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Dual Credit: The Relationship Between Grade Point Average, Hours Earned, and Semesters to Degree Attainment

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Doctor of Education in Organizational Leadership

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the College of Graduate and
Professional Studies

March 15, 2023

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School of Educational Leadership

Dual Credit: The Relationship Between Grade Point Average, Hours Earned, and Semesters to

Degree Attainment

A dissertation submitted in partial satisfaction

of the requirements for the degree of

Doctor of Education in Organizational Leadership

by

Amanda R. Ritchie

March 2023

Dedication

I would like to dedicate this dissertation to my grandparents, "Ganny" and "PawPaw," who were always my number one supporters. Both of my grandparents have passed, but they believed in me no matter what and encouraged me to follow through with anything I set my mind on. Thank you for always telling me to "stick with it" and modeling a work ethic that has been essential to my success.

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Thank you to my family for their love and support as I strived to achieve this goal. To my mom and dad—thank you for teaching me to be resilient and reminding me that small sacrifices are worth it. And lastly, thank you to my husband, Collin. I am grateful for your patience, support, and the sacrifices you made while I juggled working full time, caring for family, and being a wife and dog mom, all while going to school. (I really appreciate you agreeing to a house cleaner, that was a great investment and one I think we should keep.) Collin, without your love and support, this would not have been possible.

Abstract

Despite the reported benefits of dual credit programs, questions remain regarding the long-term influence of dual credit courses on long-term student achievement and time to degree attainment. A lack of consistent policies regarding dual credit results in students taking college courses without knowing what courses they may need for their anticipated major. Dual credit programs are continuing to expand, and if dual credit courses are to contribute to college success, policymakers, educators, high schools, and institutions must understand how the combination of dual credit courses taken impacts student success and academic progress towards degree completion. The purpose of this non-experimental, *ex post facto*, correlation, quantitative study was to explore to what extent a relationship exists between dual credit hours earned and students' grade point average and semesters to degree attainment. This study looked at student data from a regional institution in West Texas to explore if the number of dual credit hours earned correlated with semesters to degree attainment or a student's first semester and final cumulative grade point average. Four research questions were analyzed using SPSS. The data was retrieved from existing archival institutional data maintained by the Texas university. The population for this study included students who began at the institution as first-time freshmen and had earned at least one hour of dual credit before enrolling at the institution. The results of this study indicate that an increased number of dual credit hours has a positive correlation with a student's grade point average at the end of their first semester, a student's cumulative grade point average at degree completion, and shortened time toward degree completion. Considering the continued growth of participation in dual credit in Texas and the expectations of the 60x30TX strategic plan, it is important to determine the role dual credit is playing in postsecondary student success. In order to see if dual credit is working and students are reaping the intended benefits, additional

studies are needed to track how dual credit courses are utilized once the student enrolls at a postsecondary institution.

Keywords: dual credit, concurrent enrollment, degree completion, 60x30TX, student success, credit hours

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Chapter 1: Introduction

Since 2000, dual credit participation in Texas has drastically increased. In 2000, approximately 18,524 students enrolled in dual credit courses, and in 2016, the number rose to 204,286 students, an increase of over 1,100% (Miller et al., 2018). The Texas Higher Education Coordinating Board (THECB) defined dual credit 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" (THECB, 2016, p. 1). In 2017, dual credit enrollment represented 10% of higher education enrollment in Texas (THECB, 2018). Additionally, as of 2017, 79 community colleges and 29 universities provided dual credit courses to ninth-, 10th-, 11th-, and 12th-grade students in 1,650 high schools (Miller et al., 2018). With a steady rise in student enrollment in dual credit courses, it is essential to understand how the combination of dual credit courses impacts student success and academic progress toward degree completion.

In 2006, Texas passed legislation, Texas Education Code §28.009, requiring each local education agency to implement a program enabling students to earn at least 12 hours of college credit while in high school to promote high school success and college readiness. These 12 hours of college credit can be earned in various ways, such as advanced placement courses, articulated postsecondary or technical courses, or dual credit courses. In return, higher education institutions were expected to help school districts develop and implement a program allowing students to earn college credits while in high school. In 2015, Texas launched the 60 by 30 Tex (60x30TX) strategic plan to increase college degree completion and career readiness in Texas. In an effort for Texas to remain competitive in the global economy, this strategic plan outlined a goal to have 60% of Texans earn a certification or degree by 2030 (THECB, 2015).

Due to the state initiative, 60x30TX, student enrollment in dual credit courses has continued to increase rapidly. Additionally, during the 84th Legislature, Texas passed House Bill (HB) 505, declaring that high schools cannot limit the number of dual credit hours in which a student enrolls each semester or for the duration of their high school career, nor can they limit the grade level at which a student is eligible to enroll as long as the student is a high school student (THECB, 2016). According to the Texas Education Agency (TEA; 2020), "High school students in the ninth through twelfth grades who met the Texas Success Initiative (TSI) or dual credit eligibility may enroll in dual credit courses" (p. 8).

HB 505 was a strategy to enable more students the opportunity to enroll in dual credit courses. Texas policymakers believed that students who completed the common core curriculum would learn the basic skills of communication, critical thinking, and teamwork, thus complimenting their success in the workforce or enrollment at a postsecondary institution (THECB, 2016). In 2017, during the 85th Legislature, Senate Bill 1091 was passed restricting dual credit to those courses contained as part of the common core curriculum of the offering public institution, career, and technology education courses, or foreign language courses (THECB, 2018). The recent dual credit policy changes contributed to the influx of student participation, so the impact dual credit courses have on a student once enrolled in college is just starting to surface.

During the 85th Legislature in 2018, HB 1638 was codified in Texas Education Code §28.009, directing the THECB and TEA to collaborate and develop statewide requirements and goals for dual credit programs in Texas (TEA, 2018). As a result, statewide goals were established, and higher education institutions and independent school districts would have to establish a memorandum of understanding outlining the details of the dual credit partnership

(TEA, 2018). One goal outlined by the state was that dual credit students would receive advising with access to student support services (TEA, 2018). Although there are statewide requirements and goals for dual credit programs, Texas does not have a uniform model for the execution of dual credit programs (Miller et al., 2018).

Dual credit enrollment has potential benefits for students. For example, participation in dual credit encourages students to commit to college at an earlier age, providing students an opportunity to jumpstart their college careers while in high school. In some cases, a student may complete their first year of college while still in high school, lowering college attendance costs by reducing the time necessary to earn a degree. The TEA (2020) illustrated that participation in dual credit enables students to receive college credit and high school credit simultaneously, provides an opportunity for students to fast-track their undergraduate courses, and potentially saves students' tuition and fees by reducing time to degree completion. Hofmann and Voloch (2012) reported that many educators and policymakers acknowledged students who participate in dual credit are more likely to attend college, as dual credit promotes college access and increases the possibility of success (Hofmann & Voloch, 2012), supporting 60x30TX. Research has revealed students who participated in dual credit courses in high school were significantly more likely to complete a baccalaureate degree than peers who did not take dual credit courses (Blankenberger et al., 2017). For example, some students earn 60 or more semester credit hours toward a bachelor's degree or complete an associate's degree through dual credit programs (Miller et al., 2018). The study by Miller et al. (2018) presented findings from a phased study about the effect of dual credit programs in Texas. Several benefits were reported in the study, including a key finding that participation in dual credit encouraged students to further their education and earn a postsecondary degree (Miller et al., 2018). Despite the reported benefits of

dual credit programs, questions remain regarding the long-term influence of dual credit courses on long-term student achievement and time to degree attainment.

While there are many anticipated benefits associated with dual credit, there is a lack of evidence regarding how the number of dual credit hours earned may affect time to degree attainment. For example, the State of Texas has limited 4-year institutions to offer core courses only, but the availability of dual credit courses has expanded. Research by Taylor et al. (2015) illustrated many high school students do not attend the college or university where they earned their dual credit; hence, the transferability of courses is a concern. Students enrolled in dual credit courses often do not know what field they want to pursue, so they may take courses not needed for their degree program (Pretlow & Patteson, 2015). Policymakers and higher education institutions need data to understand dual credit courses and their impact on degree attainment to identify challenges and opportunities for growth (Reyna, 2010). Therefore, research on this issue should be conducted to ensure students reap the intended benefits of dual credit, shortening their time to degree completion and saving money on tuition.

Statement of the Problem

Research has been sparse regarding dual credit students' success as they declare a major and transition past their first year in college (Burns et al., 2019; Hanson et al., 2015; Jones, 2014; Karp, 2015). A lack of consistent policies regarding dual credit results in students taking college courses without knowing what courses they may need for their anticipated major (Pretlow & Patteson, 2015). Dual credit programs are continuing to expand, and if dual credit courses are to contribute to college success, policymakers, educators, high schools, and institutions must understand how the combination of dual credit courses taken impacts student success and academic progress toward degree completion.

Student enrollment in dual credit courses has rapidly increased by 1,100% since 2000 (Miller et al., 2018). One explanation for continued growth and increases in dual credit enrollment is the 60 by 30 Tex strategic plan, which outlines a goal to have 60% of Texans earn a certification or degree by 2030 (THECB, 2015). Therefore, it is crucial to ensure that dual credit students enroll in courses they need for their desired degree plan to reap the intended benefits of dual credit.

The THECB (2016) defined dual credit 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" (p. 1). In 2015, Texas passed legislation, Texas Education Code §28.009, requiring each local education agency to implement a program enabling students to earn at least 12 hours of college credit while in high school (THECB, 2016). Based on prior research, it is still unknown whether and to what extent a relationship exists between dual credit hours earned and students' grade point average and semesters to degree attainment.

Purpose Statement

The purpose of this nonexperimental, ex post facto, correlation, quantitative study was to explore to what extent a relationship exists between dual credit hours earned and students' grade point average and semesters to degree attainment. This study looked at student data from a regional institution in west Texas to explore if the number of dual credit hours earned correlates with semesters to degree attainment or a student's cumulative grade point average. I examined the correlation between semesters to degree attainment and the grade point average of students who earned dual credit before enrolling as first-time freshmen at the institution of study. The study will contribute to the literature regarding dual credit programs and explore the impact of dual credit courses on degree attainment and grade point average for students enrolled at the

institution. I explored if the number of dual credit hours earned before enrolling as a full-time freshman positively correlates with the student's grade point average or semesters to degree completion.

Research Questions

A few research questions emerged in examining dual credit hours and their impact on grade point average and semesters to degree completion. The underlying question I hoped to learn was if there was a positive, statistically significant correlation between the number of dual credit hours earned in a student's grade point average and semesters to degree completion. The specific research questions were as follows:

Research Question 1: To what extent is there a relationship between the number of dual credit hours earned and grade point average at the end of a student's first semester?

Research Question 2: To what extent is there a relationship between the number of dual credit hours earned and semesters to degree completion?

Research Question 3: To what extent is there a relationship between the number of dual credit hours earned and grade point average at degree completion?

Research Question 4: To what extent do the number of dual credit hours earned and grade point average after the first semester predict the number of semesters to degree completion?

Definition of Key Terms

Advanced placement. Advanced placement (AP) is a course taught with a standard high school curriculum and does not have to meet the standards of a postsecondary institution (Speroni, 2011). Students who take AP courses will earn high school credit and have the option to take the AP exam, which may result in a score that will earn them college credit.

Bachelor degree requirements. A minimum of 120 semester credit hours inclusive of core curriculum requirements.

Concurrent enrollment. When a student enrolls in two schools at the same time, a high school and a college, earning credits for high school graduation and college credit (TEA, 2020). Dual credit, dual enrollment, and concurrent enrollment are often used interchangeably. For this study, the term dual credit will be used.

Core curriculum. Complies with Texas legislation requiring state institutions to establish "core curriculum" as part of degree requirements providing students the opportunity and expectation of specific educational material. Senate Bill 1091 was passed restricting dual credit to those contained as part of the common core curriculum of the offering public institution, career, and technology education courses, or foreign language courses (THECB, 2018). Texas core typically consists of 42–48 semester credit hours. The THECB (2018) reflected, "State law mandates the transfer of core curriculum between all public institutions of higher education" (p. 24).

Cumulative grade point average. It is determined by adding all the numbered grades received and dividing them by the number of credit hours attempted; it includes grades of dual credit courses and courses taken at the institution post-high school graduation. According to Brown et al. (2013), a grade point average indicates the success or failure of academic classes.

Degree-seeking student. A student who has a degree plan on file with the institution.

Dual credit. Duel credit is "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" (THECB, 2016, p. 1). Dual credit can also be explained as when a high school student enrolls in a college course that is paired with a high school course required for high

school graduation; upon completion of the course, the student receives credit for the course on both the high school and college transcript (TEA, 2020). Dual credit, dual enrollment, and concurrent enrollment are often used interchangeably. For this study, the term dual credit will be used.

Dual credit student. A student who earned at least one hour of dual credit while in high school.

Dual enrollment. Dual enrollment is when a high school student takes a high school course and a college course of a similar subject to earn credit at both the high school and the college; high school credit is awarded for completion of the high school portion, college credit is awarded if the student passes the college portion (TEA, 2020). Dual credit, dual enrollment, and concurrent enrollment are often used interchangeably. For this study, the term dual credit will be used.

First-time-entering student. Students who have not attended college or earned college credit post-high school graduation before enrolling at an institution; this excludes college credit earned via AP or dual credit (THECB, 2018).

Graduation rate. Federal Student Aid (2018) defined graduation rate as the "percentage of a school's first-time, first-year undergraduate students who complete their academic program within 150% of the published time for the program" (para. 1).

Long semester. Fall or spring semester; does not include summer, winter, or minimesters.

Persistence. Persistence reflects continuous enrollment and is measured from fall-to-spring and spring-to-fall registration (DeBerard et al., 2004). This analysis of the data considered the persistence of continuing to enroll in college courses until degree completion.

Postsecondary institution. An educational entity that provides college-level courses to students who have completed high school.

Retention. Continued student enrollment from one long semester to the next long semester.

Retention rate. Federal Student Aid (2018) defined retention rate as the "percentage of a school's first-time, first-year undergraduate students who continue at that school the next year" (para. 2).

Texas Success Initiative. TSI is designed to help institutions determine if the student is ready for college-level coursework in the areas of math, reading, or writing (College for All Texans, 2021).

Transfer rate. Federal Student Aid (2018) defined transfer rate as the "percentage of a school's first-time, first-year undergraduate students who transfer to another college within 150% of the published time for the program" (para. 3).

Chapter Summary

This study is organized into five chapters. Chapter 1 included a brief introduction, a statement of the problem, the purpose statement, the underlying research question, and the definition of terms. Chapter 2 outlines the conceptual framework and a literature review related to student enrollment and participation in dual credit programs. Chapter 3 will outline the methodology used in this study to assess if and how dual credit courses influence retention and time to degree attainment for students. Chapter 4 presents data analysis, and Chapter 5 discusses the results, conclusions, and recommendations for further studies.

Chapter 2: Literature Review

This study contributed to the literature regarding dual credit programs and explored the impact of dual credit courses on degree attainment. This literature review showcases the historical development of dual credit, the impact of the 60x30TX initiative, and the outcomes of student participation in dual credit in the United States. Learning more about the expansion and vast growth of dual credit programs is important to understanding to what extent this program contributes to student success. With the continued growth of dual credit and related programs, it is important to conduct these studies to understand better how these accelerated programs may contribute to student success and college degree attainment. This chapter outlines the conceptual framework and a literature review related to dual credit programs. The chapter includes the following topics: (a) conceptual framework relative to dual credit programs; (b) the history of dual credit, including growth and expansion; (c) dual credit partnerships; (d) benefits and challenges of dual credit; (e) high school counselors and academic advising for dual credit students; and (f) student success and retention.

This quantitative study explored if dual credit courses influence retention and the time it takes to degree attainment for students at a midsize public university in west Texas based on the number of dual credit hours earned prior to enrollment at a higher education institution. The study examined existing data to see if there is a statistically significant correlation between the number of semester credit hours earned and grade point average at the end of the first semester at the institution of study, depending on the number of dual credit hours earned before enrollment at the institution. The study also examined the retention of this cohort of students from their first year to their second year at the Texas institution, time to degree completion, and grade point average at the time of degree attainment.

Research has revealed students who participated in dual credit courses in high school were significantly more likely to attend college and complete a baccalaureate degree than peers who did not take dual credit courses, as dual credit promotes college access and increases the possibility of success (Blankenberger et al., 2017; Hofmann & Voloch, 2012). The study by Miller et al. (2018) demonstrated that schools that serve first-generation or low-income students demonstrate a college-going culture by offering programs such as dual credit. Additionally, Radunzel et al. (2014) concluded that:

> Students entering college with a greater number of dual-credit hours are more likely to progress toward a degree and complete a bachelor's degree in a timely manner, and they do so without accumulating a substantially great number of credit hours by graduation. (p. 1)

Additionally, dual credit courses are thought to potentially decrease the overall cost of tuition for students and accelerate their time to degree attainment.

Student enrollment in dual credit courses has rapidly increased by 1,100% since 2000 (Miller et al., 2018); however, retention in a university and 4-year graduation rates are not growing. Few studies have investigated the success of dual credit students as they declare a major, transition past their first year in college, and eventually graduate (Burns et al., 2019; Hanson et al., 2015; Jones, 2014; Karp, 2015). Burns et al. (2019) found that early college programs seem to have a positive and statistically significant impact on reducing a student's time and increasing the probability of degree attainment. Hanson et al. (2015) studied the perceptions of dual credit from high school counselors, teachers, and principals who disclosed they strongly agreed or agreed that dual enrollment programs have a positive impact on their students, but the study does not consider the perception of long-term effects. Jones (2014) investigated if dual

credit participation contributes to course completion and a higher grade point average (GPA) in college but acknowledged there is no research revealing if dual enrollment participation continues to impact students past their first year in college positively. Karp (2015) discusses the structural reforms and the role dual enrollment courses can play on college completion and concludes that there is no structure in place for how high schools and colleges relate to one another in the way they deliver dual credit courses and engage with students.

Additionally, Radunzel et al. (2014) expressed that there is no empirical evidence regarding the long-term success of students who participated in a dual credit program. There is a lack of evidence regarding the impact dual credit courses have on students as they transition to college or how the number of credit hours earned may affect their cumulative grade point average and time to degree attainment.

Conceptual Framework

The conceptual framework for this study was the expectancy theory. Expectancy theory is a motivation theory first introduced by Victor Vroom at the Yale School of Management. Vroom (1964) suggested that a person's behavior is motivated by anticipated results or consequences. He stated:

> Whenever an individual chooses between alternatives which [sic] involve uncertain outcomes, it seems clear that his behavior is affected not only by his preferences among these outcomes but also by the degree to which he believes those outcomes to be probable. (Vroom, 1964, p. 17)

The concept of expectancy theory is that a specific outcome will be attained by performing a specific behavior (Vroom, 1964).

Expectancy theory is defined as "an individual's belief that a certain effort will lead to a given performance (expectancy) and that performance will lead to attainment (instrumentality) of a desirable or undeniable (valence) reward" (Lloyd & Mertens, 2018, p. 30). For decades, dual credit programs have helped bridge the gap between high school and college (Giani et al., 2014). Dual credit programs are thought to provide high school students an educational benefit by enabling them to earn college credit while still in high school and providing college access for these students. They can easily connect with faculty and staff at the institution. Therefore, it can be assumed that high school students choose to participate in dual credit to jumpstart their college careers while in high school; the dual credit students expect that their performance in dual credit will lead to a reward of having earned college credit, contributing to shortened time to degree completion.

Aside from student expectations, there are also expectations for high schools and postsecondary institutions. In 2006, Texas passed legislation, Texas Education Code §28.009, requiring each local education agency to implement a program enabling students to earn at least 12 hours of college credit while in high school to promote high school success and college readiness. These 12 hours of college credit can be earned in various ways, such as advanced placement courses, articulated postsecondary or technical courses, or dual credit courses. In return, higher education institutions were expected to help school districts develop and implement a program allowing students to earn college credits while in high school. While there may be an expectation for high schools and postsecondary institutions to partner to provide dual credit opportunities, these entities also expect student performance will lead to a desirable reward, such as increased retention and graduation rates, thus increased funding for both.

Vroom was among the first to create an expectancy theory in which "people believe that there is a direct correlation between the effort they put into perform their best at work, and the reward they receive from their hard work" (Agah et al., 2020, p. 81). A great amount of research discusses the benefits and expected outcomes for students who participate in dual credit; therefore, Vroom's (1964) expectancy theory fits this study because high school students expect to reap the intended benefits of participating in dual credit. Bandura stated that it is "human nature to engage in activities in order to reach desired outcomes" (Bandura, 1986, as cited in Agah et al., 2020).

Expectancy theory is an action–outcome association and works on a person's perception that action will lead to an outcome (Vroom, 1964). Expectancy theory regarding dual credit participation suggests that a high school student who participates in dual credit perceives that they will reap the intended benefits of dual credit; the students expect their high school performance in college-level work to positively affect their college degree attainment. In fact, a phased study by Miller et al. (2018) demonstrated that dual credit participation positively affected students' persistence to degree attainment.

Expectancy theory regarding dual credit participation from the high school and postsecondary perspective aligns with that of the students. The TEA (2020) illustrated that participation in dual credit enables students to receive college credit and high school credit simultaneously, provides an opportunity for students to fast-track their undergraduate courses, and potentially saves students' tuition and fees by reducing time to degree completion. For example, the institution of study has its own dual credit program and partners with multiple high schools to provide dual credit to students. On the institution's dual credit webpage, it is mentioned that participating in dual credit will save the student money and help them complete

their degree faster. High schools expect that students who participate in dual credit are on track for high school graduation, increasing accountability ratings for the high school. From the postsecondary perspective, institutions expect that dual credit students will start their college career having earned college credit, so the student is more academically prepared and this should positively affect retention and graduation rates.

Vroom (1964) discussed three variables associated with expectancy theory: expectancy, instrumentality, and valence. Expectancy is the "anticipation that a certain effort on their part will lead to a specific performance" (Lloyd & Mertens, 2018, p. 29). For example, dual credit students anticipate that participation in dual credit will lead to earning college credit and jumpstarting their college careers.

"Instrumentality is the perception that a given outcome of performance on their part will lead to them receiving an anticipated reward" (Lloyd & Mertens, 2018, p. 29). There is a great deal of research advocating for the benefits of dual credit courses, such as increased high school achievement, college enrollment, and degree attainment (Ganzert, 2014; Grubb et al., 2017; Speroni, 2011). As such, high school students who participate in dual credit courses are putting in effort with the expectation that dual credit courses will contribute to high school achievement and college degree attainment. As described by Kronholz (2011), "Dual enrollment promises to speed youngsters through college" (p. 28). Therefore, high school students are participating in dual credit courses with a desire and expectation that it will contribute to shortened time to degree attainment; the students believe if they perform well, the desired outcome will occur.

High schools in Texas are evaluated for student achievement through the Division of College, Career, and Military Preparation, which strives to "ensure that all Texas high school students have access to high-quality pathways to career to college" (TEA, 2022). High schools

are able to earn points based on students' preparedness for college, career, or the military. One way the high school can earn points is when their students earn dual credit. In terms of instrumentality, high schools strive to provide dual credit opportunities to their students to increase their student achievement ratings. Additionally, dual credit students are believed to be more academically prepared because they meet the qualifications to participate in dual credit coursework and have earned college-level credit before graduating high school. According to Barnett and Stamm (2010), dual credit was linked to increased retention and persistence in college, so postsecondary institutions are also expecting a desired outcome based on the performance of dual credit students once enrolled at their institution.

The last variable associated with expectancy theory is valence, which is an individual's preference for a given outcome (Vroom, 1964). Valence can also be compared to the "reward" as a result of good performance (Agah et al., 2020, p 83). Vroom (1964) further explained the difference between valence and value; valence is the perception of an anticipated outcome or satisfaction, while value is the satisfaction received (Lloyd & Mertens, 2018). For example, a high school student who wants to earn a college degree will likely prefer to take dual credit courses as they anticipate the courses will contribute to shortening their time to degree attainment. In some cases, a student may complete their first year of college while still in high school, lowering college attendance costs by reducing the time necessary to earn a degree.

Just like students, high schools and postsecondary institutions seek an award (valence) for their performance in dual credit. As mentioned, high schools are evaluated on student achievement based on their students' college preparedness and graduation rates. The more students who earn dual credit and graduate from high school, the more points the high school can earn, and thus more funding by meeting College, Career, and Military Readiness standards. From

the higher institution perspective, they, too, are reaping an award because academically prepared students contribute to higher retention and graduation rates, thus also impacting funding for the institution.

In conclusion, "expectancy theory is based on the postulation that individuals have choices and they make decisions based on which choice they perceive will lead to the best personal outcome" (Lloyd & Mertens, 2018, p. 29). To summarize expectancy theory regarding student participation in dual credit, high school students perceive that participation in dual credit will lead to high school achievement, an increased GPA, and college degree attainment; therefore, they actively participate in dual credit programs to earn college credit while still in high school. And from the high school and institution standpoint, they, too, assume that students who participate in dual credit will graduate high school and enroll in a postsecondary institution, contributing to retention and graduation rates and benefiting the student, high school, and institution. Therefore, high schools and postsecondary institutions continue to work together to enhance and grow dual credit opportunities for high school students. The study explored if and to what extent a relationship exists between dual credit hours earned and students' GPA and semesters to degree attainment. In this study, I aimed to determine if students are reaping dual credit's intended and expected benefits.

History of Dual Credit

The THECB (2016) defined dual credit 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" (p. 1). Dual credit programs, also referred to as dual enrollment or concurrent enrollment, emerged during the 1970s (Giani et al., 2014). These programs were initially developed so gifted and high-achieving students planning to attend college could take a

college course to build their confidence, experience the expectations of a college freshman, and prepare for the transition to college (Rogers & Kimpston, 1992). Dual credit programs expanded throughout the 1980s, offering college courses not previously available during high school and providing exposure to college-level coursework while earning credit toward a high school diploma and college credit (Allen & Dadgar, 2012; Venezia & Jaeger, 2013). Students in Texas have had the opportunity to take college courses during high school since the early 1990s, but the state did not start tracking enrollment until the fall of 1999 (Giani et al., 2014).

For decades, dual credit programs have helped bridge the gap between high school and college (Giani et al., 2014) and are thought to provide high school students an academic benefit by enabling them to earn college credit while still in high school and provide college access for these students. Moreover, students can easily connect with faculty and staff at the institution. Although dual credit has been around for decades, it only recently became a widespread academic opportunity for all high school students.

There are three types of dual credit courses a student can take: core academic courses, career and technical education courses, and foreign language courses. Core academic courses are "general education courses required for any student who plans to pursue a traditional associate or baccalaureate degree in Texas" (TEA, 2020, p. 5). Career and technical courses are typically taught at 2-year colleges and intended to prepare students for a specific occupation. Foreign language courses earned at public institutions are transferable to other public colleges and universities and may be applicable to an associate or baccalaureate degree (TEA, 2020).

Originally, dual credit courses were taught by faculty employed at postsecondary institutions. Eventually, dual credit courses were also taught by qualified instructors at the high school, and some dual credit courses were even offered online. Today, dual credit courses are

taught by credentialed high school teachers and college faculty, both in face-to-face and online instruction environments (Miller et al., 2018). Program structure and requirements for participation in dual credit programs vary and are often reflected in institutional agreements between secondary and postsecondary institutions (Bailey et al., 2002). Dual credit began as an opportunity for academically advanced students but is now accessible to a larger population and serves as a tool to promote postsecondary education. Today dual credit offers students the opportunity to earn a degree while incurring less debt due to the college courses they are able to take while still in high school (THECB, 2016).

Growth and Expansion of Dual Credit

Since 2000, dual credit participation in Texas has drastically increased. In 2000, approximately 18,524 students enrolled in dual credit courses, and in 2016, the number rose to 204,286 students (Miller et al., 2018). Through dual credit programs, some students earn an associate's degree or 60 or more semester credit hours toward a bachelor's degree (Miller et al., 2018). As of 2017, 79 community colleges and 29 universities provide dual credit courses to ninth-, 10th-, 11th-, and 12th-grade students in 1,650 high schools (Miller et al., 2018).

A contributing factor to the most recent expansion of the dual credit program is the 60 by 30 Tex strategic plan to increase education among Texas residents. In 2006, Texas passed legislation, Texas Education Code §28.009, requiring each local education agency to implement a program enabling students to earn at least 12 hours of college credit while in high school to promote high school success and college readiness, thus supporting the 60x30TX plan. Then, during the 84th Legislature, Texas passed HB 505, declaring that high schools cannot limit the number of dual credit hours in which a student enrolls each semester or for the duration of their high school career (THECB, 2016).

The Texas 60x30TX Initiative. The 60x30TX initiative was launched as a roadmap to help Texas become one of the highest-achieving states in the country. 60x30TX serves as a roadmap to help Texas achieve the goal of at least 60% of Texans aged 25–34 having earned a certificate or degree. The first major goal of the 60x30TX initiative is an educated population to "increase the percentage of postsecondary credentials or degrees to 60% by 2030, for age group 25- to 34-year old workforce" (THECB, 2015, p. V). The second goal of 60x30TX is degree completion by 2030, with at least 550,000 students completing a certificate, associate degree, bachelor's degree, or master's degree from an institution in the state of Texas (THECB, 2015).

The third goal of the 60x30TX initiative is that students who graduate from public institutions in Texas will have completed programs with identifiable marketable skills, thus making the student more marketable in the job market (THECB, 2015). The fourth and final goal of the 60x30TX is to help students graduate with manageable debt. The "undergraduate student loan department will not exceed 60% of first-year wages for graduates of Texas public institutions" (THECB, 2015, p. VI).

The goals of the 60x30TX contribute to educating Texas, helping students manage college debt, and building a stronger workforce. Due to the 60x30TX, institutions of higher education and independent school district have partnered to grow dual credit programs.

Dual Credit Partnerships

Dual credit programs are collaborative efforts between high schools and institutions of higher education. Dual credit is different from AP. AP courses are taught with a standard high school curriculum and do not have to meet the standards of a postsecondary institution (Speroni, 2011). Students who take AP courses will earn high school credit and have the option to take the AP exam, which may result in a score that will earn them college credit. Each postsecondary

institution may have different acceptable AP scores in order for college credit to be redeemed.

On the other hand, dual credit involves students taking an actual college course either with their

credentialed high school teacher or on a college campus, earning high school credit and college

credit simultaneously.

Postsecondary institutions have long accepted high-achieving high schoolers into dual

credit programs (Kronholz, 2011). Whereas dual credit programs were initially developed for

high-achieving students, dual credit programs are now used "as a way to bridge the gap between

high school and postsecondary for all students" (Giani et al., 2014, p. 214). According to

Kronholz (2011), almost every state has a dual credit program, and 12 states require

postsecondary institutions to work with school districts to create a dual credit partnership.

Integration between secondary and postsecondary institutions has been established for decades,

but the partnership has evolved over the last decade. According to the Education Commission of

the States, Giani et al. (2014) reported that every state within the United States has students

participating in a dual credit program, and 46 of those states have statewide governing manuals.

Dual credit initiates communication between high schools and colleges to create a smooth

pathway for students to transition to a postsecondary institution (Karp, 2015).

Dual credit can happen in three locations: on the student's high school campus, on a

college campus, or online. Dual credit courses offered at secondary schools are taught by a

credentialed high school teacher, which results in secondary schools looking to employ qualified

teachers, enhancing the school's prestige (Zinth, 2014). The institution's partnership with the

high school also allows students to have direct and easy access to admission information, campus

tours, and assistance in completing an admission application or financial aid forms (King, 2012).

Additionally, Kronholz (2011) noted that dual credit programs allow postsecondary institutions

to recruit and retain the brightest students in the area. The majority of dual credit courses are taken on the high school campus and taught by a familiar teacher who is credentialed and among the students' peers. Taking dual credit courses on a college campus mixes high school and college students, providing a new experience for high school students. Online dual credit courses are a great way to provide rural-area high school students with the opportunity to earn dual credit.

Cost of Dual Credit Courses

Tuition and fees for dual credit courses are typically the responsibility of the high school student. Some high schools may pay for part or all of the tuition and fees with the stipulation that the student will earn a minimum grade in the dual credit course. Other districts may pay for dual credit courses for students who qualify for free or reduced lunch. Additionally, some institutions will provide a reduced rate for the dual credit course or provide scholarships. While the student can earn college credit for free or at a reduced rate, there are still expenses for books and supplies. The TEA (2020) suggested, "A detailed description of costs and who will be responsible for them should be included in the written agreement (MOU) between the school district and the institution for higher education" (IHE; p. 17). Other costs associated with dual credit courses are textbooks. These costs are often the students' responsibility, and Texas does not require the school district or institution to provide textbooks used in dual credit courses (TEA, 2018).

Financial Aid. While federal financial aid is not available for dual credit courses, these courses can affect a student's aid eligibility in the future. For example, the Texas Education Agency (2020) advised that "a student's grades and/or withdrawals could impact their future eligibility for financial aid" (p. 20). In order for a student to receive financial aid in college, the

student must meet Satisfactory Academic Progress standards, which means they must maintain a 2.0 or higher GPA for classes, successfully complete 67% of attempted credits, and demonstrate progress toward finishing a program within a maximum time frame (TEA, 2020). There are standards for measuring the progress toward a degree program, which is measured "by dividing earned credits by attempted credits" (TEA, 2020, p. 20). Therefore, if a student earns a low grade in a dual credit course or drops the course, this could affect their aid eligibility once enrolled at an IHE.

Institutional Agreements

In 2018, during the 85th Legislature Regular Session, HB 1638 was codified in Texas Education Code §28.009, directing the THECB and TEA to collaborate and develop statewide requirements and goals for dual credit programs in Texas (TEA, 2018). As a result, the IHE and independent school district (ISD) must establish a memorandum of understanding (MOU). HB 1638 requires that on or after September 1, 2018, "any new, revised, or renewed dual credit MOU or articulation agreement must include the following:"

- A description of how the goals of the dual credit program align with statewide goals.

- An equivalency crosswalk identifying the number of credit hours that may be earned for each dual credit course.

- A description of academic support and guidance that will be provided to students participating in the dual credit program.

- Description of roles and responsibilities for the ISD and IHE.

- Details regarding funding regarding tuition, transportation, and textbooks for those participating in the dual credit program (TEA, 2018).

As of September 1, 2018, the MOUs must be posted on the web pages of both the IHE and ISDs. This applies to all MOUs, old, new, and revised agreements (TEA, 2018).

As part of HB 1638, statewide goals for dual credit programs include:

- ISDs and IHE will collaborate to inform students and parents of the benefits and costs of dual credit courses.

- Dual credit programs will assist with the transition to an IHE.

- Dual credit students will receive advising with access to student support services.

- The dual credit courses will be sufficient in quality and rigor to ensure that the dual credit student will succeed in subsequent courses (TEA, 2018).

Although there are statewide requirements and goals for dual credit programs, Texas does not have a uniform model for admission to a dual credit program or the execution of dual credit programs (Miller et al., 2018; Miller et al., 2017).

Admission criteria for enrollment into a dual credit program vary from institution to institution, and high schools may also have additional criteria. As of 2021, the only statewide requirement for students to participate in dual credit coursework is that they be TSI complete in math or English and writing if they wish to enroll in college-level math or English courses. The state indicates that a student must be TSI complete in math to enroll in dual credit math courses and TSI complete in English to enroll in English courses; however, institutions may have additional requirements. There are a few different ways a student may become TSI complete to enroll in college-level math or English courses (College for All Texans, 2021). For example, student performance on their State of Texas Assessments of Academic Readiness (STARR), Scholastic Aptitude Test (SAT), or American College Testing (ACT) may make them TSI

exempt, meaning they have met the TSI standards and are, therefore, TSI complete. Other ways a student may become TSI complete include the following:

- The student is a veteran or on active duty.

- The student has transferred work from another institution showing having completed college-level coursework in English or math.

- Enroll in a certificate program of 1 year or less at a public institution (College for All Texans, 2021).

If a student is not TSI complete and does not meet exemptions, they will need to take a TSI test to determine eligibility to enroll in dual credit courses.

Benefits and Challenges of Dual Credit

A great deal of research has generated evidence that dual credit courses have benefits, such as increased high school achievement, college enrollment, and degree attainment (Ganzert, 2014; Grubb et al., 2017; Speroni, 2011). Some studies described the challenges and limitations associated with dual credit programs (Jones, 2014; Kanny, 2015; Pretlow & Patteson, 2015; Taylor et al., 2015).

Benefits

Dual credit programs offer academic enrichment for students who have accelerated in high school courses, a glimpse of college rigor, and a head start for those who enroll in trade programs (Kronholz, 2011). Dual credit is expected to be a cost-efficient and time-saving option for individuals to earn a postsecondary education. As described by Kronholz (2011), "Dual enrollment promises to speed youngsters through college and into the workforce, cutting college costs for parents and taxpayers alike" (p. 28). Giani et al. (2014) asserted that the rapid

expansion and increased enrollment in dual credit are related to an increased interest in postsecondary participation and completion rates.

Research over the last decade has identified many benefits of participation in a dual credit program (Ganzert, 2014; Grubb et al., 2017; Miller et al., 2018; Radunzel et al., 2014; Speroni, 2011; TEA, 2020). For example, Ganzert (2014) discussed how dual enrollment affects academic success based on gender and race and concluded that dual enrollment courses positively influenced students regardless of their gender or race. Ganzert (2014) conducted a casual-comparative study to determine the dual enrollment and vocation studies Huskins Bill course on community college students in North Carolina and has applications to be replicated to study students' matriculation rates and GPA at other institutions, but did not consider those who attended a 4-year college. Grubb et al. (2017) asserted, "Dual credit offers a rigorous academic experience to high school students" (p. 81) and explored if dual credit students enroll in remedial courses at a community college and if they graduate. The research supports that dual credit has a positive effect on students who avoided remediation and graduated at a higher rate. Miller et al. (2018) reviewed the implementation of dual credit programs, and the findings revealed that overall dual credit is worth the investment. The bulk of dual credit education benefits come from the increased postsecondary educational attainment of dual credit students, which leads to increased lifetime earnings for individuals and social benefits for the state, such as decreased governmental spending on social programs and increased tax revenues.

In summary, a few benefits of participation in dual credit include:

- Students receive high school credit and college credit simultaneously (TEA, 2020).

- Increased high school graduation rates and enhanced college aspirations for minority students, those from low-socioeconomic homes, and first-generation students (Miller et al., 2018; Speroni, 2011).

- Students can fast-track their undergraduate degrees (TEA, 2020).

- Contributes to academic success in college (Ganzert, 2014).

- Dual credit students will likely earn a B or higher in subsequent college courses (Radunzel et al., 2014).

- Reduces time for college degree completion, thus eliminating time and money at the postsecondary institution (Grubb et al., 2017).

- Students will have access to college support services while in high school, which can aid in a smooth transition to college after high school graduation (TEA, 2020).

There is a great amount of research advocating dual credit courses to increase high school achievement, college enrollment, and degree attainment (Ganzert, 2014; Grubb et al., 2017; Speroni, 2011). Hofmann and Voloch (2012) acknowledged many educators and policymakers claim that dual credit promotes college access and increases the possibility of success. Participation in dual credit encourages students to commit to a college earlier in high school, providing students the opportunity to jumpstart their college careers while earning their high school diplomas. In some cases, a student may complete their first year of college while still in high school, lowering college attendance costs by reducing the time necessary to earn a degree. Hofmann and Voloch (2012) reported that many educators and policymakers insist that students who participate in dual credit are more likely to attend college, as dual credit promotes college access and increases the possibility of success (Hofmann & Voloch, 2012), supporting 60x30TX.

Taking dual credit courses can also reduce the cost of a college degree. The dual credit courses are often offered at significantly reduced prices, providing savings for students and parents.

Besides earning college credit, another benefit of participating in dual credit is the student's connection to college faculty and staff, contributing to the student's integration with a postsecondary institution. Researchers suggested that this limited "access" to college agents increases a student's likelihood of pursuing a baccalaureate degree (Blankenberger et al., 2017; Jones, 2014). Dual credit is also thought to provide benefits for institutions of higher education. According to Fink et al. (2017), students who participate in dual credit are continuing their education at a postsecondary institution at the national rate of 84%. Because dual credit is believed to contribute to a student's retention at the university, dual credit students increase the institutions' retention and persistence rates. Unfortunately, few studies investigate the association between dual credit and college persistence; this study will contribute to the literature on that topic.

However, there is a lack of evidence regarding the impact dual credit courses have on students as they transition to college or how the number of credit hours earned may affect their desired degree plan and time to degree attainment. In fact, Jones (2014) stated, "Limited research has been conducted to analyze the academic benefits of dual enrollment participation and course completion once students enter college full time" (p. 24). Additionally, Radunzel et al. (2014) pointed out that "empirical evidence showing that students benefit from participating in dual-credit programs in terms of long-term college success has been limited" (p. 2). Johnson et al. (2021) conducted a qualitative study to gain insight into outcomes associated with participation in a dual enrollment program. The study's purpose by Johnson et al. (2021) was to gain a robust perspective of participation and reference the previous findings from Jones (2014). Johnson et

al.'s (2021) study led to the discovery of many short-term benefits but concluded that future

studies should continue to "unpack the short and long-term impact of dual enrollment

participation on students' behaviors, attitudes, motivations, and outcomes" (p. 19).

There has been a rapid and continued increase in participation in dual credit programs.

Still, institutions have not seen a rapid or continued growth in student retention or shortened time

to degree attainment. Reyna (2010) argued that policymakers and higher education institutions

need data to understand dual credit's impact on degree attainment to identify challenges and

growth opportunities. A study by Taylor (2022) examined the experiences and perspectives of

administrators, faculty, and staff responsible for student success efforts and revealed that

Reyna's (2010) findings were still true regarding the focus on institutional goals and priorities

over educational goals. Taylor (2022) asserted that policymakers might argue that student

success is focused on improving the lives of college-age students, but there is an underlying pull

on state priorities.

Challenges

Despite the benefits of dual credit courses, adverse outcomes have also been reported. As

Jones (2014) expressed, with the rapid growth of dual credit programs, there has yet to be

sufficient research conducted to confirm the benefits of dual credit as described in the literature.

A few studies that reflect the challenges of dual credit are shared in this chapter (Jones, 2014;

Kanny, 2015; Pretlow & Patteson, 2015; Taylor et al., 2015).

A qualitative study by Kanny (2015) examined dual credit's perceived benefits and

disadvantages from a student perspective. In this study, students indicated appreciation for the

exposure to the college coursework but were disappointed by the setbacks on their high school

and college transcripts. Often, students were told how "good" the college coursework would look

on their high school transcript but were not warned about how poor performance in the dual credit class would also affect their college GPA (Kanny, 2015). Students in Kanny's study (2015) expressed feeling convinced there were only positive effects of dual credit, as school administrators had elaborated how students would save money by participating in dual credit, would be able to get into better colleges and be able to start college as a sophomore instead of a freshman. Unfortunately, one student expressed that over half of the courses she took through dual credit did not count toward her degree program and would not help her graduate early (Kanny, 2015). Therefore, research needs to be done to investigate this issue to ensure students can reap the intended benefits of dual credit by shortening their time to degree attainment and saving money.

Cowan and Goldhaber (2015) conducted a longitudinal study and examined a dual credit program in Washington to determine if dual credit courses actually gave students a "running start" on postsecondary enrollment and graduation. The study by Cowan and Goldhaber (2015) included over 8,500 students who had participated in dual enrollment and found no evidence that dual credit increases the likelihood that a student will enroll full-time at a postsecondary institution. The study revealed that dual credit students are more likely to enroll in college after high school graduation but less likely to attend a 4-year institution (Cowan & Goldhaber, 2015).

Because the availability of dual credit courses has expanded, high school students can take even more dual credit courses and sometimes do so to receive a boost in GPA on their high school transcript. Taking courses not needed for a degree plan could negatively affect high school graduates enrolling in college as first-time students and declaring a major. Studies by Pretlow and Patteson (2015) and Taylor et al. (2015) discovered high school students often did not know what they wanted to study or where they wanted to attend college after high school

graduation and often did not attend the college or university where they earned their dual credit. Therefore, students were not thinking about what courses might be needed for a potential degree plan, so the application of dual credit courses was a concern. Additionally, Speroni (2011) argued some high school students were not developmentally or academically ready to take college courses and, therefore, did not perform well in dual credit courses.

Aside from the potential setbacks of dual credit on a high school and college transcript, the programs create competition among students. For example, students must pay for dual credit courses, limiting access for low-income students (Jones, 2014). While admission requirements are in place to ensure the student is academically prepared for college-level coursework, this results in academically underprepared students not being able to enroll in dual credit courses, setting them even further behind in high school because they cannot earn the grade point boost on their transcript like dual credit students (Jones, 2014).

Another challenge related to dual credit courses is faculty qualifications and the quality of courses. Some high schools may have "qualified" teachers to teach dual credit courses, meaning they have earned a master's degree with at least 18 credit hours in the subject they plan to teach. The high school instructors must meet the same qualifications as the instructors on the campus of the partner institution and must be deemed qualified by the partner institution to teach a dual credit course. The rigor of the curriculum is also crucial, as dual credit courses are associated with an IHE that strives to maintain its reputation. Colleges are "required by law to ensure dual credit courses and the corresponding course offered at the main campus of the college are equivalent" (TEA, 2020, p. 6). There are also challenges when the dual credit course is offered at a partner institution. For example, the time of day of the course may affect some

students' availability to participate in the course, especially if they do not have transportation or have conflicts with extracurricular activities.

The application of dual credit courses to a student's degree plan can also be a challenge. While the State of Texas has limited 4-year institutions to only offer core courses or foreign language courses as dual credit courses with partner high schools, the availability of dual credit courses has expanded, leading to questions regarding the transferability of dual credit courses. The TEA (2020) reported that core academic courses and foreign language courses earned at a public institution are transferable to other Texas public colleges and universities, but they may not apply to the student's degree plan. Research by Taylor et al. (2015) illustrated many high school students do not attend the college or university where they earned their dual credit; hence, the transferability of courses is a concern. While core courses are a part of every degree plan, the student may take additional courses not needed for their degree plan. Students enrolled in dual credit courses often do not know what field they want to pursue, so they may take courses not needed for their degree program (Pretlow & Patteson, 2015).

There is a significant amount of research advocating that participation in dual credit programs increases high school achievement, college enrollment, and degree attainment (Ganzert, 2014; Grubb et al., 2017; Speroni, 2011); however, there is a lack of evidence regarding the impact dual credit courses have on a student as they transition to college or how the number of credit hours earned may affect their desired degree plan and time to degree attainment (Jones, 2014).

High School Counselors and Academic Advising

During the 84th Legislature, Texas passed HB 505 declaring that high schools cannot limit the number of dual credit hours in which a student enrolls each semester or for the duration

of their high school career, nor can they limit the grade level at which a student is eligible to

enroll as long as they are a high school student (THECB, 2016). HB 505 was a strategy to enable

more students the opportunity to enroll in dual credit courses.

In 2017, during the 85th Legislature, Senate Bill 1091 was passed restricting dual credit

to those contained as part of the common core curriculum of the offering public institution,

career, and technology education courses, or foreign language courses (THECB, 2018). Texas

policymakers claimed that students who completed the common core curriculum would learn

basic communication skills, critical thinking, and teamwork, thus complimenting their success in

the workforce or enrollment at a postsecondary institution (THECB, 2016).

Although the state of Texas has limited dual credit courses to core courses or foreign

language courses, students are earning college credit for courses that may not be needed for their

intended degree plan. While many schools have some type of dual credit advising in place,

advising practices vary, and high school counselors lack support from partner institutions (Miller

et al., 2017). Hanson et al. (2015) acknowledged that high school counselors might not be the

main point of contact for students when they have questions regarding a particular dual credit

course. However, they are the main point of contact with the partner institution and enroll

students in dual credit courses. Therefore, it is essential for high school counselors to be

knowledgeable about the transferability of dual credit courses and have a basic understanding of

courses students may need depending on the field of study the student plans to pursue.

Transferring Dual Credit Courses

The state of Texas has limited 4-year institutions to only offer core courses and foreign

language courses as dual credit courses with partner high schools. The TEA (2020) reported that

core academic and foreign language courses earned at a public institution are transferable to

other Texas public colleges and universities, but they may not apply to the student's degree plan. In fact, the THECB (2018) reflected, "State law mandates the transfer of core curriculum between all public institutions of higher education" (p. 24). However, career and technical dual credit courses may have limited transferability outside the applied associate's or bachelor's degree. While the courses may transfer from institution to institution, they may not be applicable to the student's desired degree plan (TEA, 2020). Additionally, the TEA (2020) emphasized that "some public institutions may award elective credit instead and many may award no credit" (p. 14). If the student attends a private institution or one out of state, those institutions may choose not to award credit for the dual credit courses.

High school counselors may offer advice regarding the transfer of dual credit courses toward a college degree but not toward a specific major or certificate (Miller et al., 2018). Miller et al. (2018) concluded high school counselors and college advisors face challenges ensuring dual credit students enroll in courses needed for intended degree programs. The most considerable challenge for high school counselors is the lack of information regarding how dual credit courses transfer toward the requirements for a major (Miller et al., 2018). The Dual Credit Education in Texas Interim Report charged that community colleges advise each of their dual credit students, but the advising was how to transfer college credit toward a college degree but not toward a specific major or certificate (Miller et al., 2018).

Miller et al. (2018) and Hanson et al. (2015) argued that high school counselors are essential to the success of dual credit programs but lack necessary information regarding advising from the college perspective, such as how courses are applied to a degree program. In fact, "Texas policymakers and practitioners have begun to express reservations about whether dual credit education can deliver on its promise to narrow gaps in college enrollment and

completion" (Miller et al., 2018, p. 6). Among those concerns are how students are advised regarding academic, career, and technical dual credit courses. Hanson et al. (2015) suggested that high school counselors and principals meet monthly with partner institutions to discuss planning, advising, and future course offerings.

Student Success and Retention

Improving the retention of students is a priority for every IHE. Delicath (2000) advised that one way to increase retention is to admit academically prepared students. Dual credit students are believed to be academically prepared because they meet the qualifications to participate in dual credit coursework and have earned college-level credit before graduating high school. According to Barnett and Stamm (2010), dual credit is linked to increased retention and persistence in college. Additionally, Giani et al. (2014) asserted that increased enrollment in dual credit is related to an increased interest in postsecondary participation and completion rates.

Accumulated Credit Hours

Many studies (Ganzert, 2014; Grubb et al., 2017; Miller et al., 2018; Speroni, 2011) have reflected that participating in dual credit has a direct impact on college success. A cooperative study by the American College Testing and four Texas public universities (The University of Texas at Austin, Texas A&M University at College Station, Texas A&M University-Commerce, and the University of Texas-Pan American) compared the successes of dual credit and nondual credit students (Radunzel et al., 2014). The study had four key findings for students who participated in dual credit. These included the following:

1. Dual credit students are more likely to be successful in college, "including completing a bachelor's degree in a more timely manner" (Radunzel et al., 2014, p. 1).

2. Dual credits students will likely earn a B or higher in college courses.

3. Dual credit students with a greater number of dual credit hours are more likely to progress to a bachelor's degree without accumulating a great number more credit hours needed by graduation.

4. College success of dual credit students did not differ by the primary source of dual credit, such as those who earned coursework at a 2-year versus 4-year institution (Radunzel et al., 2014).

It is evident that research has revealed students who participated in dual credit courses in high school were significantly more likely to complete a baccalaureate degree than peers who did not take dual credit courses (Blankenberger et al., 2017). Radunzel et al. (2014) added that the typical time to completion of a bachelor's degree is 72 months (6 years), but that was shortened to an average of 57 months (less than 5 years) for students who earned college credit via a dual credit program. Despite the benefits of dual credit programs, including increased student success and retention, questions remain regarding the long-term influence of dual credit courses on long-term student achievement and time to degree attainment.

Chapter Summary

The dual credit system evolved, enabling students to earn college-level coursework while still in high school, hoping students would graduate college in 4 years or less and save money (Giani et al., 2014). Dual credit programs cultivated a culture with a sense of urgency to get students through their degree programs and graduate as quickly as possible. Texas even passed a law capping degree plans at 120 hours. However, high school counselors have minimal support from higher education institutions as they try to advise high school students on college-level coursework, and there is a lack of a uniform model for dual credit partnerships. Dual credit

programs are continuing to expand, and if dual credit courses are to contribute to college success, policymakers, educators, high schools, and institutions must understand if dual credit courses are positively impacting student success and academic progress toward degree completion. Chapter 3 will include an overview of the research design, including in-depth details on the data collection method and sources, participant selection, statistical techniques used in the study, descriptive analysis, and hypothesis testing. Chapter 3 will conclude with assumptions based on the study and limitations of the study, leading to the findings in Chapter 4.

Chapter 3: Research Method

Chapter 3 is divided into the following sections: (a) explanation of the research design along with definitions of the variables; (b) research questions; (c) hypotheses; (d) definition and explanation of population and setting; (e) assumptions, limitations, and delimitations; (f) data collection and analysis procedures, including the statistical analysis test that was used for each research question; and (g) ethical considerations.

This quantitative, ex post facto correlation study explored the correlation between dual credit hours earned and students' GPA and semesters to degree attainment. I looked at student data available from a regional institution in west Texas to explore associations with dual credit hours earned. This study examined existing data of new, first-time, degree-seeking students who were continuously enrolled at a midsize public university in Texas from the fall of 2012, 2013, or 2014 until degree completion in May 2020 or earlier.

Research Design

This nonexperimental, ex post facto, correlation, quantitative study determined the relationship between the number of dual credit hours earned and GPA and semesters to degree completion. Quantitative methods explain relationships among variables (Creswell & Guetterman, 2019); therefore, quantitative measures were used to analyze and evaluate data in this study. No qualitative data were gathered for this study. The quantitative method correlation was chosen because the study describes the relationship among independent variables (Creswell & Guetterman, 2019). According to Sriram (2017), the Pearson correlation is the most common calculation used to determine the relationship among variables. Pearson correlation was used for the first three research questions. This study also used multiple regression, another type of correlation analysis, to determine if combined independent variables can predict an outcome.

Multiple regression is a "more sophisticated extension of correlation and used when you want to explore the predictive ability of independent variables" (Pallant, 2016, p. 108). Multiple regression is used for Research Question 4.

Variables for this study are described in Table 1 and include the number of dual credit hours earned, cumulative GPA at the end of the first academic year and degree completion, and the number of semesters enrolled until degree completion. The variables in this study are independent and measured on an interval scale. Please note that cumulative GPA includes the average of grades earned via dual credit and grades earned at the institution.

Table 1

Definition of Variables

Variable	Description	Scale of measurement
Dual Credit Hours Earned	Dual credit hours earned by the student prior to enrollment at the institution.	Ratio (1–undetermined)
Cumulative Grade Point Average	Determined by adding all the numbered grades received and dividing them by the number of credit hours attempted, includes grades of dual credit courses and courses taken at the institution post-high school graduation.	Interval on a 4.0 scale (0.00–4.00); measured out to 2 decimal points
Number of Semesters to Degree Completion	Number of long semesters a student is enrolled at the institution, up to 10 long semesters, which does not account for summer semesters, only spring and fall semesters.	Ratio (1–12)

This study's design was nonexperimental using ex post facto data. Data were obtained from an archival database at a public, midsize university in Texas and only included students who met specific measurements, so participants of this study were not randomly selected. A

nonexperimental design was chosen for this study because the experiment identified

relationships among variables and not comparing groups (Sriram, 2017). Because data for this

study already exist, the study was considered ex post facto (Suter, 2012).

Research Questions

This quantitative study explored the correlation between dual credit hours earned and

students' GPA and semesters to degree attainment. The underlying question was whether

increasing the number of dual credit hours earned correlated with a student having a higher GPA,

persisting to degree completion, and graduating in fewer than 12 long semesters. The correlation

research design determined if there are relationships among the variables and if the variables can

predict semesters to degree attainment.

Research Question 1: To what extent is there a relationship between the number of dual

credit hours earned and grade point average at the end of a student's first semester?

Research Question 2: To what extent is there a relationship between the number of dual

credit hours earned and semesters to degree completion?

Research Question 3: To what extent is there a relationship between the number of dual

credit hours earned and grade point average at degree completion?

Research Question 4: To what extent do the number of dual credit hours earned and

grade point average after the first semester predict the number of semesters to degree

completion?

I utilized correlation to describe the relationship between variables (Creswell &

Guetterman, 2019). The study determined if there was a statistically significant association

between the number of dual credit hours earned and GPA at the end of the student's first

semester and at degree completion. Additionally, the study determined if the number of dual

credit hours earned and GPA earned after the first semester was a prediction of the number of semesters to degree attainment.

According to Brown et al. (2013), GPA indicates the success or failure of academic classes. Persistence reflects continuous enrollment and is measured from fall-to-spring and spring-to-fall registration (DeBerard et al., 2004). I studied the data to see if the more dual credit hours earned correlate with students being retained by the institution and shortening time to degree attainment. This analysis of the data considered the persistence of students continuing to enroll in college courses until degree completion. While "correlation does not prove causation" (Sriram, 2017, p. 115), the study revealed if dual credit positively impacted students once they graduated and enrolled at a midsize public university in Texas.

Hypotheses

The following hypotheses include a null and alternative hypothesis that were used to identify the relationship between dual credit hours earned and students' grade point average and semesters to degree attainment:

H_01: There is no relationship between the number of dual credit hours earned and grade point average at the end of a student's first semester.

H_a1: There is a statistically significant relationship between the number of dual credit hours earned and grade point average at the end of a student's first semester.

H_02: There is no relationship between the number of dual credit hours earned and grade point average at degree completion.

H_a2: There is a statistically significant relationship between the number of dual credit hours earned and grade point average at degree completion.

H₀3: There is no relationship between the number of dual credit hours earned and semesters to degree completion.

Ha3: There is a statistically significant relationship between the number of dual credit hours earned and semesters to degree completion.

H04: The number of dual credit hours earned and grade point average after the first semester did not have a statistically significant relationship with the number of semesters to degree completion.

Ha4: The number of dual credit hours earned and grade point average after the first semester did have a statistically significant relationship with the number of semesters to degree completion.

Population and Setting

The study was conducted at a rural institution in West Texas. As of 2021, the institution's enrolment was 10,775, including freshmen, transfers, and students at partner high schools who participated in dual credit offered through the institution of study. As reported on the webpage of the institution of study, the institution has been named a Hispanic Serving Institution and military friendly since 2010, with over 100 majors and concentrations. According to data reports on the institutional webpage, each year, the incoming class averages 1,200–1,400 students who enter the institution as first-time, degree-seeking students and enroll full-time.

The population for this study included students who began at the institution as a first-time freshmen and earned at least one hour of college credit, referred to here as dual credit, before enrolling at the institution. The THECB (2016) defined dual credit 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" (p. 1). Sriram (2017) defined a population as

the entire group in which the data will be collected. The selection of participants for this study was based on the following criteria: prior dual credit enrollment; first-time, first-year, degree-seeking students who enrolled at the midsized, public institution directly following high school graduation and enrolled as a full-time student their first semester at the university. Study participants were chosen by identifying students who began at the university in the fall of 2012, 2013, or 2014 and who had earned at least one hour of dual credit before enrolling at the university. The students examined for this study were first-time students, meaning the student did not attend any institution after completing high school before beginning at the university. Students included in this study only included those who enrolled full-time in their first semester at the university, meaning they enrolled in 12 or more hours and degree-seeking with a degree plan on file. The population did not include students who took a gap year after high school or had a leave of absence.

The population included all students who met the criteria explained, approximately 1,500 students. A G*Power calculator was used to determine the number of participants needed to obtain a statistical significance with a 95% confidence interval (see Figure 1). The G*Power calculator indicated that 160 students were needed to obtain a statistical significance with a 95% confidence interval (see Figure 1).

I used existing data available at the university. Therefore, the selection of participants for this study was determined by what was available; it was a convenience sample. The individual identities of students were kept anonymous. Therefore, informed consent was not needed for this study was reviewed as exempt.

Figure 1

G*Power Calculator
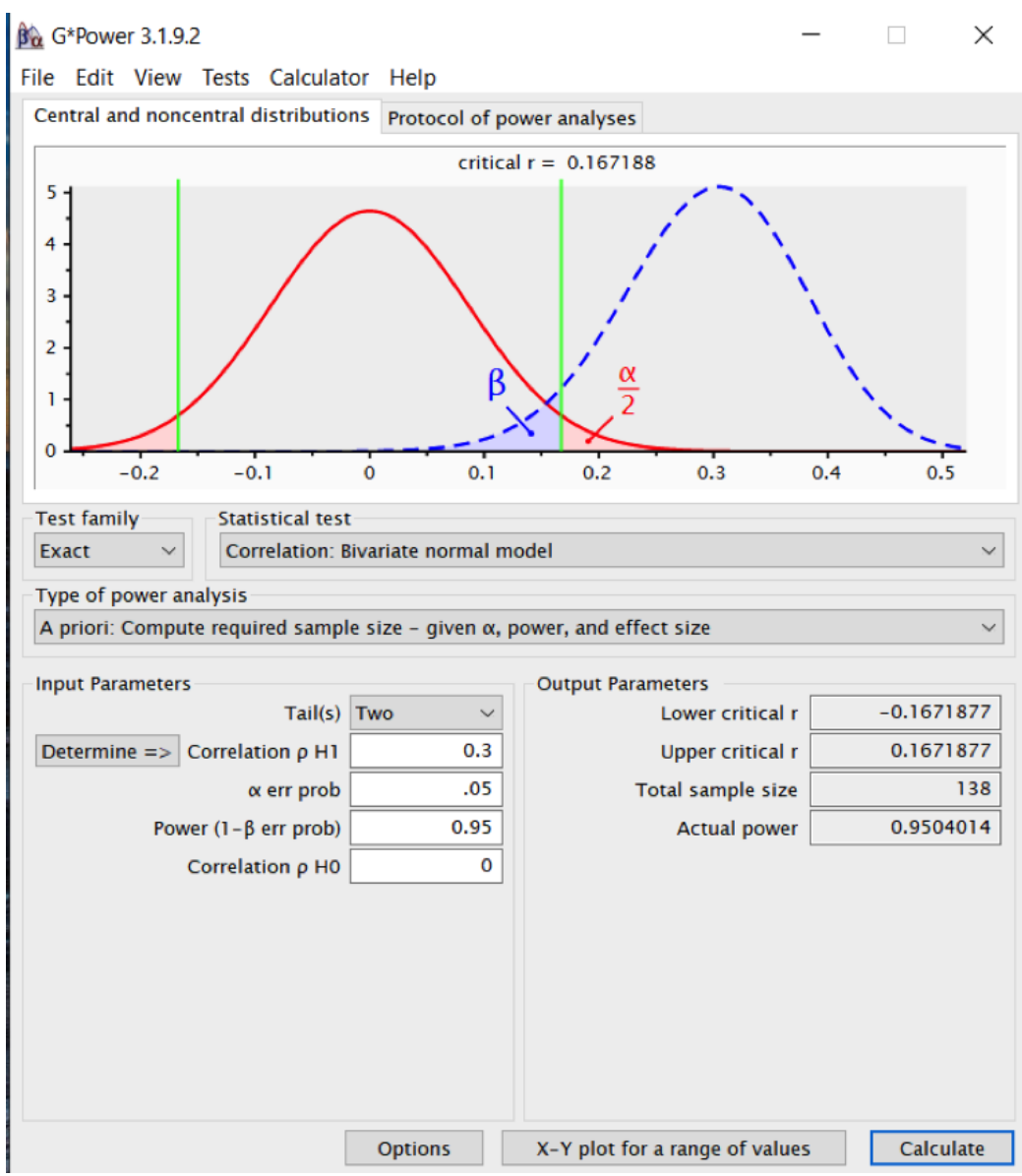
Assumptions, Delimitations, and Limitations

Assumptions

The following assumptions should be noted:

a. I assumed the data provided by a midsize public university in Texas was accurate and

complete.

b. The relationships identified among the 160 students in the sample size represents the described population.

c. It was assumed that the data would fit the Pearson *r* analysis criteria for Research Questions 1, 2, and 3:

   o Both variables must be normally distributed.

   o There should be no significant outliers.

   o Both variables should be continuous.

   o The variables have a linear relationship (Sriram, 2017).

d. It was assumed that the data would fit the multiple regression analysis for Research Question 4:

   o A linear relationship exists between the predictor variable and the response variable.

   o The predictor variables are not highly correlated with each other.

   o The observations are independent.

   o The residuals have a constant variance.

   o The residuals are normally distributed.

Limitations

Limitations of this study included the following:

a. I used existing data available at the midsize public university in Texas, so the selection of participants for this study was determined by what was available.

b. The data only included students who enrolled at the midsize public university in Texas beginning in the fall of 2012, 2013, and 2014 and graduated by the end of spring 2020. Studies conducted in different years could yield different results.

    c. Some degree programs have a sequential set of courses, which may make it impossible for a student to graduate early.

Delimitations

Delimitations of this study included the following:

    a. The data did not include students who took a gap year between high school and enrollment at the midsize public university in Texas.

    b. The data did not differentiate dual credit hours that may be technical or vocational; the data looked at the number of college credit hours earned while still enrolled in high school.

    c. The study did not examine intrinsic factors that may influence a student's motivation to perform well academically or pursue a college degree.

    d. The study did not include students who earned college credit through AP or other methods; it only included students who earned credit via dual credit enrollment.

    e. Dual credit courses are offered through various settings such as face-to-face on the high school campus, hybrid, face-to-face on the college campus, etc. This study did not account for the course delivery method for dual credit courses.

Data Collection and Analysis Procedures

The data collected and analyzed in this study determined a relationship between dual credit hours earned and students' GPA and semesters to degree attainment.

Data Collection Procedures

The data was retrieved from existing archival institutional data maintained by the Texas university. Data for this study was provided from a midsize public university in Texas in an Excel spreadsheet. The individual identities of students were kept anonymous. Therefore,

informed consent was not needed for this study. The data used in this analysis were collected

from a common enrollment data system, Banner Information System. Specifically, data was

collected for students who earned at least one dual credit hour, enrolled full-time in their first

semester at the sample institution, and were considered first-time freshmen when enrolling at the

sample institution. Data collected for the study included when the student enrolled at the

institution of study, how many dual credit hours were earned before enrolling at the said

institution, and institutional and cumulative GPA at the end of the first academic year and degree

completion. Approval from the institutional review board (IRB) at Abilene Christian University

and the regional institution, a midsize public university in west Texas, were needed to conduct

this study.

The study used ex post facto data to examine differences between variables, so no

manipulation of the data was done. The data collected and analyzed in this study determined if

increasing the number of dual credit hours earned is reflected in a student's GPA, persistence to

degree completion, and shortening the time to degree attainment.

Analysis Procedures

Data analysis was conducted using Statistical Package for the Social Sciences (SPSS;

Laerd Statistics, n.d.) statistical analysis software, with the archived data retrieved and

downloaded into the software program for analysis. The data were then analyzed within the

given parameters. The data collected from the study institution were analyzed using Pearson's

correlation (r-value) tests and multiple regression. According to Sriram (2017), the Pearson

correlation is the most common calculation used to determine the relationship among variables.

The multiple regression test will determine "how well a set of variables is able to predict a

particular outcome" (Pallant, 2016, p. 149). The analysis for each research question is displayed

in tables and figures, providing a visual representation of the results. The research questions, null

hypotheses, variables, and statistical research tests are displayed in Table 2.

Table 2

Statistical Analysis Tests for Each Research Question

Research question	Null hypothesis	Variables	Statistical test
Q1. To what extent is there a relationship between the number of dual credit hours earned and grade point average at the end of a student's first semester?	There is no relationship between the number of dual credit hours earned and grade point average at the end of a student's first semester.	Dual credit hours earned; grade point average at the end of the first semester.	Spearman's rho
Q2. To what extent is there a relationship between the number of dual credit hours earned and grade point average at degree completion?	There is no relationship between the number of dual credit hours earned and grade point average at degree completion.	Dual credit hours earned; grade point average at degree completion.	Spearman's rho
Q3. To what extent is there a relationship between the number of dual credit hours earned and time to degree completion?	There is no relationship between the number of dual credit hours earned and time to degree completion.	Dual credit hours earned; number of semesters to degree completion.	Spearman's rho
Q4 To what extent do the number of dual credit hours earned and grade point average after the first semester predict the number of semesters to degree completion?	The number of dual credit hours earned and grade point average after the first semester did not have a statistically significant relationship with the number of semesters to degree completion.	Dual credit hours earned; grade point average at the end of the first semester; number of semesters to degree completion.	Multiple Regression

The first three research questions were tested using Pearson *r* analysis. A Pearson *r*

analysis measures the relationship between two continuous variables by looking at the direction

and strength of the two variables (Muijs, 2016). This is often referred to as the correlation

coefficient and looks to determine if a score of one variable is associated with the score of another variable (Muijs, 2016). Before conducting a Pearson *r* analysis, I tested assumptions to ensure that I was working with two continuous variables and a linear relationship between the two variables (Sriram, 2017).

Pearson correlation coefficient, *r*, reflects how far away the data points are from the line of best fit (Sriram, 2017). As defined by Siram (2017), "a correlation is a number on a scale from -1.0 to +1.0 showing how two variables are related" (p. 114). Sriram (2017) described the value *r* = 1 means there is a perfect positive correlation, and the value *r* = -1 means there is a perfect negative correlation. The closer the value is to 1 or -1, the stronger the correlation (Sriram, 2017). Positive correlation reflects a tendency to increase for both variables. A negative correlation reflects a tendency for both variables to decrease. No correlation reflects that the variables do not correlate with one another. Pearson tests are often displayed in scatterplots, visually representing the correlation. Four assumptions must be met to use Pearson correlation, which include the following:

a. The two variables must be measured with an interval or ratio scale.

b. There should be a linear relationship between the two variables.

c. There should not be any significant outliers, meaning no single data point that does not follow the usual pattern.

d. The data should be normally distributed (Sriram, 2017).

For this study, assumptions were not met, so I used a nonparametric test, Spearman rho.

Research Question 4 was tested using multiple regression. Multiple regression "can be used to test the predictive power of a set of variables to assess the relative contribution of each individual variable" (Pallant, 2016, p. 126). The multiple regression test considered the

independent variables as predictor variables to make a forecast for an outcome. While multiple regression may not determine cause-and-effect relationships, it may be used to predict an outcome.

The Pearson correlation coefficient, *r*, determined the strength of the variables. Multiple regression determined the relationship among the variables and the influence they had on the outcome. For each variable, the research looked at the Sig. value. If the Sig. value was less than .05, the variable was making a significant contribution to predicting the outcome. If the Sig. value was greater than .05, the variable was not making a significant influence on the prediction of the outcome.

Five assumptions must be met to use multiple regression. The assumptions include the following:

    a. A linear relationship exists between the predictor variable and the response variable.

    b. The predictor variables are not highly correlated with each other.

    c. The observations are independent.

    d. The residuals have a constant variance.

    e. The residuals are normally distributed.

If the assumptions were not met, I would not have been able to answer the research question, as a nonparametric alternative was not an option.

It is important to note that "correlation does not prove causation, but sometimes you [sic] can conclude cause and effect because of common sense" (Sriram, 2017, p. 115). After data collection, I evaluated the correlations between dual credit hours earned and students' GPA and semesters to degree attainment to determine if dual credit positively impacts students once they graduate and enroll at a midsize public university in Texas.

Ethical Considerations

Confidentiality was maintained for this study. The student records were assigned a unique identifier, so the individual identities of students were kept anonymous. The university staff member pulling the data removed any identifying information for the student. The students were assigned a unique identifier starting with number one. As a result, informed consent was not needed for this study. The collected data were stored on a password-protected document and securely kept. Approval from the IRB at Abilene Christian University and the midsize public university in Texas was needed to conduct this study.

Chapter Summary

The nonexperimental, ex post facto*,* correlation, quantitative study explored the correlation between dual credit hours earned and students' GPA and semesters to degree attainment. This study will contribute to the literature regarding the impact of dual credit on college success and postsecondary degree attainment. Research design, population and setting, assumptions and limitations, data collection and analysis procedures, and ethical considerations were described in Chapter 3. In Chapter 4, the results of the study will be discussed.

Chapter 4: Results

This chapter presents the study results. In this chapter, I recap the purpose of the study and list the four research questions. Then, I explain the preparation procedures of the raw data for analysis and summarize the data analysis procedures. Finally, the chapter shares the results for each research question.

Purpose of the Study

The purpose of this study was to explore to what extent a relationship exists between dual credit hours earned and students' GPA and semesters to degree attainment. This study looked at student data available from a regional institution in west Texas to explore if the number of dual credit hours earned correlates with semesters to degree attainment or a student's cumulative GPA. The quantitative method correlation was chosen because the study described the relationship among independent variables (Creswell & Guetterman, 2019). The correlation research design determined if there were relationships among the variables and if the variables could predict semesters to degree attainment.

Research Question 1: To what extent is there a relationship between the number of dual credit hours earned and grade point average at the end of a student's first semester?

Research Question 2: To what extent is there a relationship between the number of dual credit hours earned and semesters to degree completion?

Research Question 3: To what extent is there a relationship between the number of dual credit hours earned and grade point average at degree completion?

Research Question 4: To what extent do the number of dual credit hours earned and grade point average after the first semester predict the number of semesters to degree completion?

Preparation of Raw Data for Data Analysis

I received approval from the IRB at Abilene Christian University and the study

institution. Once given IRB approval, I requested data from existing archival institutional data

maintained by the Texas university. Data for this study were collected from a common

enrollment data system, Banner Information System.

The selection of participants for this study was based on the following criteria: prior dual

credit enrollment, first-time, first-year, degree-seeking students who were enrolled at the

midsized, public institution directly following high school graduation and enrolled as full-time

students their first semester at the university. Participants for this study were chosen by

identifying students who began at the university in the fall of 2012, 2013, or 2014 who had

earned at least one hour of dual credit before enrolling at the university and were continuously

enrolled until degree completion in May 2020 or earlier.

Once I received the data, it was saved in a password-protected Excel spreadsheet.

Identifying information about the individual students was not provided on the Excel spreadsheet.

When the data was received, I checked the data for accuracy. I determined that the report also

included students who had not earned any dual credit before enrolling at the institution.

Therefore, I altered the data to remove students who had not earned at least one hour of dual

credit. I had anticipated around 1,500 students on the report. The original report included 1,525

students. I removed 684 students who had not earned any dual credit before enrolling at the

institution, leaving 841 students on the report.

The staff member at the study university who collected the data let me know that data

could not show continuous enrollment, so some students in the data may have taken a semester

or more off but still came back and graduated within the given study's time frame. Originally, I

wanted to consider students who began at the institution in fall 2012, fall 2013, and fall 2014 and graduated by May 2020, but then I realized that data could be skewed because students who began in 2012 would have more time to degree completion than those who started in 2014. Therefore, I altered the data to include only students who graduated within 12 long semesters. Once this adjustment was made, 14 students were removed from the data set, leaving 827 students for the analysis.

Before the data was received, I used a G*Power calculator to determine the number of participants needed to obtain a statistical significance with a 95% confidence interval. The G*Power calculator indicated that 160 students were needed to obtain statistical significance with a 95% confidence interval. After alterations were made to the data set, the sample set still met the G*Power expectations of the number of students that were needed to obtain a statistical significance with a 95% confidence interval. A unique identifier was assigned to each individual, keeping the individual identities of students anonymous, and then the data set was then uploaded to the SPSS software program for analysis.

Preparation for Data Analysis

Research Questions 1, 2, and 3 were analyzed using Pearson's correlation (*r*-value) tests. A Pearson *r* analysis measures the relationship between two continuous variables by looking at the direction and strength of the two variables (Muijs, 2016). I checked the assumptions needed to run the outlined analysis for each research question. Assumptions were not met to conduct a Pearson *r* analysis for Research Questions 1, 2, and 3 because there was not a linear relationship between the two variables for each question and the assumption of normality was not met. Therefore, a nonparametric test was used, and a Spearman rho analysis was conducted for Research Questions 1, 2, and 3. I checked the assumptions to run a multiple regression test for

Research Question 4, and the assumptions were met. Research Question 4 was analyzed using multiple regression. Multiple regression is a "more sophisticated extension of correlation and used when you [sic] want to explore the predictive ability of independent variables" (Pallant, 2016, p. 108).

Research Questions Analysis

The analysis for each research question is explained in the following sections and displayed in tables, visually representing the results.

Research Question 1 and Hypothesis 1

The first research question asked to what extent a relationship exists between the number of dual credit hours earned and GPA at the end of a student's first semester. The following null and alternative hypotheses were used to identify a relationship between the variables.

H$_0$1: There is no relationship between the number of dual credit hours earned and grade point average at the end of a student's first semester.

H$_a$1: There is a statistically significant relationship between the number of dual credit hours earned and grade point average at the end of a student's first semester.

Assumptions were not met to conduct a Pearson *r* analysis for Research Question 1 because there was not a linear relationship between the two variables, and the assumption of normality was not met. This is reflected in the scatterplot in Figure 2. Therefore, a nonparametric test was used, and the question was analyzed using a Spearman rho analysis.

Figure 2

Scatter Plot Reflecting Total Number of Dual Credit Hours Earned and Student's Grade Point

Average at the End of the Student's First Semester

Results for Research Question 1

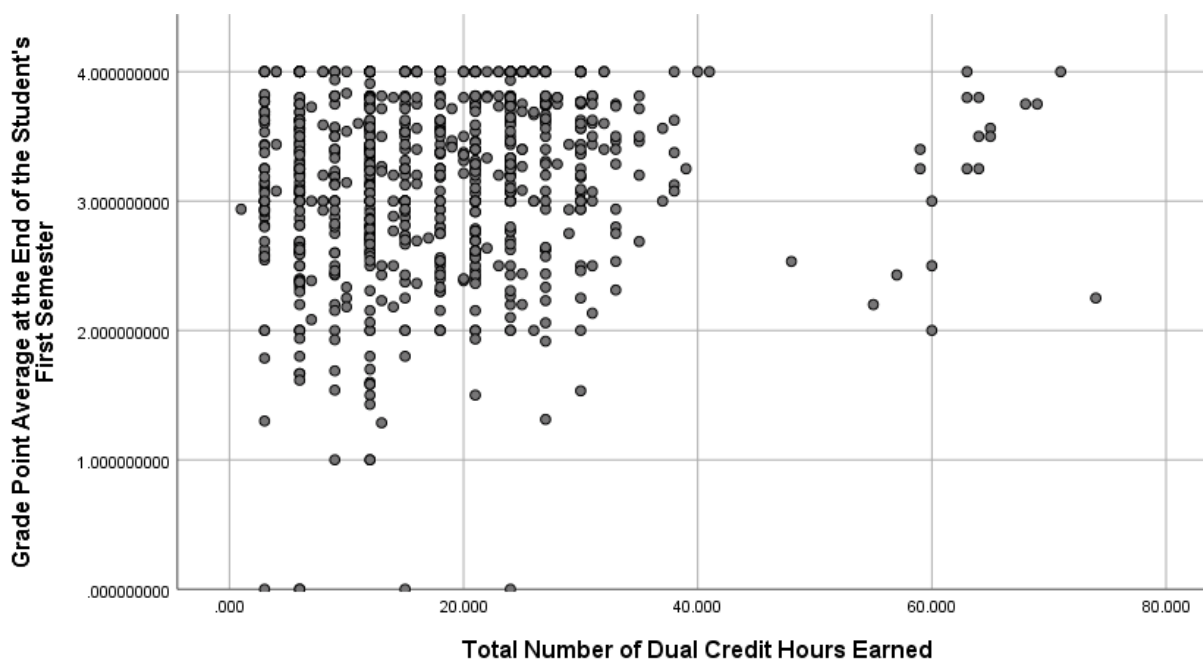   Table 3 illustrates the results for the first research question, To what extent is there a relationship between the number of dual credit hours earned and GPA at the end of a student's first semester? Results indicate a small, statistically significant positive relationship between the number of dual credit hours earned and the GPA at the end of the student's first semester, $r_s =$ .16, $n = 827$, $p = < .001$. Since the p-value is less than .001, the null hypothesis is rejected, and the alternative hypothesis is accepted. The r-value of $\pm .1$, $\pm .3$, and $\pm .5$ are considered to have a small, medium, or large effect size, respectively (Yockey, 2018). For this analysis, there is a small effect size.

Table 3

Correlation Between Total Number of Dual Credit Hours Earned and Grade Point Average at

the End of the First Semester

Variables of interest		Total number of dual credit hours earned	Grade point average at the end of first semester
Total Number of Dual Credit Hours Earned	Correlation Coefficient	1.000	.160[**]
	Sig. (2-tailed)	NA	.000
	N	827	827
Grade Point Average at the End of the First Semester	Correlation Coefficient	.160[**]	1.000
	Sig. (2-tailed)	.000	NA
	N	827	827

Note. ** Correlation is significant at the 0.01 level (2-tailed).

Research Question 2 and Hypothesis 2

The second research question asked to what extent there is a relationship between the

number of dual credit hours earned and semesters to degree completion. The following null and

alternative hypotheses were used to identify a relationship between the variables.

H₀2: There is no relationship between the number of dual credit hours earned and

semesters to degree completion.

Hₐ2: There is a statistically significant relationship between the number of dual credit

hours earned and semesters to degree completion.

Assumptions were not met to conduct a Pearson *r* analysis for Research Question 1

because there was not a linear relationship between the two variables, and the assumption of

normality was not met. This is reflected in the scatterplot in Figure 3. Therefore, a nonparametric

test was used, and the question was analyzed using a Spearman rho analysis.

Figure 3

Scatter Plot Reflecting Total Number of Dual Credit Hours Earned and Number of Semesters to
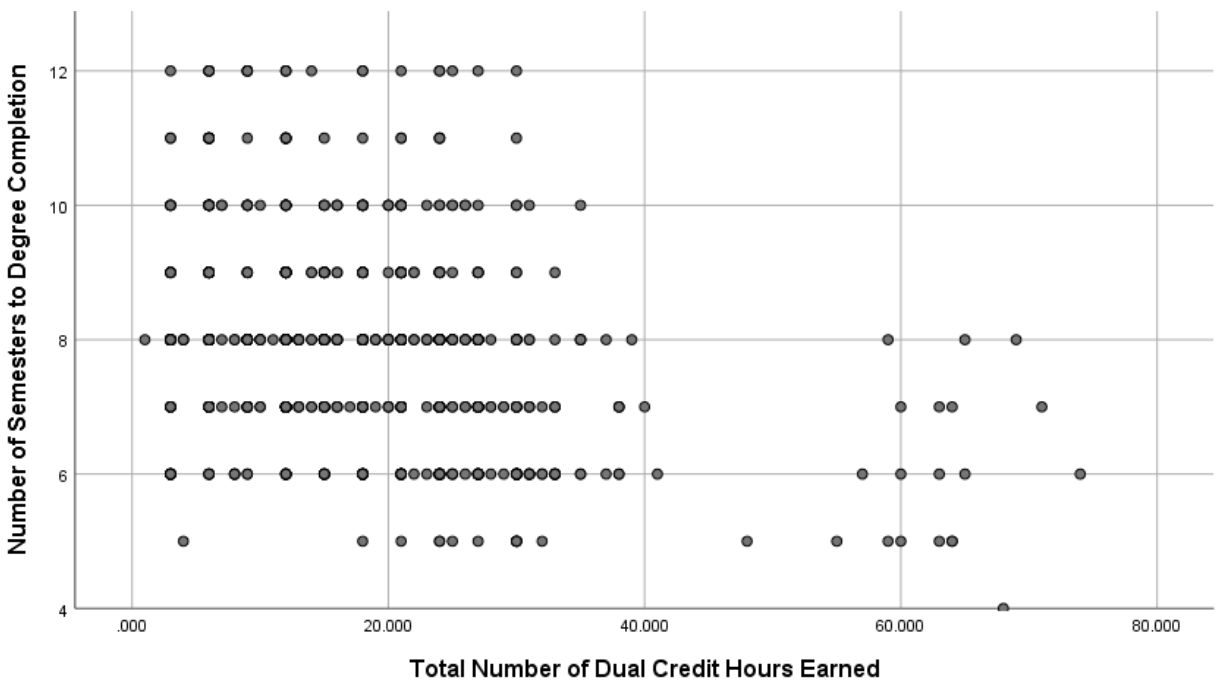
Degree Completion

Results for Question 2

Table 4 illustrates the results for the second research question, To what extent is there a

relationship between the number of dual credit hours earned and semesters to degree

completion? Results indicate a medium statistically significant negative relationship between the

number of dual credit hours earned and semesters to degree completion, $r_s = -.3$, $n = 827$, $p = <$

.001. Since the *p*-value is less than .001, the null hypothesis is rejected the alternative hypothesis

is accepted. The *r*-value of $\pm .1$, $\pm .3$, and $\pm .5$ are considered to have a small, medium, or large

effect size, respectively (Yockey, 2018). For this analysis, there is a medium effect size.

Table 4

Correlation Between Total Number of Dual Credit Hours Earned and Number of Semesters to

Degree Completion

Variables of interest		Total number of dual credit hours earned	Number of semesters to degree completion
Total Number of Dual Credit Hours Earned	Correlation Coefficient	1.000	-.295[**]
	Sig. (2-tailed)	NA	.000
	N	827	827
Number of Semesters to Graduation	Correlation Coefficient	-.295[**]	1.000
	Sig. (2-tailed)	.000	NA
	N	827	827

Note. ** Correlation is significant at the 0.01 level (2-tailed).

Research Question 3 and Hypothesis 3

The third research question asked to what extent there is a relationship between the

number of dual credit hours earned and GPA at degree completion. The following null and

alternative hypotheses were used to identify a relationship between the variables.

H₀3: There is no relationship between the number of dual credit hours earned and grade
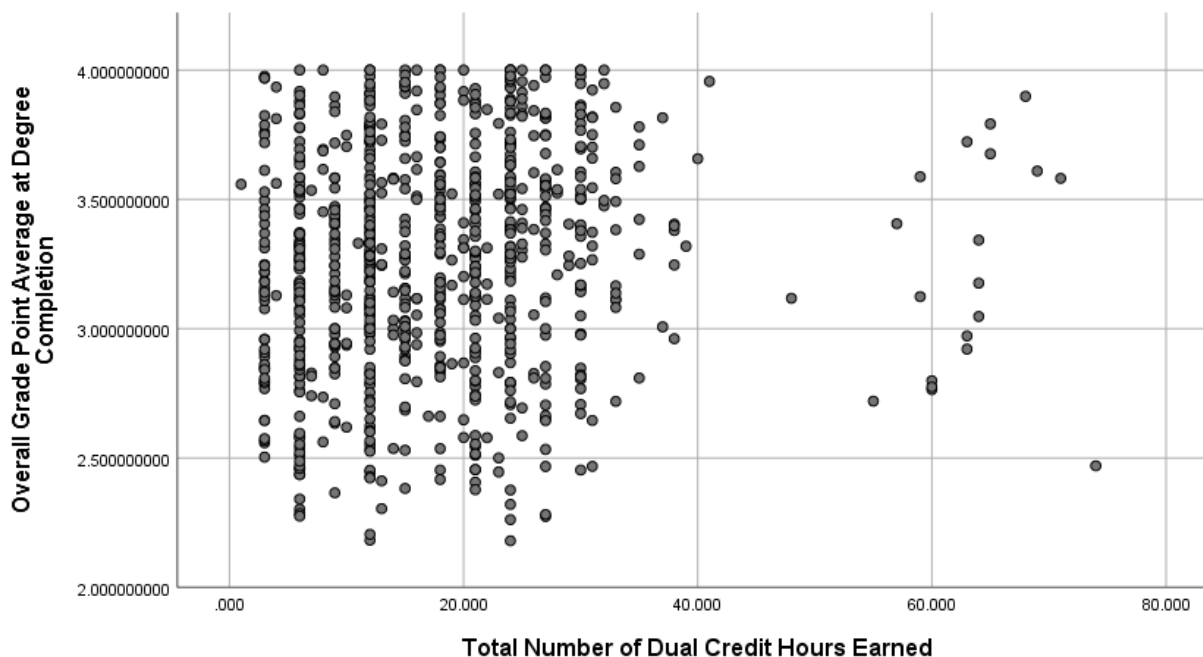
point average at degree completion.

Hₐ3: There is a statistically significant relationship between the number of dual credit

hours earned and grade point average degree completion.

Assumptions were not met to conduct a Pearson *r* analysis for Research Question 1

because there was not a linear relationship between the two variables, and the assumption of

normality was not met. This is reflected in the scatterplot in Figure 4. Therefore, a nonparametric

test was used, and the question was analyzed using a Spearman rho analysis.

Figure 4

Scatter Plot Reflecting Total Number of Dual Credit Hours Earned and Overall Cumulative

Grade Point Average at Degree Completion

Results for Question 3

Table 5 illustrates the results for the third research question, To what extent is there a

relationship between the number of dual credit hours earned and cumulative grade point average

at degree completion? Results indicate a small statistically significant positive relationship

between the number of dual credit hours earned and cumulative GPA at degree completion, $r_s = -$

$.15$, $n = 827$, $p = < .001$. Since the p-value is less than .001, the null hypothesis is rejected, and

the alternative hypothesis is accepted. The r-value of $\pm .1$, $\pm .3$, and $\pm .5$ are considered to have a

small, medium, or large effect size, respectively (Yockey, 2018). For this analysis, there is a

small effect size.

Table 5

Correlation Between Total Number of Dual Credit Hours Earned and Overall Cumulative Grade

Point Average at Degree Completion

Variables of interest		Total number of dual credit hours earned	Overall cumulative grade point average at degree completion
Total Number of Dual Credit Hours Earned	Correlation Coefficient	1.000	.149[**]
	Sig. (2-tailed)	NA	.000
	N	827	827
Overall Cumulative Grade Point Average at Degree Completion	Correlation Coefficient	.149[**]	1.000
	Sig. (2-tailed)	.000	NA
	N	827	827

Note. ** Correlation is significant at the 0.01 level (2-tailed).

Research Question 4 and Hypothesis 4

The fourth and final research question asked, Do the number of dual credit hours earned and GPA after the first semester predict the number of semesters to degree completion? The following null and alternative hypotheses were used to identify a relationship between the variables.

H₀4: The number of dual credit hours earned and grade point average after the first semester did not have a statistically significant relationship with the number of semesters to degree completion.

Hₐ4: The number of dual credit hours earned and grade point average after the first semester did have a statistically significant relationship with the number of semesters to degree completion.

Multiple regression, another type of correlation analysis, was used for Research Question 4 to determine if combined independent variables can predict an outcome.

Results for Question 4

Tables 6 and 7 illustrate the results for the fourth research question, Do the number of dual credit hours earned and GPA after the first semester predict the number of semesters to degree completion? The ANOVA test, illustrated in Table 6, indicated that $F(2, 824) = 85.76$, $p < .001$, $n^2 = .17$. The p-value was less than .05 ($p < .001$), meaning that the regression model, with all of the predictor values, included significantly predicted the number of semesters to degree completion. These results support the hypothesis that the number of dual credit hours earned and GPA after the first semester predict the number of semesters to degree completion. The null hypothesis is rejected, and the alternative hypothesis is accepted.

Table 6

ANOVA–Number of Dual Credit Hours Earned and Grade Point Average After the First

Semester Predict the Number of Semesters to Degree Completion

		ANOVA[a]				
Model		Sum of Squares	*df*	*MS*	*F*	Sig.
1	Regression	298.810	2	149.405	85.762	.000[b]
	Residual	1435.475	824	1.742		
	Total	1734.285	826			

Note. [a] = Dependent variable: Number of semesters to graduation. [b] = Predictors: (Constant), GPA at the end of the first semester, total number of dual credit hours earned.

Table 7 reflects the model summary of the multiple regression test. The $R^2 = .17$ indicated that the predictor variables accounted for 17% of the variance number of semesters to degree completion. R^2 values of .02–.12, .13–.25, and .26 or greater are considered to have a

small, medium, or large effect size, respectively (Yockey, 2018). The effect size of .17 is considered to be a medium effect size. Ultimately, students with a higher number of dual credit hours earned and a higher GPA at the end of the first semester graduated in fewer semesters.

Table 7

Multiple Regression Model Summary for Number of Dual Credit Hours Earned and Grade Point

Model Summary[b]				
Model	*R*	R^2	Adjusted R^2	*SE* of the Estimate
1	. 415[a]	.172	.170	1.320

Note. [a] = Predictors: (Constant), GPA at the end of the first semester, total number of dual credit hours earned. [b] = Dependent variable: Number of semesters to graduation.

Table 8 reflects coefficients and significance for the number of total dual credit hours earned and GPA at the end of the first semester. The unstandardized coefficient β represents the amount of change in the number of semesters to degree completion for each independent variable: the total number of dual credit hours earned and GPA at the end of the first semester. Both the total number of dual credit hours earned ($\beta = -.04$, $t = -8.63$, $p < .001$) and GPA at the end of the first semester ($\beta = -.6$, $t = -8.64$, $p < .001$) contributed significantly to the model. Since both of the unstandardized coefficients are negative and the significant values are less than .05, the model predicts that students who earned a large number of dual credit hours or earned a higher GPA at the end of their first semester will graduate in significantly fewer semesters than those with fewer dual credit hours or a lower GPA.

Table 8

Coefficients and Significance for Number of Dual Credit Hours Earned and Grade Point

Average After the First Semester Predict the Number of Semesters to Degree Completion

	Unstandardized coefficients			
Model	β	*SE*	*t*	Sig.
1 (Constant)	10.402	.227	45.792	.000
Total Number of Dual Credit Hours Earned	-.036	.004	-8.627	.000
GPA at the End of the First Semester	-.592	.069	-8.639	.000

Note. [a] Dependent variable: Number of semesters to graduation.

Conclusion

Chapter 4 presented data from the analysis of the four research questions. The first three research questions were analyzed using Spearman's rho because assumptions were not met to run a Pearson *r* analysis. The first research question found a small significant positive relationship between the number of dual credit hours earned and the GPA at the end of the student's first semester. The second research question revealed a medium significant negative relationship between the number of dual credit hours earned and semesters to degree completion. The third research question indicated a small significant positive relationship between the number of dual credit hours earned and GPA at degree completion. The fourth and final research question was analyzed using multiple regression. The fourth question concluded that students with a higher number of dual credit hours earned and a higher GPA at the end of the first semester graduated in fewer semesters than their peers with fewer dual credit hours and a lower GPA. In Chapter 5, I will further discuss the study's results and provide recommendations for

future research and possible policy implications regarding dual credit for policymakers,

educators, and students.

Chapter 5: Discussion, Conclusions, and Recommendations

This chapter includes a summary of the study, a discussion of findings from the analysis for each research question, study limitations, study implications, and recommendations for future research and practice. The purpose of this nonexperimental, ex post facto*,* correlation, quantitative study was to explore to what extent a relationship exists between dual credit hours earned and students' GPA and semesters toward degree attainment. This study looked at student data from a regional institution in west Texas to explore if the number of dual credit hours earned correlates with semesters toward degree attainment or a student's cumulative GPA. Dual credit programs are continuing to expand, and if dual credit courses are to contribute to college success, policymakers, educators, high schools, and institutions must understand how the combination of dual credit courses taken impacts student success and academic progress toward degree completion.

Summary of the Study

This quantitative, ex post facto correlation study explored the correlation between dual credit hours earned and students' GPA and semesters toward degree attainment. I aimed to determine if students are reaping dual credit's intended and expected benefits. As the researcher, I utilized student data available from a regional institution in west Texas to explore associations with dual credit hours earned. This study was examined using existing data which consisted of new, first-time, degree-seeking students who were enrolled at the midsize public university in Texas from the fall of 2012, 2013, or 2014 and graduated within 12 long semesters. The study conducted an analysis of four research questions.

Research Question 1: To what extent is there a relationship between the number of dual credit hours earned and grade point average at the end of a student's first semester?

Research Question 2: To what extent is there a relationship between the number of dual credit hours earned and semesters to degree completion?

Research Question 3: To what extent is there a relationship between the number of dual credit hours earned and grade point average at degree completion?

Research Question 4: To what extent do the number of dual credit hours earned and grade point average after the first semester predict the number of semesters to degree completion?

I used existing data available at the university. Therefore, the selection of participants for this study was based on available archival data. Data analysis was conducted using SPSS statistical analysis software, and the results are discussed in this chapter.

Discussion of Findings in Relation to Past Literature

This study was guided by four research questions with a null and alternative hypothesis for each. The first research question focused on GPA at the end of a student's first semester in college. A Spearman rho analysis was conducted to determine the relationship between the number of dual credit hours earned and GPA at the end of a student's first semester. A statistically small significant relationship was found, supporting the alternative hypothesis. The null hypothesis stating that there was no relationship between the number of dual credit hours earned and GPA at the end of a student's first semester was rejected. The analysis found that students with more dual credit hours did have a better GPA at the end of their first semester of enrollment. There was a positive, weak correlation. The study results aligned with a previous study by Radunzel et al. (2014), which illustrated that dual credit students were likely to earn a B or higher in subsequent college courses. The study results indicated that the more dual credit hours a student earned, the higher their GPA at the end of their first semester in college.

The second research question examined the relationship between the number of dual credit hours earned and semesters toward degree completion. This question was also analyzed using a Spearman rho analysis. A medium statistically significant relationship was found, supporting the alternative hypothesis. The null hypothesis stating that there was no relationship between the number of dual credit hours earned and semesters toward degree completion was rejected. Results indicated that more dual credit hours earned reflected less time toward degree completion. There was a negative relationship between the number of dual credit hours earned and semesters toward degree completion, meaning that a student can shorten their time toward degree completion by earning dual credit hours. There was a moderate correlation. These results are consistent with a study conducted by the TEA (2020), which illustrated that participation in dual credit provides an opportunity for students to fast-track their undergraduate courses and potentially saves students' tuition and fees by reducing time toward degree completion. Additionally, Radunzel et al. (2014) concluded that students "entering college with a greater number of dual-credit hours are more likely to progress toward a degree and complete a bachelor's degree in a timely manner" (p. 1).

Research Question 3 assessed the relationship between the number of dual credit hours earned and GPA at degree completion. A Spearman rho analysis was conducted for this question. A small statistically significant relationship was found, supporting the alternative hypothesis. The null hypothesis stating that there was no relationship between the number of dual credit hours earned and GPA at degree completion was rejected. The analysis found that a student with more dual credit hours did have a better GPA at degree completion. There was a positive, weak correlation. The GPA at degree completion is the overall cumulative GPA, determined by adding all the numbered grades received and dividing them by the number of credit hours attempted; it

includes grades of dual credit courses and courses taken at the institution post-high school graduation. According to Brown et al. (2013), GPA indicates the success or failure of academic classes. Again, this study's results are consistent with a previous study by Radunzel et al. (2014), who found that dual credit students were likely to earn a B or higher in subsequent college courses. The results of this study indicated that the more dual credit hours a student earned, the higher their overall cumulative GPA at degree completion.

The last research question examined the number of dual credit hours earned and GPA after the first semester to see if these variables could predict the number of semesters toward degree completion. Multiple regression was used for Research Question 4 to determine if combined independent variables could predict the outcome of semesters toward degree completion. The results supported the alternative hypothesis that students with a higher number of dual credit hours earned and a higher GPA at the end of the first semester graduated in fewer semesters. The null hypothesis was rejected, stating that the number of dual credit hours earned and GPA after the first semester did not have a statistically significant relationship with the number of semesters toward degree completion. According to Brown et al. (2013), GPA indicates the success or failure of academic classes. In this study, an increase in dual credit hours earned correlated with a higher GPA at the end of the student's first semester at the institution of study and their cumulative grade point after degree completion. Thus, an increase in dual credit hours earned and an overall cumulative GPA at degree completion resulted in shortened time toward degree completion. While the data was not able to reflect continuous enrollment for a student, students in the study graduated in an average of 8 long semesters, supporting previous research that dual credit was expected to be a cost-efficient and time-saving option for individuals to earn a postsecondary education. As described by Kronholz (2011), "Dual

enrollment promises to speed youngsters through college and into the workforce, cutting college costs for parents and taxpayers alike" (Kronholz, 2011, p. 28).

Limitations

I used existing data available at the midsize public university in Texas, so the selection of participants for this study was based on available archival data. The sample size was smaller than anticipated but still included 827 students, which surpassed the minimum number of 160, as stated by the G*Power calculation. The data only included students who started at the university in the fall of 2012, 2013, or 2014 and had earned at least one credit hour of dual credit before enrolling as first-time freshmen at the institution of study. Additionally, the data only included students who graduated within 12 long semesters. Therefore, note that there could be additional students who did graduate from the institution, but for this study, only those who graduated within a specific time range were included. The study did not account for students who took a gap year between high school and enrollment at the university. I acknowledge that studies conducted in different years or for different timeframes could yield different results.

During the data analysis obtained for this study, an anticipated limitation was discovered; the data was not able to reflect continuous enrollment. Therefore, some of the students could have taken a semester off (or longer) and then came back and still graduated within the 12 long semesters. The data was not able to reveal students who may have taken a break. The students in the study were enrolled full-time in at least 12 semester credit hours their first semester of enrollment at the institution of study, but they could have taken fewer semester credit hours after the first semester, which may have led to a longer time to degree completion; this information was not revealed in the data. Additionally, the data only considered students who graduated in 12 long semesters or less, so more students who earned dual credit could have reached degree

completion, but for this study, only students who graduated in 12 semesters or less were considered.

Another limitation was that the data did not reveal if the dual credit hours applied to the student's degree plan, just that the student transferred college credit earned via dual credit to the institution of study. This means that I did not know if all the dual credit hours were applied to the degree plan, so more dual credit hours earned did not necessarily reflect more completed hours toward the student's degree plan. Another limitation of this study was that some degree programs have a sequential set of courses, which may make it difficult for a student to graduate early. The students' majors were not considered for this study.

Recommendations for Future Research

The THECB (2016) acknowledged that participation in dual credit is growing rapidly. This observation stayed true for this study. There were 472 students who started at the institution of study in the fall of 2012 and graduated within 12 long semesters; of those 472 students, 241 students had earned at least one hour of dual credit before enrolling at the institution. This reflects that 51.06% of students who started at the institution in the fall of 2012 had earned one hour of college coursework and graduated within 12 long semesters. In 2013, there were 482 students who enrolled at the institution of study; of those 482 students, 273 students had earned at least one hour of dual credit coursework before enrolling at the institution, about 57%. In 2014, there were 540 students who enrolled at the institution and graduated within 12 long semesters; of those 540 students, 313 students, about 58%, had earned at least one hour of dual credit before enrolling at the institution. As one can see, participation in dual credit continued to increase even within these 3 years, growing from 51% to 58% of incoming students who have earned at least one hour of dual credit. The data also illustrated that the average number of dual

credit hours transferred into the institution from the selection of participants was 18 hours, and among all three entry terms, students graduated in an average of 8 long semesters. Over 3 years, there was an increase in students who participated in dual credit. This study does not include any intrinsic factors as to why a student participated in dual credit or enrolled at the institution of study. A recommendation for future research is to survey students and ask why they chose to participate in dual credit and what incentives they were given for participating in dual credit; this could help explain the continued increase. One could survey high school students actively participating in dual credit and college freshmen who participated in dual credit while in high school.

This study did not include any demographic information on the students, which may lead to additional discoveries regarding students with dual credit and how they perform once enrolled at a postsecondary institution. A recommendation for future research is to include demographic data to see how females matriculate compared to males, consider ethnicities, socioeconomic status, and so forth. Again, conducting a survey or collecting accompanying qualitative data could provide additional explanations of results regarding student performance once enrolled in college. Another idea to consider is to look at students who live on campus versus off campus and see if a student's living situation relates to their performance.

This study looked at a student's GPA at the end of their first semester and the overall cumulative GPA at degree completion. Another idea for future research is to look at the student's GPA of just their dual credit work and see if it combined with the number of dual credit hours earned could predict a student's cumulative GPA at degree completion and semesters toward degree completion. According to Brown et al. (2013), GPA indicates the success or failure of

academic classes. Therefore, looking at GPA of just dual credit hours may provide additional predictions of a student's performance once they enroll in a postsecondary institution.

As discussed in the literature review, high school students often did not know what they wanted to study or where they wanted to attend college after high school graduation and often did not attend the college or university where they earned their dual credit; therefore, application of dual credit courses can be a concern (Pretlow & Patteson, 2015; Taylor et al., 2015). As noted in this study, the student's major, which may have required a sequential set of courses, and the student's application of the dual credit hours to the degree program were not considered for this study. Therefore, a recommendation for future study is to look at students by specific majors to see if students who earned dual credit can graduate at different rates based on their major. Applying dual credit courses to a student's degree plan can also be challenging. While the state of Texas has limited 4-year institutions to only offer core courses or foreign language courses as dual credit courses with partner high schools and core courses are a part of every degree plan, the student may take additional courses not needed for their degree plan. Students enrolled in dual credit courses often do not know what field they want to pursue, so they may take courses not needed for their degree program (Pretlow & Patteson, 2015).

In discussing the application of dual credit courses, high school counselors often serve as the "advisor" for high school students taking dual credit courses. There is a need to educate high school teachers and counselors on how courses could transfer to a postsecondary institution so they can better advise the high school student on what dual credit courses to take. The state of Texas has limited 4-year institutions to only offer core courses and foreign language courses as dual credit courses with partner high schools, but since students often do not know what they want to study, they are not sure what courses they should take, leaving high school counselors to

have those discussions with the high school students. Miller et al. (2018) illustrated that the most considerable challenge for high school counselors was the lack of information regarding how dual credit credits transfer toward the requirements for a major. With that, a recommendation for a future study is to survey high school counselors to determine where they need the most support as the contact for dual credit high school students, teachers, and the postsecondary institution.

Another suggestion for future research is to compare students, including those who did not earn any dual credit hours before enrolling at the institution of study but started the same semester and graduated within the 12 long semesters. Research has revealed that students who participated in dual credit courses in high school were significantly more likely to complete a baccalaureate degree than peers who did not take dual credit courses (Blankenberger et al., 2017). A study including students with and without dual credit hours would reveal if students with dual credit hours graduated quicker than their peers who did not earn dual credit.

The last recommendation for the institution of study is to analyze students who earned dual credit from their own institution and how they are matriculating from semester to semester compared to students who earned dual credit from other institutions. For example, the institution could look to see if students who earned dual credit at the institution they attended postgraduation could apply a majority of the dual credit courses earned to the student's degree plan and if they are graduating sooner than their peers who transferred in dual credit at another school. This study could be replicated for any institution offering high school students dual credit courses.

Recommendations for Practice

A previous study concluded that high school counselors and college advisors face challenges ensuring dual credit students enroll in courses needed for intended degree programs

(Miller et al., 2018). The most considerable challenge for high school counselors is the lack of information regarding how dual credit credits transfer toward the requirements for a major (Miller et al., 2018). A recommendation for future study was to interview high school counselors to determine where they could use the most support. A recommendation for practice is that postsecondary institutions should consider working with high school dual credit students sooner to have open discussions regarding their anticipated major and how specific dual credit hours could be applied toward a degree program. Another way to support dual credit students is that institutions that provide dual credit courses to high schools should provide the services of an academic advisor accessible to the high school students. IHE and ISDs are required to establish a MOU regarding their dual credit program. A suggestion for the MOU is to include protocols regarding training and development for staff who teach dual credit courses or advise students on what dual credit courses to take. It is important that the school district staff understand core requirements and how they could be different for each major. For example, n the institution's dual credit webpage it states that the core curriculum requirements only require three hours of math, and there are multiple math courses the student could take to complete this core requirement. However, unless a student is a math major or in another science, technology, engineering, and math (STEM) related field, it is not likely that the student will need more than one math class, although there are several math dual credit courses the student could take and earn college credit for while still in high school. For instance, the study institution offers seven different math courses to dual credit students. Therefore, institutions should provide advising protocols around the selection of dual credit courses based on a student's intended area of study, such as a suggested course for an arts field as opposed to a science field.

Many of the challenges and confusion around dual credit involve applying dual credit courses to a student's degree plan. As illustrated in the literature review, high school counselors often serve as advisors for high school students taking dual credit courses but have expressed that they lack the support needed to do this. In 2018, during the 85th Legislature, HB 1638 was codified in Texas Education Code §28.009, directing the THECB and TEA to collaborate and develop statewide requirements and goals for dual credit programs in Texas. One goal outlined by the state was that dual credit students would receive advising with access to student support services (TEA, 2018). A recommendation for practice is to create pathways for dual credit students based on their anticipated major. For example, if the student plans to major in arts and humanities, it is known that the student will only need one math course, so taking more than one math dual credit course is unnecessary. However, if students plan to enter a STEM field, they should be more strategic about which courses they enroll in. For example, if a student wants to be an engineering major, they may consider a calculus course as opposed to algebra. Since degree plans may vary from institution to institution, the pathways could serve as a simple advising guide to help high school students and counselors look at the dual credit courses differently and determine what course the student may actually need once enrolled at a postsecondary institution. In order to effectively develop the pathways, it is suggested that research be done to determine the most common core courses needed for different degree plans and even what degrees often have the largest number of unused dual credit courses.

With a steady rise in student enrollment in dual credit courses, it is essential to understand how the combination of dual credit courses impacts student success and academic progress toward degree completion. ISDs and IHE continue working together to grow dual credit programs with the demands of the 60x30TX strategic plan to increase college degree completion

and career readiness in Texas. During the 84th Legislature, Texas passed HB 505, contributing to the growth of dual credit, allowing students to start dual credit as early as their ninth-grade year, and there is no cap on the number of hours a student can earn via dual credit (THECB, 2016). The TEA (2020) confirmed that "high school students in the ninth through twelfth grades who met TSI or dual credit eligibility may enroll in dual credit courses" (p. 8). With that, it is important that policymakers and educators ensure that dual credit is working and doing its job to get students from high school graduation to enroll at a postsecondary institution and graduate with a degree or certificate. A recommendation for future practice is that secondary and higher education institutions carefully monitor outcome data to ensure students succeed in dual credit courses, as it can affect their cumulative GPA once enrolled as a freshman in college.

Implications

A study by Grubb et al. (2017) illustrated that participation in dual credit reduces the time for college degree completion, thus eliminating time and money at the postsecondary institution. Dual credit courses are thought to potentially decrease the overall cost of tuition for students because of their accelerated time toward degree attainment. Students in this study graduated in an average of 8 long semesters. This study's results support the study's conceptual framework, expectancy theory, and the impact dual credit has on students and IHE.

For decades, dual credit programs have helped bridge the gap between high school and college (Giani et al., 2014). Dual credit programs are thought to provide high school students an educational benefit by enabling them to earn college credit while still in high school and providing college access for these students. The hypotheses discussed in this study reflected that participation in dual credit courses positively impacted students regarding more dual credit hours earned correlated with earning a higher GPA and shortened time toward degree completion. The

results support the theory that students who choose to participate in dual credit were able to jumpstart their college careers while in high school and that their performance in dual credit led to a reward of having earned college credit, contributing to shortened time toward degree completion. Vroom's (1964) expectancy theory fits this study because high school students expect to reap the intended benefits of participating in dual credit, and research reflects that this is true. The study's results support students' belief that they will receive a valence or reward for their participation in dual credit but may not be quite at the expected return level. Each research question in this study, which was related to the number of dual credit hours earned and its correlation with GPA and semesters toward degree completion, had a small or moderate relationship; the correlation was relatively weak. So, while this study does support the expectancy theory, specific dual credit courses earned should be considered and if they were applicable to the student's degree program because that can affect their time toward degree completion regardless of the number of dual credit hours earned and GPA.

From the postsecondary perspective regarding expectancy theory, institutions expect that dual credit students will start their college career having earned college credit, so the student is more academically prepared, and this should positively affect retention and graduation rates. Again, the hypotheses discussed in this study reflected that participation in dual credit courses positively impacted students regarding more dual credit hours earned correlated with earning a higher GPA and shortened time toward degree completion. The study supports Vroom's (1964) expectancy theory regarding postsecondary institutions experiencing higher retention and increased graduation rates. However, the correlations were relatively weak, which led me to speculate that more emphasis should be put on the selection of dual credit courses a student chooses to take while in high school. Moreover, while this study does support the expectancy

theory, the specific dual credit courses earned must be considered and if they were applicable to the student's degree program because that can affect their time toward degree completion regardless of the number of dual credit hours earned and GPA.

In terms of dual credit and expectancy theory, policymakers should consider the goals of all stakeholders, such as the students, high schools, and IHE. There could be conflicted thoughts between the stakeholders and their expectations. For example, while high schools and institutions may want to "speed" students through a degree program, students may choose to take "more" dual credit courses than they need because they want to explore different majors. If a student does choose to explore while taking dual credit courses, it is important that the students still understand the impact dual credit courses can have once they enroll at a postsecondary institution and declare a major. This is where academic pathways could be useful.

Academic pathways for dual credit students were discussed in recommendations for future research and practice. To create a strong correlation between the number of dual credit hours earned and the relationship with semesters toward degree completion, students may need to be more selective when deciding which dual credit courses to take. Degree plans may vary from institution to institution, so it can be challenging for a high school counselor to advise a student on exactly what dual credit courses they may need for an anticipated major. However, pathways could serve as a simple advising guide to help high school students and counselors look at the dual credit courses differently and determine what course the student may actually need once enrolled at a postsecondary institution. For example, a pathway could provide suggested math and science courses based on a variety of majors. If students can enroll in courses they will need for their anticipated degree plan, it can then be anticipated that a majority of their dual credit courses directly apply to their degree plan, thus minimizing courses they need

to take once enrolled at the postsecondary institution and shortening time toward degree completion.

In 2015, Texas launched the 60 by 30 Tex (60x30TX) strategic plan to increase college degree completion and career readiness in Texas. In an effort for Texas to remain competitive in the global economy, this strategic plan outlined a goal to have 60% of Texans earn a certification or degree by 2030 (THECB, 2015). The 60x30TX initiative was launched as a roadmap to help Texas become one of the highest-achieving states in the country. Dual credit is thought to positively impact the 60x30TX initiative, as the number of students participating in dual credit is growing, and those who participate in dual credit are going on to earn a postsecondary certificate or degree.

Conclusion

The THECB (2016) defined dual credit 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" (p. 1). Several studies have illustrated that dual credit enrollment has potential benefits for students, including the opportunity to receive high school credit and college credit simultaneously, increased high school graduation rates, and reduced time toward degree completion, thus saving time and money at the postsecondary institution (Miller et al., 2018; TEA, 2020). Dual credit is expected to be a cost-effective and time-saving option for individuals to earn a postsecondary education. In some cases, a student may complete their first year of college while still in high school, lowering college attendance costs by reducing the time necessary to earn a degree.

While many anticipated benefits are associated with dual credit, there is a lack of evidence regarding how the number of dual credit hours earned may affect time toward degree

attainment. Questions remain regarding the long-term influence of dual credit courses on long-term student achievement and time toward degree attainment. Research has been sparse regarding dual credit students' success as they declare a major and transition past their first year in college (Burns et al., 2019; Hanson et al., 2015; Jones, 2014; Karp, 2015). There is a lack of consistent policies regarding dual credit results in students taking college courses without knowing what courses they may need for their anticipated major (Pretlow & Patteson, 2015).

The purpose of this nonexperimental, ex post facto, correlation, quantitative study was to explore to what extent a relationship exists between dual credit hours earned and students' GPA and semesters toward degree attainment. This study looked at student data from a regional institution in west Texas to explore if the number of dual credit hours earned correlates with semesters toward degree attainment or a student's cumulative GPA. An analysis of five assumptions explored if and to what extent a relationship exists between dual credit hours earned and students' GPA and semesters toward degree attainment. I aimed to determine if students were reaping dual credit's intended and the expected benefits.

The collected data was analyzed using SPSS. The analysis results illustrated that dual credit positively affects a student's GPA at the end of their first semester enrolled at a postsecondary institution and at degree completion and shortening their time toward degree completion. The study's results support previous research by the TEA (2020), which illustrated that participation in dual credit enables students to receive college credit and high school credit simultaneously, providing an opportunity for students to fast-track their undergraduate courses and potentially saving students' tuition and fees by reducing time toward degree completion.

While the increased number of dual credit hours has had a positive correlation with (a) a student's GPA at the end of their first semester, (b) a student's cumulative GPA at degree

completion, and (c) shortened time toward degree completion, it is still not known how dual credit courses are applied to a student's degree plan and if increased dual credit courses actually means a decrease in the number of credit hours a student must take once enrolled at a postsecondary institution. Considering the continued growth of participation in dual credit in Texas and the expectations of the 60x30TX strategic plan, it is important to determine the role dual credit plays in postsecondary student success. In order to see if dual credit is working and students are reaping the intended benefits, additional studies are needed to track how dual credit courses are utilized once the student enrolls at a postsecondary institution.

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