their first semester as well as higher first-year cumulative attempted credit hours, and a higher first term GPA were more likely to graduate. Students who had higher first fall attempted credit hours were less likely to graduate. Students who attempted more credit hours

during their first fall semester were less likely to graduate with a bachelor's degree within six years.

### 5.2.4 Research Question 4

RQ4: For those who graduated within six-years, what is the relationship between excess hours status and whether or not students participated in dual credit including covariates sex, race/ethnicity, transfer hours earned prior to the first fall semester, first fall semester attempted credit hours, first year cumulative earned credit hours, first term GPA, and cumulative GPA?

$H_a4$: There is a significant association between excess hours status and dual credit participation among those who graduated within six years, even after including covariates sex, race/ethnicity, transfer hours earned prior to the first fall semester, first fall semester attempted credit hours, first year cumulative earned credit hours, first term GPA, and cumulative GPA.

The results of the chi-square test showed that the relationship between the independent and dependent variables were statistically significant; however, there was a small effect size. Students who participated in dual credit were less likely to graduate with excess hours than those who did not participate in dual credit; whereas, students who did not participate in dual credit were more likely to graduate as exceeded excess hours. After assumption testing, a binary logistic regression was completed to determine if the covariates of dual credit participation, race/ethnicity, transfer hours earned prior to the first fall semester, first fall semester attempted credit hours, first year cumulative earned credit hours, first term GPA, and cumulative GPA impacted exceed excess hours.

The model was statistically significant, indicating that it could distinguish between those who graduated within six-years and exceeded excess and those who graduated within six years and did not exceed excess hours. Not all predictor variables were adding significance to the model. The predictor variables of dual credit participation, first fall attempted credit hours and cumulative GPA significantly contributed to the model. Students who participated in dual credit were more likely to not graduate in six years as exceeding excess hours. Students who had attempted more credit hours during their first fall semester and had a higher cumulative GPA were more likely to graduate in six years as exceeding excess hours.

## 5.3 Conclusions

### 5.3.1 Research Questions 1 & 2

With research question 1, the study found that there was statistical significance in the number of transfer hours students earned prior to their first fall semester between those who participated in dual credit and those who did not participate in dual credit. Students who participated in dual credit brought in an average of 16 earned transfer hours prior to their first fall semester compared to non-dual credit participants who brought in an average of four earned transfer hours. With respect to research question 2, the study found that for students who graduated with a bachelor's degree within six years and approaching excess hours, those who participated in dual credit accumulated less attempted credit hours by graduation at an average of 140 attempted credit hours; whereas, those who do not participate in dual credit. Non-dual credit participants had, on average, 175 attempted credit hours at the time of their bachelor's degree completion.

Radunzel, Nobel, and Wheeler (2014) found similar results showing that dual credit participants were more likely to enter a post-secondary institution with a greater number of earned hours, complete a bachelor's degree in a timely manner, and accumulate fewer attempted credit hours by the time they earn their bachelor's degree. Most notably, they found that dual credit participants, on average, earned their bachelor's degree within 57 months, compared to 72 months for those who did not participate in dual credit.

### 5.3.2 Research Question 3

The results of the chi-square test showed that students who participated in dual credit were more likely to graduate with a bachelor's degree within six-years than those who did not participate in dual credit. Previous research from Adelman (2005) and Swanson (2008) that show students who participated in dual credit were more likely to graduate earlier than those with no dual credit. Although the chi-square test indicated that those who participated in dual credit were more likely to graduate with a bachelor's degree within six-years, when running a binary logistic regression, dual credit participation was not significantly contributing to the model. Leading student success metrics including transfer hours earned prior to the first fall semester, first fall semester attempted credit hours, cumulative earned credit hours, and first term GPA, significantly contributed to the model. Most interestingly, this study indicated that the more attempted credit hours the student took during their first semester, the less likely they are to graduate within six years with a bachelor's degree. These findings are different from other national studies where the first semester attempted credit hours goes against findings in national where Attewell and Monaghan (2016) found that students who took

15 or more credit hours in their first semester at a post-secondary institution were more likely to compete a bachelor's degree compared to those who take 12 hours.

### 5.3.3 Research Question 4

The results of the chi-square test showed that students who graduated with a bachelor's degree within six years, for those that participated in dual credit, they were less likely to exceed excess hours at the time of graduation; whereas, those who did not participate in dual credit were more likely to graduate as exceeding excess hours. The results of the binary logistic regression indicated that dual credit participation, a leading student success metric, first fall attempted credit hours, and a lagging student success metric, cumulative GPA significantly contributed to the model. Excess hours are a concept that was introduced in Texas Legislation and there are no state analyses to compare the results of this study too; however, previous research from Adelman (2005) and Swanson (2008) that show students who participated in dual credit were more likely to graduate earlier than those with no dual credit. Additionally, Brake (2023) found that students who participated in dual credit were 1.4 more times likely to graduate with a bachelor's degree and those who had higher GPAs were 4.7 times more likely to earn a bachelor's degree.

### 5.3.4 Research Question5-Implications

Dual credit was first recognized within the state of Texas during the 74$^{th}$ Legislative Assembly programs (Texas Education Agency Office for Planning, Grants, and Evaluation and Shapley Research Associates, 2011). HB 1336 was introduced and

allowed for the create of dual credit programs to assist students transitioning from high school to a post-secondary institution. Since the implementation of HB 1336, several legislative changes have been brought forward and implemented. In 2005, HB 1 was passed during the 79th Legislative Assembly which required all Texas Independent School Districts (ISDs) to offer junior and senior high school students the change to earn at least 12 college credits through Advanced Placement, International Baccalaureate, or dual credit (Texas Legislature, 2005). HB 1 also introduced a statewide college readiness program, TSI. This legislation required that students who wanted to participate in dual credit programs to be college ready prior to enrolling in a college level course within that subject area. HB 505 was introduced and implemented during the 84th Legislative Assembly. HB 505 lifted the restrictions regarding dual credit participation based on high school student classification. All high school students who were college ready within a subject area could register and enroll in a dual credit course.

In addition to dual credit programs and courses on the agenda for Texas Legislatures, they have also addressed the number of attempted credit hours an undergraduate resident or not-resident post-secondary student may attempt while paying Texas resident tuition. During the 75th Texas Legislature, During the 75th Texas Legislature, Texas Education Code 54.014 was passed and went into effect in fall 1999. Beginning in fall 1999 through summer 2006, undergraduate students whose first semester fell in that range at a Texas four-year public university were allowed to go up to 45 attempted credit hours over their degree program hour requirements before they could be charged a higher tuition rate for going into excess hours. TEC 54.014 was amended in the 79th Texas Legislative session and impacted the number of attempted hours a student

could accumulate beyond their degree program. With the amended changes, undergraduate students whose first semester was fall 2006 to date at a Texas public four-year university are allowed to up to 30 attempted credit hours over their degree program requirements before they could be charged a higher tuition rate for going into excess hours (Texas Education Code, n.d.).

During the 79th Texas Legislature, two major changes were passed that have the potential to impact student success outcomes including participation in dual credit programs and courses and the number of attempted credit hours that a student paying Texas resident tuition could take before the potential to go into excess hours and pay up to a non-resident rate. Fowler (2013) indicated there are six stages associated with public policy implementation including: (1) Issue Definition; (2); Agenda Setting; (3) Policy Formation; (4) Policy Adoption; (5) Implementation; and (6) Evaluation. Consider the 79th Texas Legislature convened in 2005 and the policies have gone through the first five stages, the following implications will be based on the sixth and final stage, evaluation.

#### 5.3.4.1 Data Collection

The Texas Education Agency (TEA) is located within Texas's government and oversees the data collection, data management, and data analysis for Texas school districts and charter schools.

The Texas Higher Education Coordinating Board (THECB) is an agency within Texas's government that oversees the data collection, data management, and data analysis for all public and independent two- and four-year post-secondary institutions within Texas. All public and independent two- and four-year post-secondary institutions

within Texas adhere to THECB's reporting and procedure manuals which require submissions of semester and annualized reports including student demographics, student course registration, TSI college readiness, graduation, etc. (Texas Higher Education Coordinating Board [THECB], n.d.). The reports are known as Coordinating Board Material (CBM). Currently, there are several limitations to how THECB is collecting data on dual credit participants and excess hours.

Regarding dual credit participants, THECB only collects data within the CBM0CS (census course registration) and CBM00S (end of semester course registration). For student registration, THECB collects data on 'high school credit status' with three outcomes including: (1) not a high school student; (2) student is not yet a high school graduate, course is reported for dual credit; and (3) student is not yet a high school graduate, course reported is for college credit only. Additionally, the CBM0CS and CBM00S reports look at the location of where the course is taught and there are 11 reporting options. If the course is taught on the high school campus for dual credit that is one option; however, the dual credit course could also be offered either at the post-secondary institution or through another modality (e.g. online). Within the CBM001 (student census) and CBM0E1 (student end of semester) reports, THECB collects data on 'student classification' with five undergraduate outcomes including: (1) freshman; (2) sophomore; (3) junior; (4) senior; and (5) post-baccalaureate. These classifications are based on the number of hours earned by the student including both transfer and native work at a post-secondary institution. There are limitations with the current data collection to understanding whether or not a high school student is registered in a dual credit course. Utilizing the current reporting structure, a high school student taking a dual credit course

with less than 15 earned credit hours at a post-secondary institution would be considered a freshman at the post-secondary institution; however, the high school student also carries a student classification at the high school and could be a junior or senior at their high school. Understanding these intricacies between high school and post-secondary education and their outcomes on dual credit and overall secondary and post-secondary education success would require the dual agency cooperation and collaboration between the Texas Education Agency (TEA) and the Texas Higher Education Coordinating Board (THECB).

Regarding excess hours, THECB collects data at the student and course levels. Within the CBM001 (student census) and CBM0E1 (student end of semester) reports, THECB collects data on students affected by funding limits (e.g. excess hours) with two outcomes including: (1) students first enrolled in a post-secondary institution from fall 1999 through summer 2006 to indicate they are impacted by the 45- credit hour rule and (2) students first enrolled in a post-secondary institution fall 2006 and beyond to indicate they are impacted by the 30-credit hour rule.

Overall, there are limitations in data collection within the statewide agencies. TEA and THECB Commissioners should consider additional data collection within their semester and annualized reporting periods to collect additional information that will further provide context of leading and lagging student success metrics associated with dual credit participation.

Data collection also falls on the responsibility of the post-secondary institutions. Beginning in 2009, the excess hours rule no longer applies to dual credit hours attempted. Post-secondary institutions are required to collect data through the admissions process on

the number of institutions a student attended prior to the current institution, determining if the credits earned were dual credit, coding the courses as dual credit. Once the dual credit courses are identified, post-secondary institutions are required to remove any attempted dual credit hours from the excess hours calculation. (Texas Higher Education Coordinating Board [THECB], n.d.). Within this study, the university tracked dual credit and excess hours differently. For example, dual credit is tracked at the university based on the high school transcript and courses taken; whereas, excess hours was treated as a student attribute. Once a student entered into excess hours, an attribute was placed on the student to note if the student fell under the 30- or 45- hour rule. Once the student was attributed as exceeding excess hours, all courses the student registered for were coded as attempting while exceeding excess hours.

#### 5.3.4.2 Data Analysis & Evaluation

Within the TEA website, they have a section, 'Reports & Data', that is accessible to the public and policymakers (Texas Education Agency [TEA], n.d.). There are a few reports that highlight accelerated learning that high school students may be participating in. Their report, 'College Credit Reports' looks at headcounts, total post-secondary credits earned by Career and Technical Education (CTE) students and all students, and average hours earned by each student type. The report is produced annually and can be disaggregated by statewide, regional, or district levels. Long-term evaluative reports of dual credit are not publicly available.

TEA has put in considerable effort to analyze data pertaining to other accelerated learning including Advanced Placement (AP) and International Baccalaureate (IB) participation and outcomes. TEA puts forward AP and IB participation and performance

reports at the state, district, county, and educational service region levels. Additionally, since 2010, TEA has completed annualized evaluation reports looking at AP and IB participation and outcomes over time (Texas Education Agency [TEA], n.d.).

THECB has developed a public accountability report that is accessible to the public and policymakers (Texas Higher Education Coordinating Board [THECB], n.d.). Each public and independent two- and four-year institution has a report that is publicly accessible. The accountability includes metrics such as 'Students Enrolled in Dual Credit', 'Degrees and Certificates Awarded', 'Graduation and Persistence Rate', 'Graduate Rate: 4-, 5-, and 6-Year', 'Excess Semester Credit Hours Attempted', and 'Working or Enrolled in Texas within One year after Award.' Each metric has a three-year trend and point change over time. Although three-year trends are provided, no evaluations were completed to explain how and why the metrics changed over time.

Overall, there are limitations in data analyses and evaluation within the statewide agencies. Each agency is generating analyses and evaluative reports that are specific to the data collected within each of their state agencies. Each agency is reporting on dual credit participation prior to a student graduating from high school; however, each agency is analyzing and assessing outcomes post high school graduation differently. TEA focuses on the transition from high school to college going rates; whereas, THECB is focused on outcomes after transitioning to a post-secondary institution including first year GPA, persistence, and credential or degree completion (Texas Higher Education Coordinating Board [THECB], n.d.).

## 5.4 Recommendations for Future Research

This study explored quantitative data associated with dual credit participation and six-year bachelor's degree graduation and exceeding excess hours. Regarding six-year bachelor's degree completion, the study assumed only two outcomes including whether the student graduated from the initial university within six-years with a bachelor's degree or did not graduate from the initial university. Plaid Consulting (2020) found the dual credit students were likely to transfer out to another university. At the beginning of the study, PSA students were removed from the sample considering their intent is to transfer out of the Texas A&M regional university and apply to transfer to Texas A&M University during their second fall. On average, PSA students encompass, on average, 25% of the total incoming first-time, full-time bachelor's degree-seeking cohort. Although PSA students were removed, the transfer out rates for the fall 2015 and 2016 cohorts were 45% and 44% respectively (National Center for Education Statistics [NCES], n.d.). This means an additional 20% of the first-time, full-time bachelor's degree-seeking cohort transferred out of the initial university. In total, the transfer out rates shows that within six-years, nearly half of each cohort left their initial university and did not return to earn a credential. A multinomial logistic regression would allow researchers to look at a dependent variable with two or more categories. The dependent variable could be updated from two outcomes of graduated from the initial university within six-years with a bachelor's degree or did not graduate from the initial university to, graduated at the initial university within six years, graduated at another university within six years, still enrolled at the initial university after six years, still enrolled at another university after six years, stopped out. The additional outcomes would allow researchers to assess timely completion of a bachelor's degree and intent to enter the workforce.

Regarding students who graduate with a bachelor's degree within six years and exceeding excess status, the study treated the outcome variable of exceeding excess status as dichotomous as either exceeded excess hours or not exceeding excess hours. Given THECB's new strategic plan, Building a Talent Strong Texas, two of the three goals are focused on 60% of Texans aged 25-64 have an earned post-secondary credential and to graduate with no student debt or manageable levels of student debt. Given their focus on degree completion and manageable debt, researchers could expand on this research in two areas. First, additional research could be conducted on the number of hours students exceed and how that impacts their time to degree completion. Second, the costs associated with higher education and the value of a credential are a concern for students and their families. Students who exceed excess hours may be charged up to non-resident tuition rates for every additional credit hour attempted beyond their 30- or 45-hour funding rule. This study showed that students who participated in dual credit were less likely to exceed excess hours and graduate with a bachelor's degree within six years. This means students who participated in dual credit programs may have had the opportunity to participate in dual credit courses and programs at a reduced cost while in high school and have a lower probability of being charged excess hour fees as a post-secondary student; whereas, a student who did not participate in dual credit has the potential to go into excess hours and be charged more per credit hour in excess hour fees. Further research to analyze the total cost of attendance between dual credit and non-dual credit participants could provide policymakers with more insight about the amount of debt students and/or their families are taking on to finance their education.

Within Texas, dual credit was first recognized in 1995 under (HB) 1336 which (Texas Education Agency [TEA], 2011). There have been several additional legislatives updates since then including HB 1 in 2005 which required ISDs to offer college ready high school juniors and seniors the opportunity to earn 12 hours of college credit and HB 505 which opened dual credit up to college ready high school freshmen and sophomores. (Texas Legislature, 2005; Texas House Bill 505, 2015). Within Texas, to be eligible to participate in dual credit programs or courses, all high school students are required to be college ready within the content area they would like to take course(s) in. Policy makers and researchers should consider the rippling effects COVID has taken on learning at all educational levels including elementary, middle, and high school. Prior to COVID, the college readiness rates for math were increasing within Texas from 73% in 2008/09 cohort to 80% in 2013/14 cohort (Garland, Booth, & Pham, 2017). However, Harris and Chen & Curriculum Associates (2022) looked at critical milestones throughout K-12 and the anticipated impacts on high school graduation and college-going rates. During and immediately following COVID, families were delaying kindergarten enrollment (Harris & Chen, 2022). Prior to spring 2021, historically 74% of third graders had achieved fundamental reading skills and 43% of eighth graders had achieved fundamental math skills. In spring 2022, those dropped to 67% and 37%, respectively (Curriculum Associates, 2022). Considering dual credit participants must be college ready, research should be conducted to see if dual credit participation decreases due to the potential disruptions in core learning through K-12. Additionally, if more students can come into post-secondary education as not college ready, they make have to take additional

coursework or attempt courses more than one time which increases their potential to go into excess hours.

The results of this study were based on high school students who participated in dual credit program or courses and enrolled as first-time, full-time bachelor's degree seeking students at a public four-year university within Texas. Researchers outside Texas as well as at community and technical colleges are encouraged to replicate this study with dual credit students who participated in dual credit programs or courses and enrolled as first-time, full-time associate and/or bachelor's degree-seeking students to see if the results are generalizable to first-time students who start their post-secondary education at another state and/or degree level.

## 5.5 Final Summary

The interest and participation in dual credit programs and courses has grown over the past several decades, especially within Texas. Over the last two decades Texas Legislatures have developed and implemented several policies that directly and indirectly relate to dual credit and leading and lagging student success outcomes. The purpose of this study was to examine the impact dual credit participation had on six-year graduation rates and exceeding excess hours at a public four-year regional university in South Texas.

The researcher utilized independent sample t-tests, chi-squares, and binary logistic regression to test hypotheses. The results indicated that leading student success measures contributed to six-year bachelor's degree completion and for students who graduated within six-years, those who participated in dual credit were less likely to exceed excess hours. Additionally, the results indicated statistical significance in that

dual credit students are more likely to graduate with a bachelor's degree within six years and are less likely to exceed excess hours.

During their previous and current strategic plan, THECB has focused on degree completion and graduating with little to minimal debt. Dual credit participation and the opportunity to mitigate the potential to go into excess hours could impact three of their strategic plan goals including the number of degrees and credential awarded annually, the percentage of those within the workforce holding a credential and/or degree, and graduates will graduate with no student loan debt or manageable levels of debt in relation to their potential earnings within their field of study. Stakeholders, including those from the Texas Education Agency (TEA), the Texas Higher Education Coordinating Board (THECB), and the Texas Workforce Commission (TWC), could utilize the results of this study to develop individual and/or collaborative agency reports and annualized evaluations showing the impact policies established in the 79$^{th}$ Texas Legislation have individually and combined on dual credit participation and exceeding excess hours.

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VITA

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## *EDUCATION*

Northern Kentucky University May 2009
M.S. in Industrial-Organizational Psychology

University of Kentucky August 2006
B.A. in Sociology & Minor in Psychology

## *WORK EXPERIENCE*

TEXAS A&M UNIVERSITY-CORPUS CHRISTI, Corpus Christi, TX
Associate Vice President of Planning, Analytics, Institutional Research, and Strategic Initiatives, February 2020 - present
Executive Director of Institutional Research, June 2018 – January 2020

MOUNT ST. JOSEPH UNIVERSITY, Cincinnati, OH
Institutional Research Director, March 2016-June 2018

NORTHERN KENTUCKY UNIVERSITY, Highland Heights, KY
Institutional Research Associate Director, July 2014-March 2016
Institutional Research Assistant Director of Operations, September 2011-July 2014
Institutional Research Manager, August 2010-September 2011
Institutional Research Analyst, May 2009-August 2010
Institutional Research Graduate Assistant, August 2007-May 2009

## *NATIONAL, REGIONAL, & STATE PRESENTATIONS*

Liu, X. & Mulligan-Nguyen, E. (2022 February). 15 to Finish: How Does Taking 15 Or More Credits Impact First-time Undergraduate Students? *2022 Texas Association for Institutional Research. Denton, TX.*

Liu, X. & Mulligan-Nguyen, E. (2022 June). The Effect of Housing Locations on Retention and Progression. *2022 Association for Institutional Research. Phoenix, AZ.*

Liu, X. & Mulligan-Nguyen, E. (2022 June). The Impact of Taking 15 Credits On First-Year Retention*. 2022 Association for Institutional Research. Phoenix, AZ.*

Liu, X. & Mulligan-Nguyen, E. (2022 February). The Effect of Housing Locations on Retention and Progression: An Unexpected Story of a Reginal Public Institution. *2022 Texas Association for Institutional Research. Denton, TX.*

Liu, X. & Mulligan-Nguyen, E. (2022 February). 15 to Finish: How Does Taking 15 Or More Credits Impact First-time Undergraduate Students? *2022 Texas Association for Institutional Research. Denton, TX.*

Mulligan-Nguyen, E. (2021 October). Managing an Institutional Research Office Before COVID and After COVID. *2021 Southern Association for Institutional Research, Louisville, KY.*

Mulligan-Nguyen, E. & Kessinger, W. (2015 November). And They're Off! Using College Readiness Factors to Assess Student Movement towards Graduation. *2015 Kentucky Association for Institutional Research, Frankfort, KY.*

Mulligan-Nguyen, E. & Kessinger, W. (2015 October). Dynamic Retention and Graduate Rate Reporting. *2015 Southern Association for Institutional Research, Savannah, GA.*

Padgett, R, Mulligan-Nguyen, E., & Gillian, S. (2014 November). A Cross-Divisional Collaborative Model for Student Success. *2014 Consortium for Student Retention Data Exchange.*

Mulligan-Nguyen, E. (2014 October). Implementing a Comprehensive Retention Database. *2014 Association for Institutional Research, Orlando, FL.*

Mulligan-Nguyen, E. & Kessinger, W. (2013). Where Have All the Students Gone and Why Do the Ones Still Here Change Their Major Every Term? *2013 Kentucky Association for Institutional Research, Frankfort, KY.*

Mulligan-Nguyen, E. & Kessinger, W. (2013). Where Have All the Students Gone and Why Do the Ones Still Here Change Their Major Every Term? *2013 Kentucky Association for Institutional Research, Frankfort, KY.*

Mulligan-Nguyen, E. & Kessinger, W. (2013). An Evaluation of Internal and External Mobility? *2013 Ohio Association for Institutional Research and Planning, Columbus, OH.*

Rice, G., Coughlin, M., Boling, C., Stewart, J., Hale, E., Mulligan-Nguyen, E., & Chukwuemeka, V. (2012). Implementing the Student Learning Progress Model: Lessons Learned and Advantages Over Traditional Metrics. *2012 Association for Institutional Research and Planning, New Orleans, LA.*

Mulligan-Nguyen, E. (2012). Why Not Assess Every Student's Success in College: Comparing a New Student Learning Model to the Traditional IPEDS Metrics. *2012 Kentucky Association for Institutional Research and Planning, Frankfort, KY.*

Mulligan-Nguyen, E. & Bevins, K. (2012). Taking the Monkey Off Your Back: Exploring a More Sophisticated Survey Tol Other Than Survey Monkey. *2012 Kentucky Association for Institutional Research and Planning, Frankfort, KY.*

## ***PROFESSIONAL AFFILIATIONS***

- Texas Association for Institutional Research (TAIR) 2019 - present
    - Nominating Committee 2022 - 2023
    - Awards Committee 2021- 2022
- Southern Association for Institutional Research (SAIR) 2015, 2022 - present
- Association for Institutional Research (AIR) 2010 - present
- Ohio Association for Institutional Research (OAIRP) 2010 - 2018
- Kentucky Association for Institutional Research (KAIR) 2009 - 2018
    - President 2017 - 2018
    - Vice President 2016 - 2017