# EXPLORING COLLEGE READINESS: THE ROLE OF DUAL CREDIT AND SES ON COLLEGE PERSISTENCE AND STUDENT SUCCESS

by

CHARLES ROWETT

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ABSTRACT

EXPLORING COLLEGE READINESS: THE ROLE OF DUAL CREDIT AND SES ON COLLEGE PERSISTENCE AND STUDENT SUCCESS

Charles Rowett, PhD

The University of Texas at Arlington, 2012

Supervising Professor: Barbara Tobolowsky

Texas' 2006 House Bill 1, which required all high schools in Texas to provide students with the opportunity to earn a minimum of 12 hours of college credit prior to their graduation beginning the fall of 2008, changed the high school experience. The goal of the bill was to smooth the transition from high school to higher education. By looking at data from before, during, and after the implementation of House Bill 1, the results of this study shed light on the success or failure of Texas' 2006 House Bill 1 regarding college persistence and student success.

The study used admission data from three academic years: 2007, 2008, and 2009, from a research university in Texas. This study utilized logistic regression, and multiple regression to see how much the independent variables: dual credit, poverty, gender, ethnicity, SAT scores, class rank, and high school location contributed to the

dependent variables: first to second year persistence and last term freshman GPA. The study also used measures of correlation and association to determine the strength of that association between the independent and dependent variables. The Chi-square test of independence was used to examine if a student's high school location was independent from the amount of dual credit the student obtained.

This study used Pierre Bourdieu's theory of cultural capital for the overarching theoretical framework. In light of this, this study looked at agency factors (dual credit, SAT scores, and class rank) as well as background factors (poverty, gender, ethnicity, and high school location) in predicting student success at college. The research discovered persistence and last term freshman GPA can be predicted from both background factors and agency factors, some factors having a stronger association than others with the dependent variables.

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# CHAPTER 1

## INTRODUCTION

According to the College Board (2010), "there are formidable challenges at every level of the [education] system that confront students who aspire to enroll and succeed in college" (p. 4). Barnes and Slate (2010) state that one of those K-16 challenges is college readiness, which is "the level of preparation a student needs to be ready to enroll and succeed–without remediation–in a credit-bearing course at a two-year or four-year institution" (ACT, 2011, p. 5). Although K-12 has attempted to address this lack of preparation with a number of initiatives, including teacher testing, student testing, and curriculum alignment, too many students are underprepared (Barnes & Slate, 2010). In fact, "three out of four ACT-tested 2006 high school graduates who take a core curriculum [English, history, science, and mathematics] are not prepared to take credit-bearing entry-level college courses with a reasonable chance of succeeding in those courses" (ACT, 2007, p. 1).

One reason students are underprepared is the current law that allows each state to set its minimum passing standard which may or may not correlate with college readiness (Duncan, 2011). According to the National Center for Educational Accountability (NCEA) (2010), states should set the standards so that students have a 10 percent or less probability to need remediation. However, NCEA (2006) reports that many students are entering high school unprepared, which in turn "makes it difficult for

states to raise their official standards high enough to ensure that a high school diploma is a guarantee of readiness for college" (p. 11). In addition, because the standards are tied to financial sanctions, the states have been inclined to keep the standards low (NCEA, 2006). For example, to graduate in Texas, students needed a score on the 2005 English TAKS test which only gave a 57% probability of not needing remediation in college and a score on the mathematics test which only gave a 67% probability (NCEA, 2006).

## Why Dual Credit?

Some people argue fairness dictates that "students from poverty, small schools, and schools with high minority populations need to be provided the same head start on college as students from larger, less diverse, and more affluent high schools" (Peters & Mann, 2009, p. 652). One way to get students ready for college and provide them with a "head start" on college has been the development of dual credit programs. Dual credit programs enable students to take a class and receive credit for high school and college at the same time. There are three ways for high school students to receive dual credit: a) attend a college class on a college campus that is taught by a college instructor, b) attend a class on his/her high school campus taught by a college instructor, and c) attend a class on his/her high school campus taught by high school teachers who are certified by a college (Finken, 2003).

The number of dual credit programs in U.S. high schools has had tremendous growth in recent years, and students are taking advantage of them. Today, more than

70% of all high schools offer dual credit courses (Duncan, 2010). In Texas, the number of students taking dual credit has been steadily increasing as shown in Figure 1.

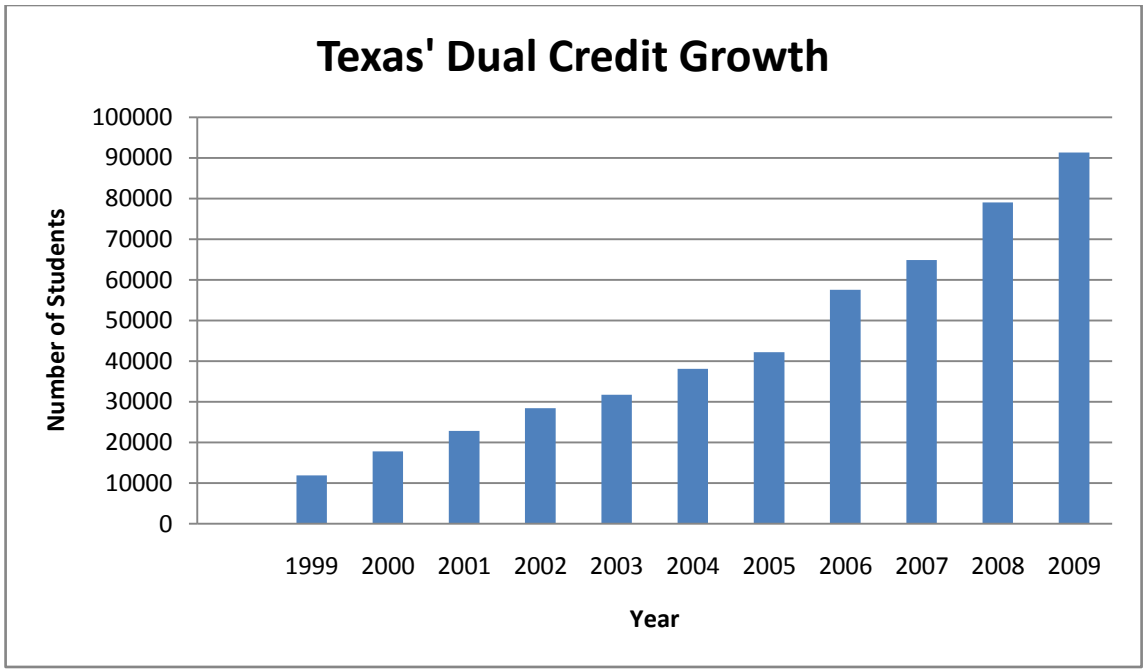



Figure 1 Texas' Dual Credit Growth.

Research shows a range of benefits from dual credit. Welsh, Brake, and Choi (2005), found that dual credit programs can be an important policy tool to help achieve state policy goals. For example, one of the missions and objectives of public education in Texas is for "…all students to stay in school until they obtain a high school diploma" (Texas Education Code, 2005, n. p.). The Texas Education Agency (2011) states one of the advantages of dual credit programs is that "earning college credits while in high school increases the likelihood a student will complete high school…" (p.12). In addition, many researchers (Ashburn, 2007; Daly, 2009; Hartman, 2007; Mead, 2009;

Sherman Valentine, 2010) indicate dual credit programs have a significant positive effect on a student's college experience. However, other researchers (Duffy, 2009; Nitzke, 2002; Williams, 2010) report that these programs have little or no effect on college success or persistence.

Arguably then, students who take dual credit classes are better prepared for college (Gomez, 2001), leading them to save on educational costs. "Parents have saved $5,000 to $24,000 in tuition expenses for students completing up to one year of college credit through the dual-credit program" (Marshall & Andrews, 2002, p. 241). In addition, through the use of dual credit programs, students are able to finish their high school and community college degrees at the same time (Finken, 2003). However, although there are benefits associated with these programs, they are not uniformly operational. One reason is

> because of the different policies that guide these programs, dual enrollment programs vary widely from state to state. Variation exists in …who can participate; where the courses are offered; who teaches the course; what the student mix is [high school and college students]; and how many courses are offered through the program (ED.Gov, 2012, n.p.).

One variance between states is the different funding structures (or lack thereof), which add another hurdle for many students and their families to overcome. According to the Education Commission of the States (ECS) (2008), the students and/or parents pay the tuition for dual credit in 22 states. In six other states, the school district pays; in three states, the participating postsecondary institution pays. In three states, the state

department of education or another state organization pays, while in four states different groups are responsible. In six states there is no clear funding system in place. In Texas, higher education institutions may waive tuition charges but the tuition is ultimately the responsibility of the student or his/her parent.

States also differ on whether or not dual credit should be mandatory or voluntary. The ECS (2008) reports 12 states require that high schools provide dual credit enrollment opportunities. In 21 states there are voluntary partnerships between K-12 and postsecondary institutions. Nine states have policies that do not specify whether the program is mandatory or voluntary and four states do not have statewide dual credit enrollment policies. In Texas, after passage of 2006 House Bill 1, it is mandatory for all high schools to offer students the opportunity to obtain a minimum of 12 hours of college credit before the students graduate, but it is voluntary for the high schools to offer dual credit (schools may offer 12 hours through AP classes, IB programs, advanced technical credit courses including locally articulated courses).

## Student Demographics

Although there is limited research on how dual credit affects different student groups from a range of high school settings (Miller, 2009; Swanson, 2008), it does suggest the possibility that dual credit affects the success of different student groups in disparate ways. This section addresses the demographic changes in population during the time period of the study at the national level as well as corresponding changes in Texas' demographics. In addition, changes in Texas' K-12 public school enrollment by

race and location are revealed as well as demographic changes and changes in enrollment of dual credit classes at the college level are presented.

The U.S. Census Bureau reports the White, African American, and Hispanic populations have had different levels of growth from 2000 to 2010 at the national level (Census, 2012). In those 10 years, the U.S. population grew 9.7% from 281.4 million to 308.7 million. "More than half of the growth of the total population of the United States between 2000 and 2010 was due to the increase in the Hispanic population" changing from 35.3 million to 50.5 million" (Census, 2012). At the same time, the non-Hispanic population grew by about five percent. People who reported their race as White alone grew only by one percent, and overall the proportion of the White total population declined from 69 to 64 percent (Census, 2012).

When compared to the population growth of all the other states during the same time period (2000-2010), Texas "experienced the highest numeric increase, up by 4.3 million people" (Census, 2012) changing from 20,851,820 to 25,145,561. The White population alone increased 4.2%, while the minority population increased 38.6%. This gave the minority population in Texas the majority of people with 54.7% (Census, 2012).

According to the Census Bureau, in 2000, 222,360,539 or 79.0% people in the United States lived in urban areas. At the same time, 59,061,367 or 21.0% of the U.S. population lived in rural areas. The Census Bureau defines rural areas as those areas not included in an urban area. In 2010, the number of people living in urban areas rose to 249,253,271 or 80.7%. At the same time, the number of people living in rural areas

decreased to 59,061,367 or 19.3%. The direction of change at the national level was similar to the direction of population changes in the study's district locations as shown in Table 1. Definitions for the study's district locations can be found in Appendix A.

Table 1
Changes in Texas' Public School Enrollment by Location: 1997-2007

| Location | 1997 | 2007 | Percent Change |
|---|---|---|---|
| Major Urban | 802,444 | 892,014 | +11.2% |
| Major Suburban | 1,090,162 | 1,529,257 | +40.3% |
| Rural | 166,583 | 144,613 | -13.2% |
| Other | 1,837,639 | 2,015,124 | +9.6% |
| Totals | 3,846,828 | 4,581,008 | +19.1% |

During this time period, the TEA (2011) revealed there were also changes in ethnicity/race within the study's locations as shown in Table 2. From 1997-2007 in *Major Urban Districts* both the White population and the African American population decreased, while the Hispanic population increased. At the same time, in *Major Suburban Districts* the White population decreased, while both the African American and the Hispanic population increased. Finally, in *Rural* Districts, both the White population and the African American population decreased, while the Hispanic population increased.

Table 2
Changes in Texas' Public School Population by Location: 1997-2007

| Location | Ethnicity | 1997 | 2007 | Percent Change |
|---|---|---|---|---|
| Major Urban | | | | |
| | African American | 193,760 | 167,920 | -25.8% |
| | Hispanic | 436,830 | 565,073 | +29.4% |
| | White | 154,430 | 134,343 | -20.0% |
| | Asian | 15,488 | 22,624 | +46.1% |
| Major Suburban | | | | |
| | African American | 154,722 | 258,256 | +66.9% |
| | Hispanic | 306,461 | 622,585 | +103.2% |
| | White | 567,098 | 539,971 | -27.0% |
| | Asian | 58,477 | 103,292 | +76.6% |
| Rural | | | | |
| | African American | 11,324 | 8,255 | -27.1% |
| | Hispanic | 42,789 | 43,379 | +1.4% |
| | White | 111,487 | 91,643 | -17.8% |
| | Asian | 417 | 467 | +12% |

At the post-secondary level, during the 2000-2010 periods, information from the Texas Higher Education Coordinating Board (THECB) (2011) revealed there were demographic changes in who was attending Texas higher education institutions as shown in Figure 2. Total student population increased from 876,430 in 2000 to 1,445,157 in 2010. Of these students, 486, 911 were White, 90,855 African American, and 212,231 were Hispanic. In 2010, the White population grew to 640, 087, which was an increase of 31%. The African American population increased almost 100% to 181,398, and the Hispanic population increased just over 100% to 425,727.

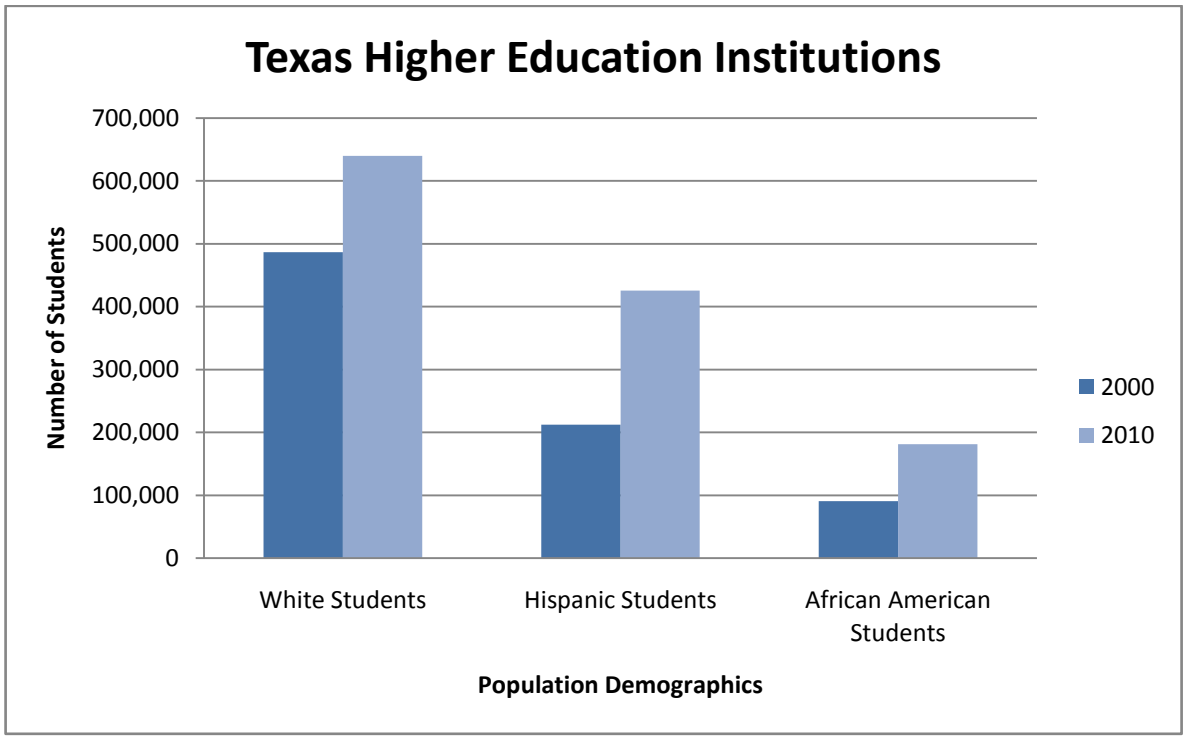



Figure 2 Texas Higher Education Institutions.

During the same 2000-2010 time frame, information from the THECB (2011) showed there were changes in who was taking dual credit classes as shown in Figure 3. In 2000, 17,784 students took dual credit classes. Of these students, 12,886 (72.4%) were White, 570 (3.2%) African American, and 3,519 (19.8%) were Hispanic. In 2010, 90,364 students took dual credit classes. The White student population had grown to 40,790. The African American population had increased to 5,491 and the Hispanic population had increased to 32,801.

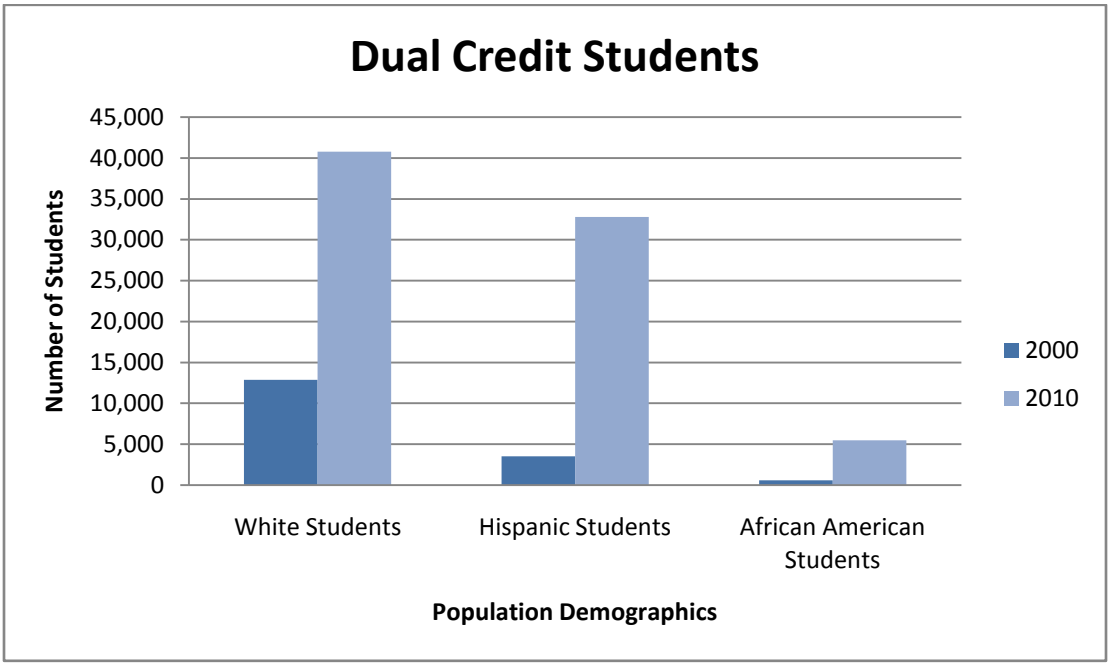



Figure 3 Dual Credit Students.

To review, over the last 10 years, our nation's total population has grown 9.7%, due mainly to an increase in the Hispanic population. Similarly, Texas' population grew more than other states primarily because of an increase in the Hispanic population as well. This demographic shift is evident in the public school population. In Texas's public schools, the number of White students has declined, the number of African American students has had a slight increase, and the number of Hispanic students has increased greatly. Some of Texas' district locations are seeing increases in enrollment while other areas are experiencing declining enrollment. At the post-secondary level, the growth in the White population in Texas' higher education institutions has slowed while the African American and Hispanic populations have both doubled in numbers.

Finally, Texas has experienced tremendous growth in the numbers of students taking dual credit classes. According to Eklund (2009), "it is important to look at these demographic characteristics to see what level dual credit programs serve these populations and if program growth involves these participants" (p.102). Although the current literature shows overall growth across Texas with more students taking dual credit classes, it also reveals gaps in information. What is not known is how did dual credit growth in the study's locations serve the study's participants? This study attempts to answer this question.

## Statement of the Problem

The Texas Higher Education Coordinating Board (2011) reports, in the fall of 1999, only 11,921 students in the state of Texas enrolled in dual credit classes. By 2006, when Texas's House Bill 1 passed, 57,554 students were taking dual credit classes and that number increased to 91,303 by the fall of 2009. Although more students are taking advantage of dual enrollment, its effect on student success in Texas is unknown. Additionally, past research did not disaggregate the data by high school setting or student race/ethnicity. It is possible that the rising numbers of dual credit enrollments have not increased equally for all student groups. For example, the high school setting may have had an effect on the amount of dual credit a student was able to take. In addition, the role dual credit plays in these students' college persistence and student success is not clear. This study does three things: a) explores the effects of dual credit programs on college persistence and student success in college, b) determines if there is

a difference based on the high school setting and student demographics, and c) looks at the three-year period when Texas's 2006 House Bill 1 was first implemented.

## Purpose of the Study

Therefore, this study will use institutional data covering the 2007, 2008, and 2009 academic years from a single Texas university to determine the role dual credit plays on college persistence and student success before the Bill was enacted, the year it went into effect, and the following year. For the purposes of this study, persistence is measured by retention from the first year of college to the second year and student success is operationalized as a student having a higher last term freshman GPA when compared with other students. In addition, this study looks specifically at differences in student demographics and three different student groups: high school graduates from rural, urban, and suburban areas in order to determine if the high school setting makes any difference. Finally, this study seeks to determine whether the number of dual credit hours earned by a student is independent of the student's high school setting.

## Research Questions

The purpose of this study was to explore whether or not: a) the passage of the 2006 Texas' House Bill 1 increased college student success for all groups based on high school location, and b) are the factors at the secondary level that are high school factors (amount of dual credit, high school class rank, and SAT scores) stronger predictors than background factors (poverty, race, gender, and high school setting)? For the purposes of this research, this researcher defines a student from poverty as living in an area where, according to the Census Bureau (2012), "the percent of population for whom poverty

status is determined" exceeded the 2007 national average of 13%. This does not mean that the student or his/her family is poor, only that the student and/or his/her family lives in an area which is impoverished, where more people than the national average live in poverty. More specifically, this study will attempt to answer the following research questions and hypotheses:

1. Can first-to-second-year college persistence for the 2007-2008 academic school year be predicted from the following variables: dual credit, poverty, gender, high school class rank, SAT, ethnicity, and location of students' high school setting (urban, suburban, and rural high schools)?
2. Can first-to-second-year college persistence for the 2008-2009 academic school year be predicted from the following variables: dual credit, poverty, gender, high school class rank, SAT, ethnicity, and location of students' high school setting (urban, suburban, and rural high schools)?
3. Can first-to-second-year college persistence for the 2009-2010 academic school year be predicted from the following variables: dual credit, poverty, gender, high school class rank, SAT, ethnicity, and location of students' high school setting (urban, suburban, and rural high schools)?
4. Can last freshman term GPA for the 2007-2008 academic school year be predicted from the following variables: dual credit, poverty, gender, high school class rank, SAT, ethnicity, and location of students' high school setting (urban, suburban, and rural high schools)?

5. Can last freshman term GPA for the 2008-2009 academic school year be predicted from the following variables: dual credit, poverty, gender, high school class rank, SAT, ethnicity, and location of students' high school setting (urban, suburban, and rural high schools)?
6. Can last freshman term GPA for the 2009-2010 academic school year be predicted from the following variables: dual credit, poverty, gender, high school class rank, SAT, ethnicity, and location of students' high school setting (urban, suburban, and rural high schools)?

## Research Hypotheses

1. The number of dual credit hours earned by a student for the 2007-2008 academic school years is independent of the student's high school setting (urban, suburban, and rural high schools).
2. The number of dual credit hours earned by a student for the 2008-2009 academic school years is independent of the student's high school setting (urban, suburban, and rural high schools).
3. The number of dual credit hours earned by a student for the 2009-2010 academic school years is independent of the student's high school setting (urban, suburban, and rural high schools).

## Theoretical Framework

This study uses Pierre Bourdieu's concept of *cultural capital* as the overarching theoretical framework. Winkle-Wagner (2010) states, "used appropriately, cultural

capital holds the promise of providing an excellent theoretical source for research, particularly research that centers on topics related to class issues, social stratification, or attempts to understand the perpetuation of equality more generally" (p.1).

This study looks at factors that are somewhat within the students control at the secondary level that are high school factors (i.e., amount of dual credit, high school class rank, and SAT score) and also background factors which are out of a student's control (i.e., SES, race, gender, and location of students' high school setting).

Bourdieu held the belief in the absence of external factors (agency) social structure will reproduce itself. However, through agency, one has the possibility of influencing and resisting the social structure (Winkle-Wagner, 2010). Agency is "the idea that individuals are equipped with the ability to understand and control their own actions, regardless of the circumstances of their lives" (Webb, Schirato, & Danaher, 2002, p. ix). Education is one area where the interaction of agency and social structure can be investigated (Winkle-Wagner, 2010).

## Significance of the Study

Texas' 2006 House Bill 1 changed the high school experience, because it required all high schools in Texas, beginning in the fall of 2008 to provide students with the opportunity to earn a minimum of 12 hours of college credit prior to their graduation. By looking at data from before and after the passage and implementation of this law, the results of this study should shed light on the success or failure of Texas' 2006 House Bill 1 regarding college persistence and student success with regards to rural, urban, and suburban students. The merit of the study will be its ability to add to,

confirm, or refute research on dual credit programs, on college persistence, and student success in terms of, student demographics, and student high school setting. Differences in cultural capital between student groups may result in different college persistence and student success of those student groups. If an inequity previously existed on who could take dual credit classes, House Bill 1 may have reduced this inequity. The findings from this study may aid students, parents, high school counselors, and others in helping students choose a path for college success.

# CHAPTER 2

# LITERATURE REVIEW

This chapter provides a summary of current literature relevant to the study by focusing on the following topics: Factors for college readiness, college persistence, predictors of college success, dual credit programs, school characteristics, and theoretical framework.

## Factors for College Readiness

There is considerable evidence that students are unprepared for college. Byrd and MacDonald (2005) claim 29% of all college-going students need remediation in reading, writing, or mathematics. Although there is no universally definition for college readiness, Tinto (1987) argued "that the interplay between individual goals and commitments (internal and external) influences not only whether a person leaves but also the form that the leaving takes" (p. 130). This researcher would argue college readiness and institutional departure are two sides of the same coin. Therefore, for the purposes of this study, college readiness consists of those factors internal and external to the student that can predict or contribute to college success.

High schools play a critical role in helping students become ready for college. Plank and Jordan (2001) conducted a longitudinal study of 25,000 students and found college preparation while in high school increases the chances of an individual enrolling in college. Allen, Robbins, Casillas, and Oh (2008) found that "pre-college academic

preparation is essential to first-year academic performance, which then affects the likelihood of staying, transfer [ring], or [being a] dropout" (p. 662). This pre-college preparation would include rigorous coursework, academic self-discipline, and commitment to education (Allen et al., 2008). Byrd and MacDonald (2005) go so far as directly recommending teaching high school students the practical skills needed for college.

In addition to the quality of the student's high school education, research shows family circumstances play a large role in their student's college readiness. This is an important area to study since background factors may have different effects on a student's success at college. Fann, McClafferty, and McDonough (2009) found that parents who have not gone to college have neither gained the experiences nor learned information necessary to aid their children with the process of college preparation. More specifically, Byrd and MacDonald (2005) found that parents and students feel inadequately prepared regarding financial aid. "Students presume they cannot afford college but they don't know much about…financial aid" (College Board, 2011, p. 115.). To make matters worse, Jones (2009), in a report by the California Postsecondary Education Commission, indicated colleges are taking a much larger share of family income compared to 30 years ago. This rise in college costs only increases the importance of financial aid information. Unfortunately, De La Rosa and Tierney (2006) found, "rather than promote access, college admissions and financial aid processes often create a series of barriers that the poorest student must overcome to get into college"

(p.1). This is just one area that the lack of knowledge can have a profound effect on students' college-going decisions and, ultimate, success.

## College Persistence

The debate on why students are not successful and drop out of college is not new. Research in the area of persistence had its start in the 1970's with work by Astin (1970) and Tinto (1973). Collaboration between Tinto and Cullen in 1973 produced a theoretical model of attrition and persistence (as cited in Tinto, 1987). Tinto took a two-pronged approach to reasons behind student departure from colleges. Tinto (1987) theorized a student leaves college due to factors within the individual and factors gained from the environment. According to Tinto (1987),

> individual departure from institutions can be viewed as arising out of a longitudinal process of interactions between an individual with given attributes, skills, financial resources, prior educational experiences, and dispositions (intentions and commitments) and other members of the academic and social systems of the institution. The individual's experience in those systems, as indicated by his/her intellectual (academic) and social (personal) integration, continually modifies his or her intentions and commitments. (pp.113-114)

Furthermore, according to Tinto (1987), patterns of entry are related to patterns of departure, so extending Tinto's idea to this study: Students taking college classes while still in high school may have a different effect on persistence than students taking college classes while in college. Getting introduced to college before high school matriculation may have a positive effect on student persistence.

Many factors in high school have been examined to determine if they had an effect on college persistence. Johnson (2008) found that completing a college-preparatory curriculum in high school was associated with a 1.16 increase in the odds of persistence. She also found students from high schools with a greater percent of SAT takers have greater odds of persisting. However, Johnson (2008) found that college students who came from high schools with a high percentage of their students receiving free lunches were less likely to persist to a second year of college compared to those who did not.

Other researchers found dual enrollment had a significant positive effect on college persistence (Harrington, 2005; Shaughnessy, 2009; Sherman-Valentine, 2010). A study done by Harrington (2005) looked at first-time freshman with dual and/or concurrent enrollment credits compared with students without dual/concurrent enrollment. Out of almost 5,000 incoming first-time freshmen, 26% had college credit before they began their freshman year. Harrington's research indicated students with prior college credit had higher high school GPAs and higher SAT scores than those students without dual credits. Although Harrington found a positive predictive value for dual/concurrent enrollment credit on college persistence, it accounted for a very small amount of variance. So it helped with grades but not for persistence.

However, Sell's findings (2008), complicate the picture. In this study, recent community college graduates, with dual/concurrent enrollment were more likely to have a higher fall semester GPA at the beginning of their second year, but were no more likely to persist to the fall semester. Yet, this was reversed the following spring. At that

point, they were more to persist to the spring semester, but not more likely to have a significantly higher spring semester GPA.

Other research shows academic performance is a key factor in long-term persistence (Allen, Robbins, Casillas, & Oh, 2008). In the study, that utilized a large sample from 23 institutions, they found gender (with females out performing males) and higher SES (socioeconomic status) were all positive predictors of higher GPA. However, academic performance was the best indicator of persistence (Allen, et al. 2008).

In my study, I plan to add to the research literature by building on previous research that looked at persistence, as well as GPA, as a dependent variable. This study will not just replicate previous research but expand upon that work by using variables that the current literature suggests may be important to college readiness and which leads to student success.

## Predictors for College Success

Colleges are interested in increasing student success at their institutions and use factors they believe are related to student success in the student admissions process such as high school curricula, SAT scores, and high school class ranking. Most states make changes to their high school curricula in an effort to increase college preparedness. In Texas, House Bill 1, 79$^{th}$ Legislature (2006), recommended public schools and institutions of higher education work together to align the curriculum in the four core classes to contain the knowledge and skills necessary for students to be successful in

entry-level college courses. Texas currently offers three different high school academic curriculum programs: the Minimum Plan, the Recommended Plan, and the Distinguished Plan. These plans differ in the amount of high school credits a student must obtain before graduation as well as the number of advanced courses required (junior-senior-level courses). The Distinguished Plan also requires the student demonstrate mastery at the college level. This mastery can be demonstrated through AP testing, taking and passing a college class, or completing a college-level project. Students who take college-level or advanced high school courses, as required in the Distinguished Plan, are more likely to earn a bachelor's degree than students who take vocational courses (Allen, Robbins, Casillas, & Oh, 2008).

Another factor used in the admission decision is standardized tests. The most commonly used standardized tests to predict college success are: the Scholastic Aptitude Test (SAT) and the American College Test (ACT). According to some, the SAT is a valid predictor of college success (Menson, Patelis, & Doyle, 2009). Yet others claim admission tests, such as the SAT and ACT, can only predict up to 25 percent of the grades the student will achieve in college (Popham, 2007). Others suggest tests such as the SAT and ACT do not reliably predict much past the first year (Jalomo, 2000). This being the situation, it is not surprising that large state universities "require applicants to report class rank (as do many scholarship programs), and rely on it to help sort through the high volume of applications received" (College Board, 2012, n.p.).

In addition to standardized tests, many colleges use high school GPA in the pre-admission phase. Mattson (2007) found high school GPA to be the most significant

predictor of college success as measured by college GPA. This is supported by Berry and Sackett (2009) who used college grades, not college GPA, to measure success. They found when SAT and high school GPAs were combined together they accounted for between 44% and 62% of the variance in college grades. However, Sinha, Oswald, Imus, and Schmitt (2011) point out that standardized cognitive ability tests such as the SAT have sizable subgroup differences wherein African Americans score about one standard deviation below Whites, Hispanics score two-thirds standard deviation below Whites, and Asians score above White students. They also found that when noncognitive measures such as biographical data (student interests, background experiences, motivational characteristics, and life history) were added to the usual predictors of college success, different proportions of ethnic groups would be admitted. According to Sinha, Oswald, Imus, and Schmitt (2011), the use of noncognitive measures can reduce the adverse impact of cognitive measures on ethnic selection during the admission process.

In summary, both high schools and colleges are interested in the factors surrounding college success. Three areas relevant to this study are: high school curricula, standardized tests, and high school class rank. These areas are important in the admission decisions of colleges and universities.

## Dual Credit

"Dual credit is a process through which a student may earn high school credit for successfully completing a college course…The 'dual credit' earned is college credit and high school credit for one course" (TEA, 2011). There is much research that has

been published in the area of dual credit. Some argue that being able to earn college credits while in high school allows students to get a head start on earning their college degree while still in high school (Gertge, 2008). This, of course, would suggest dual credit facilitates college readiness and decreases time to degree attainment.

Several researchers have in fact found dual credit reducing time to degree attainment. Sherman-Valentine (2010) used longitudinal data from traditional first-year students who had enrolled at Indiana University of Pennsylvania and had earned dual enrollment and /or AP credits. The researcher used descriptive statistics, chi-square, and a one-way ANOVA to analyze the data. She found students who participated in dual credit and/or AP programs had a significant influence on their first semester GPA and time to degree attainment. Westcott (2009) also compared degree attainment of students with and without dual credit. She tracked the students across all institutions they attended for six years and found dual credit students had a significantly higher rate of degree attainment and a shorter time to completion. Shaughnessy (2009) reached similar conclusions. He found students who participated in the state dual enrollment program in high school had higher proportions of college retention and degree attainment within four years when compared to their non-dual enrollment counterparts. In addition, Shaughnessy found as the number of dual credit courses increased the rate of degree attainment increased.

Other researchers found that there are additional benefits associated with dual credit. Hartman (2007) conducted a large-scale study and found students who participated in dual credit courses had a higher college freshman GPA than their non-

dual credit counterparts. In a longitudinal study, Shannon (2005) found students who participated in dual enrollment programs had higher ACT composite scores, better high school class ranks, and shorter time to degree completion when compared to non-dual enrollment programs. An (2009), using data from the National Longitudinal Study of 1988, compared dual credit students with non-dual credit students. Although An did not find that having dual credit decreased time to degree attainment, he did find that students with dual credit had more college credits earned, decreased the likelihood of college remediation, and increased the likelihood of degree attainment. Finally, Swanson (2008) using a national database found students with dual credit were more likely to enter college immediately after high school and persist to the second year. Furthermore, those dual credit students with academic momentum were more likely to earn a bachelor's degree or advanced degree.

Research has been mainly positive regarding dual credit and its benefits to students who plan on attending college and attaining a degree. Generally speaking, research has shown students who obtained dual credit compared to those who do not have dual credit, may have a higher college GPA, improve their odds of persisting, and increase the likelihood of degree attainment.

## School Characteristics

According to Bouck (2004), the size of a school influences the student's educational experience, including post-secondary outcomes. Rather than identify schools by population numbers, some researchers choose to report information using school location or types (i.e., urban, suburban, and rural), whereas, other researchers

choose to characterize schools as small and large campuses, In general, most large schools in Texas are found in urban and suburban locations, and most small schools in Texas are found in rural locations. Current literature on schools in different settings and of different sizes focuses on school safety, poverty, counseling, and student achievement.

**School Safety**

School safety issues seem to be connected to levels of student poverty, school location, and school demographics. According to Gregory, Cornell, and Fan (2011), poor urban schools report more misbehavior than wealthy suburban schools. Other researchers found that small schools, which are often rural, are better than large schools due to fewer discipline problems (Kinnaman, 2008) and reduced occurrences of violence (Klonsky, 2002). Gregory et al. (2011) found that schools with higher rates of free or reduced lunch have higher rates of victimization. Mayer and Furlong (2010) also found urban schools had significantly higher violent victimization rates when compared with suburban and rural settings. Although bullying was slightly lower in urban schools than other school types, they found that bullying rates were similar in suburban and rural schools (Mayer & Furlong, 2010).

Other studies credited rural schools with many benefits. Gandara, Gutierrez, and O'Hara (2001) found "rural students are less likely [than non-rural students] to feel pressure to engage in gang activity" (pp.88-89). In general, Bouck (2004) reported that students in rural schools tend to be "more satisfied with their school, [felt] that their teachers are more supportive, and that they feel safer, as compared to urban schools" (p.

39). One reason may be that small schools can more easily put into place strategies that reduce violence, engage the faculty, and school community (Klonsky, 2002).

**Poverty**

One thing these studies show is that poverty is found in virtually all public schools in this nation. It also affects student success in many ways. Besides safety issues that were discussed above, it affects the resources at the school like guidance counseling, teacher quality, course offerings, and access to technology.

According to McCoy (2010) counselors who work in high poverty schools believe that working with parents about their student's college opportunities is part of their job. Unfortunately, Bryan, Holcomb-McCoy, Moore-Thomas, and Day-Vines (2009) found students in high-poverty schools were less likely to seek out counselors for information about college. One suggestion to increase college awareness is for school counselors to expand their leadership role serving as a culture broker between students, their families, and the school (Amatea, & West-Olatunji, 2007). This is important since Burney and Cross (2006) found that students from poverty who do not have family experienced with college require exceptional levels of support in order to graduate college. Guidance counselors could offer that support.

It comes to no one's surprise that schools with high-poverty levels have difficulty in attracting or retaining quality teachers. According to Milanowski, Longwell-Grice, and Saffold, (2009), many school districts are using financial incentives to reach and keep high-quality teachers in high-need, low-achieving schools. However, their research using focus groups with pre-service teachers indicated that

working conditions were more of a factor than amount of salary (Milanowski, Longwell-Grice, & Saffold, 2009). In a study that focused on the racial and poverty composition of schools, Southworth (2010) found increasing teacher quality reduces but does not eliminate the effects of poverty on student achievement. Fowler, Banks, Anhalt, Der, and Kalis, (2008) found that student achievement was more about developing strong teacher-student relationships than just teacher quality.

Bouck (2004) claims that urban and rural schools have higher poverty levels when compared to suburban schools, and that this does affect the educational course offerings. Specifically, Bouck (2004) suggests poverty affects student access to computers, with students in suburban locations having greater access than both urban and rural students. This lack of computer access affects the ability of students to take online college courses and/or virtual high school courses (Bouck, 2004). Without equal computer access, urban and rural students are at a disadvantage when compared to suburban students.

**Achievement**

Different school types affect school achievement differently. In this section, I will focus on the school characteristics that affect achievement. According to Cucchiara and Horvat (2009) research shows, "for several decades, urban public schools in the United States have been associated with low-income populations and with chronic poor performance" (p. 975). In addition, "the evidence on the newer wave of more rigorous tests, however, suggests that more recent exit exam policies are consistently associated

with increased drop-out rates, particularly for low-achieving students attending urban high-poverty schools" (Holme, Richards, Jimerson, & Cohen, 2010, p. 504).

Several researchers report students in small schools have better academic achievement than students in large schools (Kinnaman, 2008; Viadero, 2001; Wasley & Lear, 2001). Wasley and Lear (2001) suggest schools with fewer than 400 students are able to implement practices that increase student learning. In addition, students in poverty, according to Ferguson (2000), "perform better when they attend smaller schools. The lower the income in the community, the more student achievement is benefited by smaller schools" (p.10).

However, Wainer and Zwering (2006) assert that small schools do no better [academically] than other types of institutions, as evidenced by being overly represented at both ends of the performance distribution. In addition, Hoff (2008) reported that creating small schools from large ones did not increase the school's overall achievement on state tests.

Fischer and Hebel (1999) argue large schools may be viewed as having some benefits, but these benefits have not translated into better achievement. "Even assuming that larger schools did equate more fiscal efficiency, diverse curriculum, and extracurricular activities, those factors have not translated into better achievement" (Fischer & Hebel, 1999, p. 76). Leithwood and Jantzi (2009) found mixed results when looking at academic achievement of large secondary schools. Of 19 schools, five showed that academic achievement increased as school size increased, six showed

achievement increased up to an optimum point then decreased, and eight showed as school size increased, academic achievement decreased.

In summary, a review of current research reveals researchers are not in agreement on which school type is best. Research shows each type of location has advantages and disadvantages. Thus, students in those different schools have different advantages and disadvantages.

## Theoretical Framework

This study uses Pierre Bourdieu's concept of cultural capital as the overarching theoretical framework. Bourdieu claimed cultural capital is

> the product of a privileged family background, which 'naturally' imbues children with just the 'knowledge and practical and verbal know-how' (Centre de sociologie europeenne, 1972:12) that they need to succeed at school, gain entry to a prestigious tertiary institution and, consequently, gain the kind of employment which keeps them in the privileged social group into which they were born. (Harker, 2000, p. 265)

According to Fowler (1997), people inherit capital from their families and it is hard to change their situation if they come from poverty. For example, Johnson (2008) found the odds of first-generation students persisting whose parents did not have a bachelor's degree were only .83 times the odds of persisting when compared to students whose parent(s) had a bachelor's degree. Additionally, Johnson (2008) found the odds of a student persisting increase with the increase of their parent's income, and students from families with lower income are more likely to leave college.

Some terms associated with cultural capital are field, habitus, and agency. Winkle-Wagner (2010) explains "field" as an educational environment where cultural capital exists. In this environment, cultural capital is fostered through habitus. Habitus, which operates at the subconscious level (Winkle-Wagner, 2010) "generates practices which serve, in absence of external factors, to reproduce social structure. As a consequence, history tends to repeat itself" (Jenkins, 1992, p. 96). So, extending this idea, students of rural, urban, and suburban environments will have differences in their cultural capital, and these differences, in absence of external factors, will cause students to reproduce their social structure.

Fortunately, Bourdieu allows for the possibility of change, and for exceptions to cultural reproduction, through a concept he calls "agency." Agency is the concept that individuals can make definitive choices and control their own actions regardless of their circumstances (Webb, Schirato, & Danaher, 2002). Taking dual credit classes may be an external factor (agency) that provides certain students the ability to change their destinies. This change may or may not affect college persistence and/or student success.

## Summary

This chapter provided a review of current literature relevant to the study by focusing on the following topics: Factors for college success, college persistence, predictors of college success, dual credit programs, school characteristics, and theoretical framework. Bourdieu's theory of cultural capital allows for the possibility of change through agency. Therefore, it is important to study the factors, which may increase college readiness and allow for student success at the college level.

# CHAPTER 3

# METHODOLOGY

After being an educator in urban, suburban, and rural locations, this researcher felt that perhaps differences in high school settings as well as opportunities may have different effects on the success of students when they attend college. Quantitative research was chosen as the preferred methodology. According to Gall, Gall, and Borg (2007), quantitative research,

> is grounded in the assumption that features of the social environment constitute an objective reality that is relatively constant across time and settings. The dominant methodology is to describe and explain features of this reality by collecting numerical data on observable behaviors of samples and subjecting these data to statistical analysis. (p.650)

This quantitative study was non-experimental in nature and used existing data provided by a single, large public institution located in the Southwestern United States. Before any data were collected, written approval was sought and obtained from the institutional review board (IRB). Any information that might lead the researcher to the identity of students was removed from the data before the data were given to the researcher. The study was conducted during the fall and spring semesters of the 2011-2012 academic years.

## Research Questions

The purpose of this study was to explore: a) If student success increased equally for all student groups after the passage of the 2006 Texas's House Bill 1, and b) are the factors at the secondary level that are high school factors (e.g., amount of dual credit, high school class rank, and SAT scores) stronger predictors than background factors (poverty, ethnicity, gender, and location of students' high school setting)? This study was guided by the following research questions and hypotheses:

1. Can first-to-second-year college persistence for the 2007-2008 academic school year, be predicted from the following variables: dual credit, poverty, gender, high school class rank, SAT, ethnicity, and location of students' high school setting (urban, suburban, and rural high schools)?
2. Can first-to-second-year college persistence for the 2008-2009 academic school year, be predicted from the following variables: dual credit, poverty, gender, high school class rank, SAT, ethnicity, and location of students' high school setting (urban, suburban, and rural high schools)?
3. Can first-to-second-year college persistence for the 2009-2010 academic school year, be predicted from the following variables: dual credit, poverty, gender, high school class rank, SAT, ethnicity, and location of students' high school setting (urban, suburban, and rural high schools)?
4. Can last freshman term GPA for the 2007-2008 academic school year, be predicted from the following variables: dual credit, poverty, gender, high

school class rank, SAT, ethnicity, and location of students' high school setting (urban, suburban, and rural high schools)?

5. Can last freshman term GPA for the 2008-2009 academic school year, be predicted from the following variables: dual credit, poverty, gender, high school class rank, SAT, ethnicity, and location of students' high school setting (urban, suburban, and rural high schools)?
6. Can last freshman term GPA for the 2009-2010 academic school year, be predicted from the following variables: dual credit, poverty, gender, high school class rank, SAT, ethnicity, and location of students' high school setting (urban, suburban, and rural high schools)?

## Research Hypotheses

1. The number of dual credit hours earned by a student for the 2007-2008 academic school years is independent of the student's high school setting (urban, suburban, and rural high schools).
2. The number of dual credit hours earned by a student for the 2008-2009 academic school years is independent of the student's high school setting (urban, suburban, and rural high schools).
3. The number of dual credit hours earned by a student for the 2009-2010 academic school years is independent of the student's high school setting (urban, suburban, and rural high schools).

## High School Setting Definitions

In Texas, the Texas Education Agency (TEA) classifies school districts into these categories: Major Urban, Major Suburban, Other Central City, Other Central City Suburban, Independent Town, Non Metropolitan: Fast Growing, Non-Metropolitan: Stable, Rural, and Charter (TEA, 2010). For the purposes of this dissertation, I chose three categories, which comprise 80% of the studies population, to use as independent variables for high school location: Major Urban, Major Suburban, and Rural. The TEA defines an area being Major Urban if: (a) it is located in a county with a population of at least 735,000; (b) its enrollment is the largest in the county or at least 75 percent of the largest district enrollment in the county; and (c) at least 35 percent of enrolled students are eligible for free or reduced-price meals (Texas Education Agency, 2010). TEA's defines an area as Major Suburban if: (a) it is contiguous to a major urban district; (b) its enrollment is at least 3 percent that of the contiguous major urban district or at least 4,500 students (Texas Education Agency, 2010). The TEA defines a rural district as having "(a) an enrollment of between 300 and the median district enrollment for the state and an enrollment growth rate over the past five years of less than 20 percent; or (b) an enrollment of less than 300 students" (Texas Education Agency, 2010). Definitions for all of the TEA's district classifications can be found in Appendix A.

## Population and Sample

The population for this study consisted of all first-time Texas public undergraduate students from high school graduating class years 2007 to 2009 ($N$ = 195,648). The sample used for the study consisted of those students from this

population who attended the selected single, large public institution located in the Southwestern United States. Only those student cases that were first-time, first-year students were selected for the study and given to the researcher. The 2007 to 2009 data set contained 6,788 students. Of these students, 348 from 47 different states came to the institution, but only those who graduated high school in Texas were included in the study, which left 6,440 students. Additionally, 80 students who were home-schooled, received a GED, or whose high school was unknown or was not able to be categorized into TEA's district categories, were excluded from the study. This left a total of 6,360 students.

The ethnicity data for the sample included these categories: American Indian/Alaskan Native, Asian, Black/African American, Hispanic/Latino, Multiple Ethnicities, Native Hawaiian/Other Pacific Islander, No Ethnicity Entry for This Student, Not Specified, and White. This research only focused on comparisons between Asian, Black/African American, Hispanic/Latino, and White students that made up over 90% of the sample. Therefore the other student cases were removed. A comparison of students' ethnicity between this study's sample with the 2007-2009 average student population of Texas is shown in Table 3. When looking at the overall percentages, the study's White and Hispanic sample is smaller than the population, but having the same numerical order, White being the largest ethnic group, Hispanic being second largest. The overall percent of the Black sample was very similar to the population, but the Asian sample was twice as large as the general populations. Both the White and Asian

samples showed an overall percent reduction over the three-year period, whereas the Hispanic sample had a slight gain and the Black sample was relatively stable.

Table 3
Sample Student Ethnicity Percent Compared to Total State Population

| Category | 2007 (*n* = 1949) Percent | 2008 (n = 2062) Percent | 2009 (n = 2349) Percent | Population (n = 195,648) Percent |
|---|---|---|---|---|
| White | 45.6 | 41.5 | 38.3 | 48.7 |
| Hispanic/Latino | 17.6 | 19.8 | 21.3 | 27.3 |
| Asian | 15.8 | 15.3 | 14.5 | 7.6 |
| Black/African American | 13.2 | 14.2 | 13.9 | 13.7 |
| Other | 7.9 | 9.1 | 11.9 | 2.4 |
| Total | 100.1 | 99.9 | 99.9 | 99.7 |

*Note*. Total percent does not equal 100 due to rounding.

In order to perform some of the statistical tests, it was necessary to insert two columns into the Excel spreadsheet. The first column gave the students' high school district type (location) as categorized by the Texas Education Agency (TEA, 2011). The researcher matched the students' school district names with TEA's descriptions and coded them as: Urban, suburban, and rural. Since these three locations comprised 80% of the districts, those locations that did not fit into these three categories were excluded. Additionally, non-public high schools were excluded since this research looked at the effects of Texas House Bill One on public high schools.

The second column categorized the students' home location as either being above the poverty level or below the poverty level by using the students' home zip

code. Other researchers used poverty levels as determined by zip code information to note low income locations (Aron et al (2010); Mirtcheva, D., Powell, L. (2009); Kirby, Karen, and Jeffrey, (2001). This researcher used zip code data from the 2000 U.S. Census Bureau to determine whether or not a student lived in a location with higher than national average poverty level. The Census Bureau provides a web site, which allows a researcher to type in a five-digit Zip code tabulation area number and then reveals the percent of the population living in that zip code area for whom poverty status is determined. Students living in zip codes with a higher than 2007 national average poverty level (13%) were coded as 1; students living in zip codes with a lower than national average poverty level were coded as 0. Students for whom poverty level information through the Census Bureau could not be determined were excluded from the study.

Finally, the researcher examined the entire data set for cases that contained missing values. According to George and Mallory (2003), missing values can influence the results of your analysis in undesirable ways. Also, they suggest that it is best to deal with the missing values upfront versus hoping that SPSS will correctly handle missing values. In addition, Tabachnick and Fidell (2001) state "if only a few cases have missing data and they seem to be a subsample of the whole sample, deletion is a good alternative" (p. 59). Therefore this researcher chose to delete missing values. After all the deletions, the final sample was 3,573. (See table 4 for demographics).

Table 4
Final Sample

| Variable | 2007 (*n* = 1,039) Count | 2008 (*n* = 1,154) Count | 2009 (n = 1,380) Count | Total (*n* = 3,573) Count |
|---|---|---|---|---|
| *Gender* | | | | |
| Male | 515 | 582 | 673 | 1770 |
| Female | 524 | 572 | 707 | 1803 |
| *Ethnicity* | | | | |
| White | 479 | 458 | 531 | 1468 |
| Hispanic | 218 | 287 | 356 | 861 |
| Asian | 201 | 226 | 294 | 721 |
| Black | 141 | 183 | 199 | 523 |
| *High School Location* | | | | |
| Urban | 540 | 585 | 724 | 1849 |
| Suburban | 477 | 560 | 647 | 1684 |
| Rural | 22 | 9 | 9 | 40 |
| *Dual Credit by Location* | | | | |
| Urban | 9 | 6 | 4 | 19 |
| Suburban | 4 | 1 | 6 | 11 |
| Rural | 1 | 1 | 0 | 2 |
| *Poverty by Location* | | | | |
| Urban | 166 | 223 | 302 | 691 |
| Suburban | 74 | 98 | 127 | 299 |
| Rural | 13 | 6 | 6 | 25 |
| *Persistence by Location* | | | | |
| Urban | 384 | 421 | 540 | 1345 |
| Suburban | 332 | 407 | 507 | 1246 |
| Rural | 11 | 6 | 6 | 23 |

## Variables

In research, there are basically two types of variables, dependent and independent. Dependent variables are the outcome variable, the independent variables are those that are studied to see how they do or do not contribute to the outcome. Dependent and independent variables can also be continuous, discrete, and dichotomous. According to Tabachnick and Fidell (2001), some researchers may "prefer to substitute the terms interval or quantitative for continuous and nominal, categorical, or qualitative for dichotomous and discrete" (p. 6).

This study had two main dependent variables: Persistence from freshman (first-year) to sophomore year (second-year), and last freshman term GPA (grade-point average). Persistence is a discrete variable, either yes or no, which was re-coded dichotomously: Yes = 1, No = 0. GPA is a continuous variable (Tabachnick & Fidell, 2001, p.6). Last freshman term GPA is calculated by dividing the total number of college credit points by the total number of college hours completed during the last semester the student was enrolled as a college freshman. College credit points are determined by multiplying the number of class hours by the letter grade equivalents: A = 4, B = 3, C = 2, D = 1, and F = 0. These variables were chosen as indicators of student success (Eklund, 2009; Peng, 2003; Williams, 2010). And although Swanson (2008) would argue that, "grade point averages play a vital role in persistence to degree" (p.180), this researcher still feels that a high GPA does not necessarily guarantee persistence and a low GPA does not guarantee a lack of persistence. This researcher feels it is important to know the answer to questions like if coming from a certain high

school setting promotes a high college GPA but a low persistence, or a low college GPA but a high persistence.

In addition, the chi-square test of independence was used to determine if the amount of dual credit a student received was independent of high school setting. Since this study had three different high school locations, the chi-square test was to be used to determine if there was a significant difference $p < .05$ between the expected value for each cell from the observed value. If the two values differed significantly, the two variables would be considered to be NOT independent (George & Mallory, 2003). Unfortunately, the number of students from the sample who had dual credit was so small ($n = 32$), whether or not the amounts of dual credit (three hours, six hours, nine hours, etc.) was independent of high school setting could not be calculated, only whether or not a student had dual credit or not was independent of high school setting could be calculated. Students who had dual credit were coded with a 1; students without dual credit were coded with a 0.

This study had seven independent variables: dual credit, poverty, gender, high school class rank, SAT scores (Math, Verbal, Writing), ethnicity (African American, Hispanic, White, and Asian), and location of students' high school setting (urban, suburban, and rural). It was postulated the student has some control over three of the factors: amount of dual credit, high school class rank, and SAT score. Whereas, the student had little if no control over background factors: Poverty, ethnicity, gender, and location of students' high school setting. These variables were chosen to shed light on overall purpose of the study, to find out if factors at the secondary level that are high

school factors (for example, having dual credit, high school class rank, and SAT scores) are stronger predictors than background factors (poverty, ethnicity, gender, and location of students' high school setting) of future student success at college. A data code book, which describes how each variable was coded, is located in Appendix B.

## Correlation Coefficients and Measures of Association

Before relationships between dependent variables and independent variables can be analyzed, it is important to ascertain if there is any relationship at all between the variables. Boslaugh and Watters (2008) suggest that correlations should be used during the exploratory stage of research to determine which variables have a statistical relationship with each other (p. 169). In order to do this, a researcher can use parametric and nonparametric procedures. Parametric procedures require both the dependent and independent variables to be interval or ratio variables and normally distributed; nonparametric procedures are not (Huizingh, 2007). If there is no relationship between the variables, the variables are said to be independent of each other.

For research questions one, two, and three, since the dependent variable (first-to second-year persistence) is not an interval or ratio variable, but measured at the nominal (categorical) level, nonparametric methods need to be utilized to determine if there is any relationship between itself and the categorical independent variables. According to Huizingh (2007), "when we are dealing with variables grouped into categories, we use a crosstable to study the relationship between two variables" (p. 95).

> The purpose of cross tabulation is to show in tabular format the relationship between two or more categorical variables. Categorical variables include those

> in which distinct categories exist such as gender (female, male), ethnicity (Asian, White, Hispanic), place of residence (urban, suburban, rural), responses (yes, no), grade (A, B, C, D, F), and many more. (George & Mallery, 2003, p.106)

Therefore, cross tabulation was used to explore if there was a relationship between first-to second-year persistence and: dual credit, poverty, gender, race, and location of students' high school setting. The Phi coefficient was run to provide information on the possible strength of the correlation. The Cramer's V coefficient was used to test the measures of association between the variables. In research questions one, two, and three, where the dependent variable (first-to second-year persistence) is categorical and the independent variables are continuous (SAT), the point-biserial correlation coefficient was used to explore if there was a relationship.

To answer research questions four, five, and six, since the dependent variable (last freshman term GPA) is continuous, ratio data, "to determine the strength and direction of the relationship" the Pearson product-moment correlation coefficient (r) is used (Boslaugh & Watters, 2008, p. 176). To use the Pearson r, it is assumed that the variables are interval or ratio and the sample comes from normal distribution (Huizingh, 2007, p.290). In research questions four, five, and six, where the dependent variable (last freshman term GPA) is continuous and the independent variables are categorical (dual credit, poverty, gender, race, and location of students' high school setting), Eta was used to explore if there was a relationship. Eta is used "if the dependent variable is interval and the independent variable nominal or ordinal" (Huizingh, 2007, p.253).

To answer research hypotheses, one, two, and three, the chi-square test of independence was used to analyze the potential relationship between amount of dual credit earned (having dual credit or not) and high school setting: Urban, suburban, and rural. Each class (2007, 2008, and 2009) was analyzed separately and in aggregate.

## Data Analysis

Regression analysis assumes that both the dependent and independent variables are interval or ratio and that the relationship is linear. This researcher converted the non-interval variables such as urban, suburban, and rural into first nominal variables giving them values of A, B, and H, and then into dummy variables with the values of 1 or not 1 (else = 0). "The conversion of a discrete variable into a series of dichotomous ones is done to limit the relationship between the dichotomous variables into linear relationships" (Tabachnick & Fidell, 2001, p.6).

To answer research questions one, two, and three, logistic regression was used to analyze the relationship between the dependent (outcome) variable: first-to second-year persistence, and the independent (predictor) variables: dual credit, poverty, gender, high school class rank, SAT, ethnicity (African American, Hispanic, White, Asian), and location of students' high school setting: urban, suburban, and rural. Each class (2007, 2008, and 2009) was analyzed separately and in aggregate. According to Tabachnick and Fidell (2001), "logistic regression allows one to predict a discrete outcome such as group membership from a set of variables that may be: continuous, discrete, dichotomous, or a mix" (p. 517). Calculations were made using the statistical software SPSS version 20.0.

To answer research questions four, five, and six, regression analysis was used to analyze the relationship, between the dependent variable: last freshman term GPA, and the independent variables: dual credit, poverty, gender, high school class rank, SAT, ethnicity (African American, Hispanic, White, Asian), and location of students' high school setting: urban, suburban, and rural. Each class (2007, 2008, and 2009) was analyzed separately and in aggregate. Calculations were made using the statistical software SPSS version 20.0.

In addition, multiple regression was chosen to analyze the relationship between the dependent variables: Persistence and last freshman term GPA, and the background and agency independent variables. First, the background variables: Poverty, gender, ethnicity (African American, Hispanic, White, and Asian), and location of students' high school setting: urban, suburban, and rural were entered into the analysis to see how much of the dependent variable could be predicted. Afterward, the agency variables: Dual credit, SAT scores, and class rank, were entered into the analysis to see if they added to the model. The classes (2007, 2008, and 2009) were analyzed in aggregate. Calculations were made using the statistical software SPSS version 20.0.

There are five common methods of entering the variables into the regression equation all having advantages and disadvantages: Enter, forward, backward, stepwise, and remove. Since this is an exploratory study, it is important to uncover all relationships between variables. Therefore, this researcher chose the *Enter* method which forces SPSS to enter all the variables into the regression equation regardless of significance level (George & Mallory, 2003). The alpha level was set at .05.

To answer research hypotheses, one, two, and three, the chi-square test of independence was used to analyze the potential relationship between amount of dual credit earned (having dual credit or not) and high school setting: Urban, suburban, and rural. Each class (2007, 2008, and 2009) was analyzed separately and in aggregate. Tabachnick and Fidell (2001) assert, "The chi-square ($\chi^2$) test of independence is used to examine the relationship between two discrete variables" (p. 55). The students' high school setting (i.e., urban, suburban, and rural) is already a discrete variable. However, the amount of dual credit students earned is a continuous variable and had to be changed into a discrete variable. Tabachnick and Fidell (2001) state "sometimes discrete variables are used in multivariate analysis in place of continuous ones if there are numerous categories and the categories represent a quantitative attribute" (p. 6). Chi-square calculations were made using the statistical software SPSS version 20.0.

## Ethical Issues

The researcher took all reasonable measures to assure the study was conducted in such a manner that it could be replicated given the same data and following the same procedures that were used in this study. Information necessary to replicate this study is available to show "transparency" and willingness on the part of this researcher for his research to be publically examined. Anytime humans are involved in activities such as data entry into a computer spread sheet, mistakes can occur. The utmost care was taken when entering all data to insure the results are as valid as humanly possible. All results were reported in as an unbiased manner as possible.

## Summary

This quantitative study examined the effects of college readiness and dual credit programs on student success as measured by college persistence and last freshman GPA. The focus was on urban, suburban, and rural students who had taken dual credit classes while in high school. The population for the study consisted of all first-time Texas public undergraduate students from high school graduating class years 2007 to 2009. The sample for the study came from those first-time Texas public undergraduate students who entered the selected public research university in Texas. Tests of association and correlation, logistic regression, multiple regression, and the chi-square test of independence were used to analyze the data. The results of this study will add to current literature regarding dual credit as well as differences between urban, suburban, and rural students.

# CHAPTER FOUR

# DATA ANALYSIS

The purpose of this study is to add to the existing literature by examining the effects of college readiness and dual credit programs on college persistence and student success. This researcher looked at two different types of factors that may affect college readiness in students a) background factors such as ethnicity, gender, poverty, and high school location and b) high school factors such as obtaining dual credit, class rank, and SAT scores. The results of this study may give evidence for supporting the dual enrollment policy or for making changes in this policy at the state level.

## Analysis of Data Overview

To answer research questions one, two, and three, logistic regression was used to assess the association, between the dependent variable (i.e., first-to second-year persistence), and the independent variables. The independent variables are: dual credit (obtained or did not obtained), poverty, gender, class rank, SAT scores (math, verbal, writing), ethnicity (African American, Hispanic, White, and Asian), and location of students' high school setting (urban, suburban, and rural). The poverty of the student was determined by the students' home zip code. If the students home zip code had a poverty level $\geq$ 13%, they were coded as below the national average, if their home zip code had < 13% poverty, they were coded as above the national average. Each class was

analyzed combined with the other classes to increase sample size (see table 4 page 39) and then analyzed separately to possibly see changes over the three-year period.

To answer research questions four, five, and six, regression analysis was used to assess the association between the dependent variable (i.e., last freshman term GPA), and the independent variables which were: dual credit, poverty, gender, high school class rank, SAT scores, ethnicity, and location of students' high school setting. Each class was analyzed combined with the other classes to increase sample size and then analyzed separately to see changes over the three-year period. The same process was used to determine poverty as above.

To answer research hypotheses, one, two, and three, the chi-square test of independence was used to assess the association between amount of dual credit earned and high school setting (i.e., urban, suburban, and rural). Each class (2007, 2008, and 2009) was analyzed together due to small sample size and then separately.

## Descriptive Statistics

Table 5 presents the descriptive statistics for the independent variables. These were presented separately by class and also in an aggregate total for all three years. There were no surprises for gender, there being slightly more females than males, in the sample, as is the case in the entire population. However, there were more Asian students than Black students in the sample than in the population. Only slightly more students came from urban locations than suburban locations in the sample. Surprisingly, very few students came to the selected university after attending high schools in rural locations.

Table 5
Description of Variables

| Variable | 2007 (*n* = 1,039) Count | Percent | 2008 (*n* = 1,154) Count | Percent | 2009 (n = 1,380) Count | Percent | Total (*n* = 3,573) Count | Percent |
|---|---|---|---|---|---|---|---|---|
| *Gender* | | | | | | | | |
| Female | 524 | 50.4 | 572 | 49.6 | 707 | 51.2 | 1803 | 50.5 |
| Male | 515 | 49.6 | 582 | 50.4 | 673 | 48.1 | 1770 | 49.5 |
| *Ethnicity* | | | | | | | | |
| White | 479 | 46.1 | 458 | 39.7 | 531 | 38.5 | 1468 | 41.1 |
| Hispanic | 218 | 21.0 | 287 | 24.9 | 356 | 25.8 | 861 | 24.1 |
| Asian | 201 | 19.3 | 226 | 19.6 | 294 | 21.3 | 721 | 20.2 |
| Black | 141 | 13.6 | 183 | 15.9 | 199 | 14.4 | 523 | 16.6 |
| *High School Location* | | | | | | | | |
| Urban | 540 | 52.0 | 585 | 50.7 | 724 | 52.5 | 1849 | 51.7 |
| Suburban | 477 | 46.0 | 560 | 48.5 | 647 | 47.9 | 1684 | 47.1 |
| Rural | 22 | 2.1 | 9 | .8 | 9 | .7 | 40 | 1.1 |
| *Dual Credit by Location* | | | | | | | | |
| Urban | 9 | .9 | 6 | .5 | 4 | .3 | 19 | .5 |
| Suburban | 4 | .4 | 1 | .1 | 6 | .4 | 11 | .3 |
| Rural | 1 | .1 | 1 | .1 | 0 | 0 | 2 | .1 |
| *Poverty by Location* | | | | | | | | |
| Urban | 166 | 31.0 | 223 | 38.1 | 302 | 41.7 | 691 | 37.4 |
| Suburban | 74 | 15.5 | 98 | 17.7 | 127 | 19.6 | 299 | 17.8 |
| Rural | 13 | 59.1 | 6 | 66.7 | 6 | 66.7 | 25 | 63.0 |
| *Persistence by Location* | | | | | | | | |
| Urban | 384 | 71.1 | 421 | 72.0 | 540 | 74.6 | 1345 | 72.7 |
| Suburban | 332 | 70.0 | 407 | 72.7 | 507 | 78.4 | 1246 | 74.0 |
| Rural | 11 | 50.0 | 6 | 66.7 | 6 | 66.7 | 23 | 57.5 |

*Note:* Percents may not equal 100 due to rounding. All numbers, if needed, were rounded from the hundredths to the tenths place, .05 or greater becoming .1, .04 or less becoming 0.

Even more surprising, very few students were in the sample who had dual credit, from any location. This researcher suggests three possible reasons more students with dual credit were not part of the sample, a) the sample given to the researcher only contained first-time freshman, and students may have come to the university having earned enough credits while in high school to be classified as a sophomore or higher; b) it may be that many other students go to a community college before attending this selected university and obtain enough credits not to be classified as a first-time freshman; and c) the state has many public universities so the students with dual credit may have selected to attend another public university.

According to the data, 28 percent of the students who came to the selected university came from a poverty location. At the time, the national average for people living in poverty was 13 percent. This would seem to indicate that many students were able to overcome some of the disadvantages poverty can create. In addition, the data showed more students came from poverty in rural and urban areas than suburban areas.

The data also revealed that approximately the same percent of students coming from urban and suburban locations persisted to the sophomore year. Students from rural locations lagged further behind. However, the small sample size of the rural students should be taken into consideration.

## Analysis of the 2007, 2008, 2009 Aggregated Data

For this research, it is important to find out the strength of the association between the independent and dependent variables. Therefore, this researcher used various correlation coefficients and measures of association that were required for the

task: the Phi coefficient, Cramer's V coefficient, Point Biserial correlation coefficient, and Pearson's coefficient of nonlinear relationship (Eta). A correlation of +1, indicates the dependent variable is exactly predictable from the independent variable; as the value of one goes up, so does the other (George & Mallory, 2003). The data in Table 6 shows the relationship between the dependent variable (i.e., persistence) and the independent variables (i.e., dual credit, poverty, gender, class rank, ethnicity, and high school location).

What this researcher learned from this aggregated data was that all of the independent variables were significantly correlated with the dependent variable. However, the strength of the association for all of the independent variables was weak. As to be expected, there was a negative trend for persistence as one moved further away from the high school first quarter class ranking toward the fourth quarter.

Table 6

Correlation Coefficients and Measures of Association: Persistence 2007, 2008, 2009

| Independent Variable | Phi Coefficient | Cramer's V Coefficient | Approx. Sig. | ($n$ = 3,573) |
|---|---|---|---|---|
| Dual Credit | .038 | .038 | .025* | |
| Poverty | -.042 | .042 | .012* | |
| Gender | .049 | .049 | .003** | |
| Class Rank | | | | |
| 1st Q | .145 | .145 | .000*** | |
| 2nd Q | -.049 | .049 | .003** | |
| 3rd Q | -.116 | .116 | .000*** | |
| 4th Q | -.100 | .100 | .000*** | |
| Ethnicity | .154 | .154 | .000*** | |
| HS Location | .051 | .051 | .009** | |

*Correlation is significant at the p<.05 level (2-tailed)
**Correlation is significant at the p<.01 level (2-tailed)
***Correlation is significant at the p<.001 level (2-tailed)

In addition, dual credit did show a very weak positive correlation with persistence, and living in a poverty area had a weak negative effect on persistence. Ethnicity was significant, and had as strong of an association with persistence, as 1st quarter class rank. High school location only had a weak association with persistence.

The data in Table 7 shows the strength of association between the dependent variable persistence and student SAT scores. All of the independent variables showed that they were significantly correlated with the students' persistence. All of the correlations were weak, writing and math having more effect than the verbal score.

Table 7
Point Biserial Correlation Coefficient: Persistence with SAT Scores 2007, 2008, 2009

| (*n* = 3,573) | Persistence | SAT Math | SAT Verbal | SAT Writing |
|---|---|---|---|---|
| Persistence | 1 | | | |
| SAT Math | .136** | 1 | | |
| SAT Verbal | .103** | .560** | 1 | |
| SAT Writing | .137** | .551** | .751** | 1 |

*Correlation is significant at the p<.05 level (2-tailed)
**Correlation is significant at the p<.01 level (2-tailed)
***Correlation is significant at the p<.001 level (2-tailed)

The data in Table 8 shows the relationship between the students' last freshman GPA and the independent variables: Dual credit, poverty, gender, class rank, ethnicity, and high school location. Eta squared is "the proportion of the variance in the dependent

variable accounted for by the independent variable" (George & Mallery, 2003, p.121). Of the independent variables, being in the 1st Quarter of his/her high school class, accounted for a variance of 3.9% in last freshman GPA. Dual credit and being Black each accounted for a variance of 3.5% in a student's last freshman GPA. Surprisingly, high school location accounted for a very low percent of variance in the student's last freshman GPA. This small range in high school location variance (.3% to .6%) would suggest that the college readiness the students received from being in different high school settings was similar at least in regards to last freshman GPA.

Table 8
Eta Correlation: Last Term Freshman GPA by Independent Variables 2007, 2008, 2009

| Independent Variable | Eta | Eta Squared | Percent Variance | ($n$ = 3,573) |
|---|---|---|---|---|
| Dual Credit | .187 | .0349 | 3.5 | |
| Poverty | .076 | .0057 | .6 | |
| Gender | .062 | .0038 | .4 | |
| Class Rank | | | | |
| 1st Q. | .197 | .0388 | 3.9 | |
| 2nd Q. | .086 | .0073 | .8 | |
| 3rd Q. | .143 | .0204 | 2.0 | |
| 4th Q. | .111 | .0123 | 1.2 | |
| Ethnicity | | | | |
| Asian | .126 | .0158 | 1.6 | |
| Black | .187 | .0349 | 3.5 | |
| Hispanic | .087 | .0075 | .8 | |
| White | .107 | .0114 | 1.1 | |
| HS Location | | | | |
| Urban | .076 | .0057 | .6 | |
| Suburban | .088 | .0077 | .8 | |
| Rural | .55 | .0030 | .3 | |

The data in Table 9 shows the relationship between the last freshman term GPA and the student's SAT scores. This data is very similar to the data comparing the SAT scores with persistence. Both sets of the independent variables showed that they were significantly correlated, and just like with persistence, all of the correlations were weak, writing and math having more effect on last freshman term GPA than the verbal score.

Table 9
Pearson Correlation Coefficient: Last Term Freshman Term GPA 2007, 2008, 2009

| ($n$ = 3,573) | Last Freshman Term GPA | SAT Math | SAT Verbal | SAT Writing |
|---|---|---|---|---|
| Last Freshman Term GPA | 1 | | | |
| SAT Math | .280** | 1 | | |
| SAT Verbal | .236** | .560** | 1 | |
| SAT Writing | .312** | .551** | .751** | 1 |

*Correlation is significant at the p<.05 level (2-tailed)
**Correlation is significant at the p<.01 level (2-tailed)
***Correlation is significant at the p<.001 level (2-tailed)

Table 10 shows the aggregated (classes 2007, 2008, and 2009) logistic regression of persistence with the independent variables: dual credit, class rank, SAT scores, gender, poverty, ethnicity, and high school location. In order to fully understand the data, it is important to go over some of the table's meanings of measures: B, S.E., Wald, df, Sig., and Exp(B). The coefficient B, is the natural log of the odds ratio Exp

(B). It shows the effect of the predictor variable (independent variable) on the predicted variable (dependent variable). S.E. stands for standard error. Wald is the measure of the significance of B for the given independent variable. Df stands for degrees of freedom. Sig. is the significance of the Wald test. Finally, Exp(B) is the odds ratio. An odds ratio greater than 1 shows an increase in the odds of an event happening; an odds ratio less than 1 shows a decrease in the odds of the event happening. For example, an odds ratio of 1.5 shows the event is 1.5 times as likely or 50% more likely to happen, whereas an odds ratio of .50 is .5 times as likely or 50% less likely to happen. This is of course with all other factors (independent variables) staying the same (held constant).

As shown in Table 10 many of the independent variables had a significant correlation with persistence including dual credit. The logistic regression was run omitting 1st quarter class rank, male, White, and urban to act as comparisons. Dual Credit showed significance at the *p*. <.05 level with a value of .036. The odds ratio, Exp(B), indicated a student with dual credit persisting three and one-half times (3.585) compared to a student without dual credit, all other variables held constant. All of the class ranks (2nd, 3rd, and 4th quarter) showed significance at the p. < .001 level. Interestingly, when compared with students in the 1st quarter of their high school class, a student in the 2nd quarter only had 61% odds of persisting, 3rd quarter students 38% odds, and 4th quarter students 23% odds of persisting. Math and writing SAT scores had a high significant correlation, but added little to the students' odds (.002) of persisting. Female students were almost 30% more likely to persist when compared to male students. Compared to White students, Asian students were more than twice (2.2) as

likely to persist, whereas Black students were only 78% likely to persist. Finally, rural students' odds of persisting were only 41% when compared to urban students, but the small sample size might have skewed these results.

Table 10
Logistic Regression: Persistence by Independent Variables 2007, 2008, 2009

| Independent Variable | B | S.E. | Wald | df | Sig. | ($n$ = 3,573) Exp(B) |
|---|---|---|---|---|---|---|
| *Agency Factors* | | | | | | |
| Dual Credit | 1.277 | .608 | 4.415 | 1 | .036* | 3.585 |
| Class Rank | | | | | | |
| 2nd Q. | -.498 | .093 | 28.606 | 1 | .000*** | .608 |
| 3rd Q. | -.970 | .131 | 54.842 | 1 | .000*** | .379 |
| 4th Q. | -1.461 | .232 | 39.490 | 1 | .000*** | .232 |
| SAT | | | | | | |
| Math | .002 | .001 | 10.240 | 1 | .001** | 1.002 |
| Verbal | .001 | .001 | 1.659 | 1 | .198 | 1.001 |
| Writing | .002 | .001 | 8.405 | 1 | .004** | 1.002 |
| *Background Factors* | | | | | | |
| Female | .261 | .088 | 8.791 | 1 | .003** | 1.299 |
| Poverty | -.054 | .094 | .331 | 1 | .565 | .947 |
| Ethnicity | | | | | | |
| Asian | .776 | .125 | 38.824 | 1 | .000*** | 2.174 |
| Black | -.248 | .120 | 4.292 | 1 | .038* | .780 |
| Hispanic | .108 | .108 | .991 | 1 | .319 | 1.114 |
| HS Location | | | | | | |
| Suburban | -.007 | .083 | .006 | 1 | .936 | .993 |
| Rural | -.886 | .334 | 7.019 | 1 | .008** | .412 |

*$p$ < .05, **$p$ < .01, ***$p$ < .001

In order to fully understand the data in Table 11, it is important to go over some of the table's meanings of measures: B, Std. Error, Beta, t, Sig., Tolerance, and VIF. B, refers to the coefficient that measures the predicted values of the independent variables. Std. Error is the standard error of B. Beta refers to the B value of standardized scores. T is B divided by the Std. Error of B. Sig. stands for significance. Tolerance indicates collinearity. A high tolerance (near 1) shows the variable is fairly independent of other independent variables; a low tolerance (near 0) shows extreme multicollinearity. On the other end a high variance inflation factor (VIF), over 10, indicates multicollinearity. Multicollinearity occurs when two or more variables are highly correlated with each other. None of the independent variables showed multicollinearity.

Table 11 shows the aggregated (classes 2007, 2008, and 2009) regression analysis of last freshman GPA with the independent variables: dual credit, class rank, SAT score, gender, poverty, ethnicity, and high school location. The regression analysis was run leaving out: 1$^{st}$ quarter class rank, male, white, and urban to act as comparisons. As shown in Table 11, all but two of the independent variables (SAT verbal score and Hispanic ethnicity) were shown to be significant regarding their ability to predict last term freshman GPA. Having dual credit, as opposed to not having dual credit was shown to have a weak positive predictive influence (.049) on last term freshman GPA. Other significant positive influences were being female (.084) when compared to male, Asian (.064) when compared to White, and suburban (.037) when compared to urban.

Table 11
Regression Analysis: Last Term Freshman GPA by Independent Variables 2007-2009

| ($n$ = 3,573) Independent Variable | Unstandardized Coefficients B | Std. Error | Standardized Coefficients Beta | t | Sig. | Collinearity Statistics Tolerance | VIF |
|---|---|---|---|---|---|---|---|
| *Agency Factors* | | | | | | | |
| Dual Credit | .532 | .182 | .049 | 2.929 | .003** | .991 | 1.009 |
| Class Rank | | | | | | | |
| 2nd Q | -.346 | .037 | -.148 | -9.401 | .000*** | .911 | 1.097 |
| 3rd Q | -.589 | .056 | -.164 | -10.495 | .000*** | .919 | 1.088 |
| 4th Q | -.826 | .102 | -.123 | -8.063 | .000*** | .966 | 1.035 |
| SAT | | | | | | | |
| Math | .002 | .000 | .139 | 6.684 | .000*** | .518 | 1.932 |
| Verbal | .000 | .000 | .013 | .550 | .583 | .382 | 2.615 |
| Writing | .003 | .000 | .196 | 8.080 | .000*** | .383 | 2.612 |
| *Background Factors* | | | | | | | |
| Female | .173 | .034 | .084 | 5.054 | .000*** | .809 | 1.236 |
| Poverty | -.102 | .037 | -.045 | -2.755 | .006** | .838 | 1.194 |
| Ethnicity | | | | | | | |
| Asian | .164 | .043 | .064 | 3.809 | .000*** | .787 | 1.270 |
| Black | -.317 | .050 | -.109 | -6.306 | .000*** | .749 | 1.336 |
| Hispanic | -.061 | .043 | -.026 | -1.416 | .157 | .686 | 1.448 |
| HS Location | | | | | | | |
| Suburban | .077 | .032 | .037 | 2.390 | .017* | .916 | 1.092 |
| Rural | -.459 | .148 | -.047 | -3.109 | .002** | .976 | 1.025 |

*$p$ < .05, **$p$ < .01, ***$p$ < .001

To answer research hypotheses, one, two, and three, the chi-square test of independence was used to assess the association between amount of dual credit earned and high school setting (i.e., urban, suburban, and rural). Originally, it was hoped that it

would be possible to determine if going to high school in a specific location might provide greater opportunities for students to obtain dual credit and therefore students in different location types would have different amounts of dual credit. Unfortunately, the number of students in the sample who actually had dual credit was so small (as shown in Table 4), it was necessary to collapse the categories into a dichotomy, either the students had dual credit or they did not have dual credit. In this section, the class by location data was aggregated together (2007, 2008, and 2009) and then analyzed using the chi-square test of independence. Table 12 shows the numbers of students who had and who did not have dual credit by high school location.

Table 12
Chi-square Test of Independence: Dual Credit by H.S. Location 2007-2009

| ($n$ = 3573) | | | District Type | | | |
|---|---|---|---|---|---|---|
| | | | Urban | Suburban | Rural | Total |
| Dual Credit | .00 | Observed | 1830 | 1673 | 38 | 3541 |
| | | Expected | 1832.4 | 1668.9 | 39.6 | 3541.0 |
| | 1.00 | Observed | 19 | 11 | 2 | 32 |
| | | Expected | 16.6 | 15.1 | .4 | 32.0 |
| Total | | Observed | 1849 | 1684 | 40 | 3573 |
| | | Expected | 1849.0 | 1684.0 | 40.0 | 3573.0 |

The hypothesis for the aggregated group would be that the number of dual credit hours earned by a student for the 2007, 2008, and 2009 academic school years is independent of the student's high school setting (urban, suburban, and rural high schools). According to Tabachnick and Fidell (2001),

> If the observed frequencies are similar to the expected frequencies, then the value of $\chi^2$ is small and the null hypothesis is retained; if they are sufficiently different, then the value of $\chi^2$ is large and the null hypothesis is rejected. (p.55)

The results of the chi-square test of independence showed a Pearson Chi-Square value of 9.069, a significance of $p$ = .021, and a very small strength of association with Phi = .050, Cramer's V = .050. This allows the null hypothesis to be rejected, that the amount of dual credit is independent of the high school location. Additionally, since the sample size was small, the Fisher's Exact Test was run and indicated a significance (2-sided) value of .029, $p$ = <.05, which confirms the Chi-square results.

## Research Questions

This study attempted to answer the following: a) Was student success increased equally for all student groups after the passage of the 2006 Texas's House Bill 1, and b) are the factors at the secondary level that are high school factors (for example, amount of dual credit, high school class rank, and SAT score) stronger predictors than background factors (poverty, ethnicity, gender, and location of students' high school setting)?

### Research Question One

> Can first-to-second-year college persistence for the 2007-2008 academic school years, be predicted from the following variables: dual credit, poverty, gender, high school class rank, SAT score, ethnicity, and location of students' high school setting (i.e., urban, suburban, and rural high schools)?

To address research question one, logistic regression was used to examine the predictive ability of the independent variables: dual credit, poverty, gender, high school class rank, SAT scores, ethnicity (Black, Hispanic, White, Asian), and location of

students' high school setting (urban, suburban, and rural) on the dependent variable: first-to second-year persistence. According to the data shown in Table 13, class rank, math and writing SAT scores, being Asian or Black, and rural high school location were significantly correlated with persistence. Compared to students in the 1st quarter of their high school class, and all other variables held constant, the odds of students in the 2nd

Table 13
Logistic Regression: Persistence by Independent Variables 2007-2008

| Independent Variable | B | S.E. | Wald | df | Sig. | (*n* = 1,039) Exp (B) |
|---|---|---|---|---|---|---|
| *Agency Factors* | | | | | | |
| Dual Credit | .956 | .767 | 1.555 | 1 | .212 | 2.601 |
| Class Rank | | | | | | |
| 2nd Q | -.393 | .161 | 5.999 | 1 | .014* | .675 |
| 3rd Q | -.910 | .212 | 18.466 | 1 | .000*** | .402 |
| 4th Q | -1.429 | .424 | 11.367 | 1 | .001** | .240 |
| SAT | | | | | | |
| Math | .003 | .001 | 8.720 | 1 | .003** | 1.003 |
| Verbal | -.002 | .001 | 2.073 | 1 | .150 | .998 |
| Writing | .003 | .001 | 5.217 | 1 | .022* | 1.003 |
| *Background Factors* | | | | | | |
| Female | .195 | .136 | 2.075 | 1 | .150 | 1.216 |
| Poverty | -.196 | .155 | 1.600 | 1 | .206 | .822 |
| Ethnicity | | | | | | |
| Asian | .813 | .215 | 14.338 | 1 | .000*** | 2.254 |
| Black | -.515 | .197 | 6.820 | 1 | .009** | .598 |
| Hispanic | -.108 | .175 | .380 | 1 | .538 | .898 |
| HS Location | | | | | | |
| Suburban | -.072 | .138 | .277 | 1 | .599 | .930 |
| Rural | -.901 | .437 | 4.252 | 1 | .039* | .406 |

*$p < .05$, **$p < .01$, ***$p < .001$

quarter were only 68% that they would persist. These odds were reduced to 40% for being in the 3rd quarter and 24% for being in the 4th quarter. Compared to White students, Asian students were more than twice (2.2) as likely to persist, all other variables held constant, and Black students were only 60% likely to persist. Only 40% of rural students were predicted to persist when compared to urban students, but the small numbers of rural students ($n$ = 22) may have skewed the results.

The data in Table 14 shows the strength of the relationship between the dependent variable persistence and the independent variables: Dual credit, poverty, gender, class rank, ethnicity, and high school location. Two of the independent variables (class rank and ethnicity) were significantly correlated with persistence. And although

Table 14
Correlation Coefficients and Measures of Association: Persistence 2007-2008

| Independent Variable | Phi Coefficient | Cramer's V Coefficient | Approx. Sig. | ($n$ = 1,039) |
|---|---|---|---|---|
| Dual Credit | .040 | .040 | .196 | |
| Poverty | -.039 | .039 | .206 | |
| Gender | .045 | .045 | .149 | |
| Class Rank | .171 | .171 | .000*** | |
| Ethnicity | .168 | .168 | .000*** | |
| HS Location | .066 | .066 | .103 | |

*Correlation is significant at the p<.05 level (2-tailed)
**Correlation is significant at the p<.01 level (2-tailed)
***Correlation is significant at the p<.001 level (2-tailed)

the significance level was high (*p*. <.001), the strength of the association was weak. So, yes it was highly correlated but it had little actual effect. As to be expected after the logistic regression, dual credit, poverty, and gender were not shown to be significant. High school location was also not shown to be significant which would lead one to believe the numbers were skewed in the logistic regression due to the small sample size.

Table 15 shows the strength of the relationship between persistence and the students' SAT scores: Math, verbal, and writing, using the Point Biserial correlation coefficient. The data indicates all three scores had a significant correlation with persistence. However, the association between the SAT scores and persistence was weak, so the effect was very small.

Table 15
Point Biserial Correlation Coefficient: Persistence with SAT Scores 2007-2008

| (*n* = 1,039) | Persistence | SAT Math | SAT Verbal | SAT Writing |
|---|---|---|---|---|
| Persistence | 1 | | | |
| SAT Math | .132** | 1 | | |
| SAT Verbal | .069* | .501** | 1 | |
| SAT Writing | .115** | .514** | .737** | 1 |

*Correlation is significant at the p<.05 level (2-tailed)
**Correlation is significant at the p<.01 level (2-tailed)
***Correlation is significant at the p<.001 level (2-tailed)

**Research Question Two**

Can first-to-second-year college persistence for the 2008-2009 academic school years, be predicted from the following variables: dual credit, SES, gender, high school class rank, SAT, ethnicity, and location of students' high school setting (i.e., urban, suburban, and rural high schools)?

As shown on Table 16, to address research question two, logistic regression was used to examine the predictive ability of the independent variables: dual credit, poverty, gender, high school class rank, SAT scores, ethnicity (Black, Hispanic, White, Asian), and location of students' high school setting (urban, suburban, and rural) on the dependent variable: first-to second-year persistence as shown in Table 16.

Class rank was found to be significant along with SAT math, female, Asian, and Black. Compared to 1st quarter students and with all other variables held constant, students in the 2nd quarter of his/her high school class odds of persisting are 63%, 3rd quarter 35%, and 4th quarter 21%. The math SAT score showed only a very small gain in the odds of persistence (.003); being female increased one's odds 30% when compared with males, all other variables held constant. When compared with White, the odds of Asian students persisting increased 69%, but being Black reduced the odds of persisting to only 67% all other variables held constant. Dual credit, poverty, and high school location were found not to be significant.

Table 16
Logistic Regression: Persistence by Independent Variables 2008-2009

| Independent Variable | B | S.E. | Wald | df | Sig. | ($n$ = 1,154) Exp (B) |
|---|---|---|---|---|---|---|
| *Agency Factors* | | | | | | |
| Dual Credit | 1.002 | 1.071 | .875 | 1 | .350 | 2.724 |
| Class Rank | | | | | | |
| 2nd Q | -.456 | .152 | 8.989 | 1 | .003** | .634 |
| 3rd Q | -1.054 | .198 | 28.237 | 1 | .000*** | .348 |
| 4th Q | -1.555 | .393 | 15.644 | 1 | .000*** | .211 |
| SAT | | | | | | |
| Math | .003 | .001 | 8.756 | 1 | .003** | 1.003 |
| Verbal | .001 | .001 | .255 | 1 | .613 | 1.001 |
| Writing | .001 | .001 | 1.285 | 1 | .257 | 1.001 |
| *Background Factors* | | | | | | |
| Female | .266 | .132 | 4.074 | 1 | .044* | 1.304 |
| Poverty | -.224 | .143 | 2.450 | 1 | .118 | .799 |
| Ethnicity | | | | | | |
| Asian | .523 | .199 | 6.926 | 1 | .008** | 1.687 |
| Black | -.400 | .185 | 4.688 | 1 | .030* | .670 |
| Hispanic | .008 | .167 | .002 | 1 | .962 | 1.008 |
| HS Location | | | | | | |
| Suburban | .036 | .132 | .073 | 1 | .788 | 1.036 |
| Rural | -1.166 | .677 | 2.965 | 1 | .085 | .312 |

*$p$ < .05, **$p$ < .01, ***$p$ < .001

The Phi Coefficient and Cramer's V coefficient was used to show the strength of the relationship between the persistence and the independent variables: Dual credit, poverty, gender, class rank, ethnicity, and high school location. As shown in Table 17, class rank (1st, 3rd, and 4th quarters), ethnicity (Asian and Black), and gender had a significant correlation with persistence, but all of the strengths of association were weak. Dual credit, poverty, and high school location were found not to be significant.

Table 17
Correlation Coefficients and Measures of Association: Persistence 2008-2009

| Independent Variable | Phi Coefficient | Cramer's V Coefficient | Approx. Sig. | ($n$ = 1,154) |
|---|---|---|---|---|
| Dual Credit | .029 | .029 | .330 | |
| Poverty | -.046 | .046 | .117 | |
| Gender | .059 | .059 | .043* | |
| Class Rank | | | | |
| 1st Q. | .155 | .155 | .000*** | |
| 2nd Q. | -.040 | .040 | .174 | |
| 3rd Q. | -.135 | .135 | .000*** | |
| 4th Q. | -.103 | .103 | .000*** | |
| Ethnicity | | | | |
| Asian | .098 | .098 | .001** | |
| Black | -.090 | .090 | .002** | |
| Hispanic | -.004 | .004 | .889 | |
| White | -.009 | .009 | .767 | |
| HS Location | | | | |
| Urban | -.003 | .003 | .920 | |
| Suburban | .013 | .013 | .669 | |
| Rural | -.055 | .055 | .063 | |

*Correlation is significant at the p<.05 level (2-tailed)
**Correlation is significant at the p<.01 level (2-tailed)
***Correlation is significant at the p<.001 level (2-tailed)

Table 18 shows the strength of the relationship between persistence and the students' SAT scores: Math, verbal, and writing, using the Point Biserial correlation coefficient. Similar to the data from the 2007 year, all three scores had a significant effect on persistence. However, just like the 2007 year the strength of the association between the SAT scores and persistence was weak, so the effect was very small.

Table 18
Point Biserial Correlation Coefficient: Persistence with SAT Scores 2008-2009

| (*n* = 1,154) | Persistence | SAT Math | SAT Verbal | SAT Writing |
|---|---|---|---|---|
| Persistence | 1 | | | |
| SAT Math | .153** | 1 | | |
| SAT Verbal | .126** | .582** | 1 | |
| SAT Writing | .129** | .556** | .745** | 1 |

*Correlation is significant at the p<.05 level (2-tailed)
**Correlation is significant at the p<.01 level (2-tailed)
***Correlation is significant at the p<.001 level (2-tailed)

**Research Question Three**

Can first-to-second-year college persistence for the 2009-2010 academic school years, be predicted from the following variables: dual credit, SES, gender, high school class rank, SAT, ethnicity and location of students' high school setting (i.e., urban, suburban, and rural high schools)?

Like research questions one and two, logistic regression (as shown on Table 19) was used to examine the predictive ability of the independent variables: dual credit, poverty, gender, high school class rank, SAT scores, ethnicity and location of students' high school setting on the dependent variable: first-to second-year persistence. Class rank, SAT writing, and ethnicity were the only three independent variables that had a significant correlation with persistence. With class rank, compared to 1st quarter students, the odds of persisting went down dramatically for students in the 2nd, 3rd, and

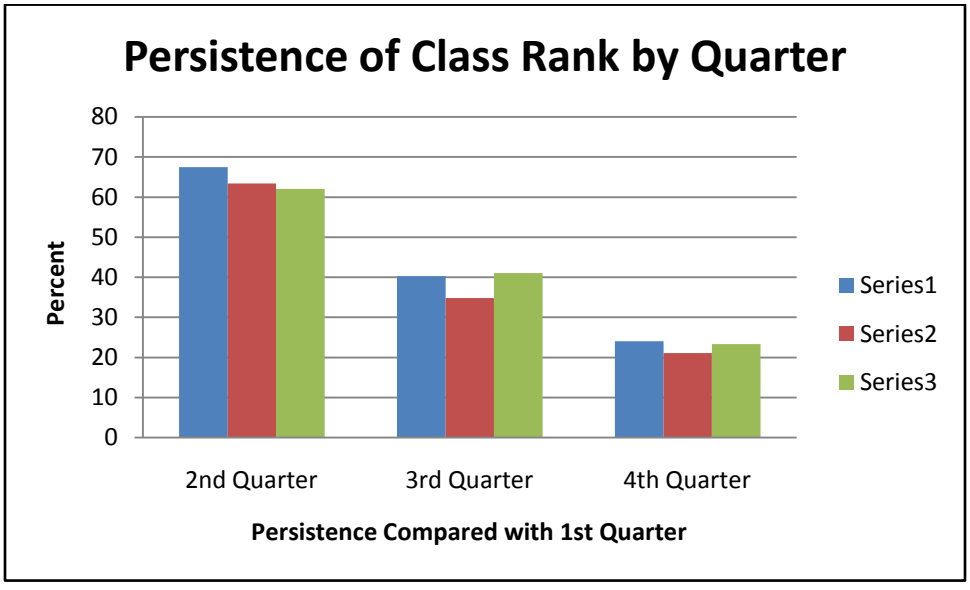
4th quarters, all other variables held constant. On Table 19, the independent variable dual credit was left blank on purpose. After many attempts to get the statistics to run correctly, it was postulated they would not run correctly due to the small number of dual credit students in this year ($n$ = 10).

Table 19
Logistic Regression: Persistence by Independent Variables 2009-2010

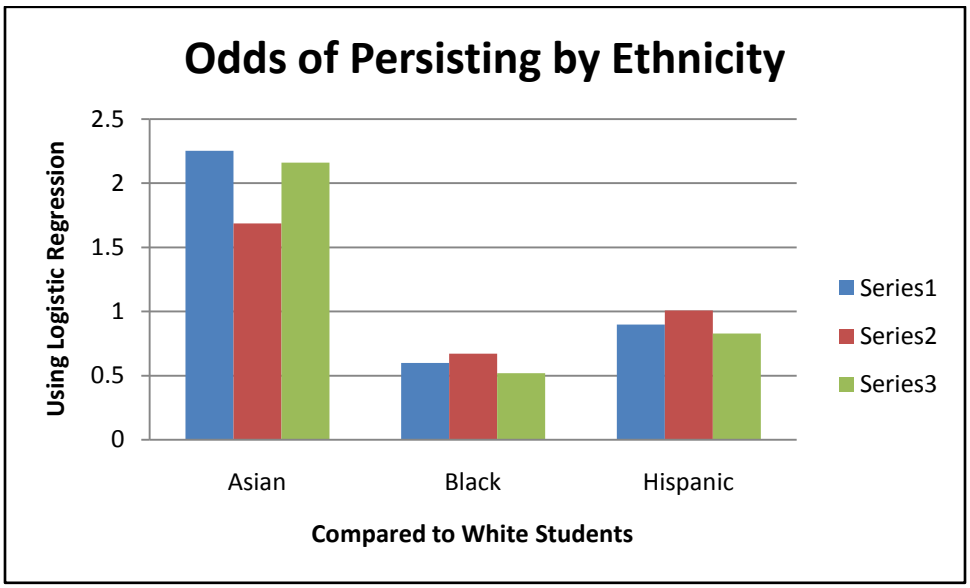
| Independent Variable | B | S.E. | Wald | df | Sig. | ($n$ = 1,380) Exp(B) |
|---|---|---|---|---|---|---|
| *Agency Factors* | | | | | | |
| Dual Credit | | | | | | |
| Class Rank | | | | | | |
| 2nd Q | -.477 | .146 | 10.626 | 1 | .001** | .620 |
| 3rd Q | -.892 | .249 | 12.821 | 1 | .000*** | .410 |
| 4th Q | -1.456 | .358 | 16.564 | 1 | .000*** | .233 |
| SAT | | | | | | |
| Math | .002 | .001 | 3.086 | 1 | .079 | 1.002 |
| Verbal | -.001 | .001 | 1.336 | 1 | .248 | .999 |
| Writing | .005 | .001 | 15.223 | 1 | .000* | 1.005 |
| *Background Factors* | | | | | | |
| Female | .201 | .127 | 2.514 | 1 | .113 | 1.223 |
| Poverty | -.253 | .133 | 3.590 | 1 | .058 | .777 |
| Ethnicity | | | | | | |
| Asian | .770 | .206 | 14.051 | 1 | .000*** | 2.161 |
| Black | -.653 | .179 | 13.246 | 1 | .000*** | .520 |
| Hispanic | -.188 | .158 | 1.424 | 1 | .233 | .828 |
| HS Location | | | | | | |
| Suburban | .210 | .128 | 2.695 | 1 | .101 | 1.234 |
| Rural | -.383 | .712 | .290 | 1 | .590 | .681 |

*$p$ < .05, **$p$ < .01, ***$p$ < .001

A comparison of the study's three years is shown in Figure 4. The graph shows odds are against those students persisting when compared with students in the 1st quarter of their high school class. SAT writing, although significant, had a negligible effect on persistence. When compared to White students, the odds of Asian students persisting were twice (2.161) as much, and Black students half (.520) as likely to persist, all other variables held constant. Figure 5 shows a three-year comparison of the odds of persisting by ethnicity. Even though Hispanic was not found to be significant in its predictive ability, the researcher felt it should be included in the figure for comparison purposes.




*Note:* Series 1 is class year 2007, series 2 year 2008, and series 3 year 2009.
Figure 4 Persistence of Class Rank by Quarter.




*Note:* Series 1 is class year 2007, series 2 year 2008, and series 3 year 2009.
Figure 5 Odds of Persisting by Ethnicity.

As shown in Table 20, like research questions one and two, Phi Coefficient and Cramer's V coefficient was used to show the strength of the relationship between the dependent variable persistence and the independent variables: Dual credit, poverty, gender, class rank, ethnicity, and high school location. Only class rank and ethnicity had a significant correlation with persistence. The strengths of these two associations were weak. Dual credit, poverty, and high school location were found not to be significant.

As shown in Table 21, the Point Biserial correlation coefficient shows the strength of the association between persistence and the students' SAT scores: Math, verbal, and writing. Again, similar to the 2007 and 2008 years, all three scores were significantly correlated with persistence. However, just like the 2007 and 2008 years,

the strength of the association between the SAT scores and persistence was weak.

Figure 6 shows a comparison of all three years of the study.

Table 20
Correlation Coefficients and Measures of Association: Persistence 2009-2010

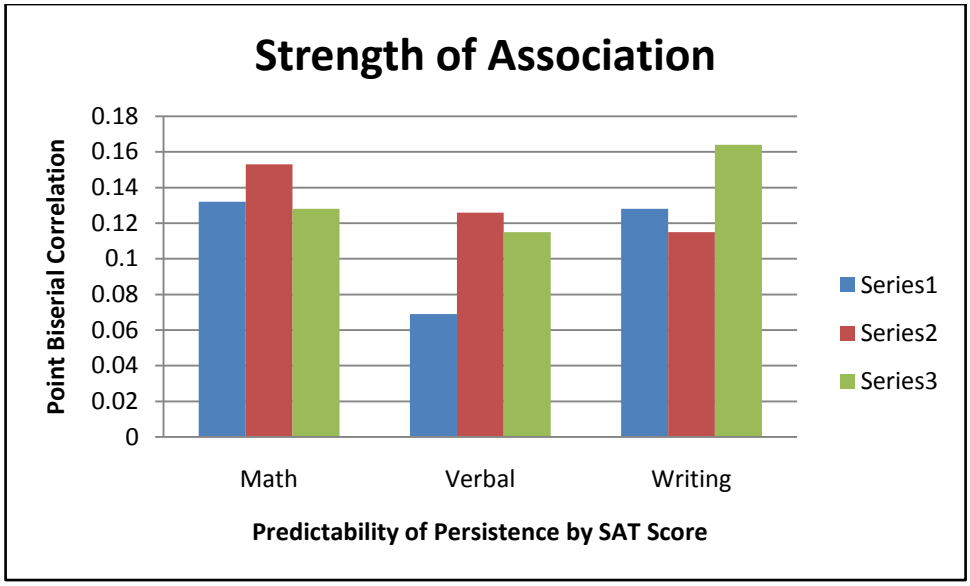
| Independent Variable | Phi Coefficient | Cramer's V Coefficient | Approx. Sig. | (*n* = 1,380) |
|---|---|---|---|---|
| Dual Credit | .048 | .048 | .077 | |
| Poverty | -.051 | .051 | .058 | |
| Gender | .043 | .043 | .113 | |
| Class Rank | .158 | .158 | .000*** | |
| Ethnicity | .174 | .174 | .000*** | |
| HS Location | .048 | .048 | .206 | |

*Correlation is significant at the p<.05 level (2-tailed)
**Correlation is significant at the p<.01 level (2-tailed)
***Correlation is significant at the p<.001 level (2-tailed)

Table 21
Point Biserial Correlation Coefficient: Persistence with SAT 2009-2010

| (*n* = 1,380) | Persistence | SAT Math | SAT Verbal | SAT Writing |
|---|---|---|---|---|
| Persistence | 1 | | | |
| SAT Math | .128** | 1 | | |
| SAT Verbal | .115** | .584** | 1 | |
| SAT Writing | .164** | .574** | .767** | 1 |

*Correlation is significant at the p<.05 level (2-tailed)
**Correlation is significant at the p<.01 level (2-tailed)
***Correlation is significant at the p<.001 level (2-tailed)




*Note:* Series 1 is class year 2007, series 2 year 2008, and series 3 year 2009.
Figure 6 Strength of Association of Persistence by SAT Scores.

**Research Question Four**

Can last freshman term GPA for the 2007-2008 academic school year, be predicted from the following variables: dual credit, SES, gender, high school class rank, SAT, ethnicity, and location of students' high school setting (i.e., urban, suburban, and rural high schools)?

The data in Table 22 shows the relationship between the dependent variable last freshman term GPA and the independent variables: Dual credit, poverty, gender, class rank, ethnicity, and high school location.

Table 22
Eta Correlation: Last Freshman GPA with Independent Variables 2007-2008

| Independent Variable | Eta | Eta Squared | Percent ($n$ = 1,039) Variance |
|---|---|---|---|
| Dual Credit | .068 | .0046 | .5 |
| Poverty | .106 | .0112 | 1.1 |
| Gender | .059 | .0034 | .3 |
| Class Rank | | | |
| 1st Q. | .185 | .0342 | 3.4 |
| 2nd Q. | .049 | .0024 | 2.4 |
| 3rd Q. | .173 | .0299 | 3.0 |
| 4th Q. | .099 | .0098 | 1.0 |
| Ethnicity | | | |
| Asian | .121 | .0146 | 1.5 |
| Black | .182 | .0331 | 3.3 |
| Hispanic | .074 | .0054 | .5 |
| White | .090 | .0081 | .8 |
| HS Location | | | |
| Urban | .044 | .0019 | .2 |
| Suburban | .068 | .0046 | .5 |
| Rural | .082 | .0067 | .7 |

Class rank and Ethnicity were the top two overall categories that helped to explain more of the variance in last term freshman GPA. Being in the 1st Quarter of his/her high school class accounted for a variance of 3.4%; being in the 2nd quarter accounted for a variance of 2.4%. Being Black, accounted for a variance of 3.3% student's last term freshman GPA; being Asian accounted for a variance of 1.5% in a student's last term freshman GPA. Dual credit, gender, and high school location did not show much variance in last term freshman GPA. This would seem to indicate that class rank and ethnicity had more of an effect on last term freshman GPA than did dual credit, gender

and high school location. However, this does not mean the effect was necessarily positive.

The data in Table 23 shows the relationship between the last freshman term GPA and the student's SAT scores. All of the SAT scores were found to be significant. However, all of the correlations were weak, writing and math being only slightly stronger than the SAT verbal score being able to predict last freshman term GPA.

Table 23
Pearson Correlation Coefficient: Last Term Freshman GPA with SAT 2007-2008

| ($n$ = 1,039) | Last Freshman Term GPA | SAT Math | SAT Verbal | SAT Writing |
|---|---|---|---|---|
| Last Freshman Term GPA | 1 | | | |
| SAT Math | .253** | 1 | | |
| SAT Verbal | .212** | .501** | 1 | |
| SAT Writing | .266** | .514** | .737** | 1 |

**Correlation is significant at the p<.01 level (2-tailed)

Table 24 shows the regression analysis of last freshman term GPA with the independent variables: dual credit, class rank, SAT score, gender, poverty, ethnicity, and high school location. The regression analysis was run leaving out: 1st quarter class rank, male, white, and urban to act as comparisons. As shown in Table 24, several of the independent variables were shown to be significant, most notably class rank and ethnicity. Compared to class rank 1st quarter, 2nd quarter had a -.133 predictive influence on last term Freshman GPA, all other variables held constant. Being in the 3rd quarter

had a -.170 predictive influence and in the 4th quarter a -.111 predictive influence on last term freshman GPA, when compared to 1st quarter. Compared to White students, being Asian had a .064 positive influence on predicting last term freshman GPA, whereas being Black had a -.113 influence on predicting last term freshman GPA. Neither Dual credit, nor poverty was significant predictor of GPA.

Table 24
Regression Analysis: Last Term Freshman GPA by Independent Variables 2007-2008

| (*n* = 1,039) Independent Variable | Unstandardized Coefficients B | Unstandardized Coefficients Std. Error | Standardized Coefficients Beta | t | Sig. | Collinearity Statistics Tolerance | Collinearity Statistics VIF |
|---|---|---|---|---|---|---|---|
| *Agency Factors* | | | | | | | |
| Dual Credit | .513 | .263 | .056 | 1.947 | .052 | .880 | 1.137 |
| Class Rank | | | | | | | |
| 2nd Q | -.276 | .073 | -.113 | -3.756 | .000*** | .897 | 1.114 |
| 3rd Q | -.581 | .103 | -.170 | -5.664 | .000*** | .902 | 1.108 |
| 4th Q | -.779 | .204 | -.111 | -3.813 | .000*** | .956 | 1.046 |
| SAT | | | | | | | |
| Math | .002 | .000 | .117 | 3.104 | .002** | .566 | 1.768 |
| Verbal | .001 | .001 | .041 | .926 | .355 | .418 | 2.391 |
| Writing | .002 | .001 | .134 | 2.969 | .003** | .400 | 2.497 |
| *Background Factors* | | | | | | | |
| Female | .140 | .067 | .066 | 2.099 | .036* | .813 | 1.230 |
| Poverty | -.108 | .075 | -.044 | -1.454 | .146 | .880 | 1.137 |
| Ethnicity | | | | | | | |
| Asian | .172 | .085 | .064 | 2.033 | .042* | .807 | 1.239 |
| Black | -.349 | .100 | -.113 | -3.495 | .000*** | .771 | 1.297 |
| Hispanic | -.060 | .086 | -.023 | -.698 | .485 | .740 | 1.352 |
| HS Location | | | | | | | |
| Suburban | .097 | .063 | .046 | 1.540 | .124 | .922 | 1.085 |
| Rural | -.462 | .214 | -.063 | -2.162 | .031* | .950 | 1.053 |

*$p < .05$, **$p < .01$, ***$p < .001$

**Research Question Five**

Can last freshman term GPA for the 2008-2009 academic school year, be predicted from the following variables: dual credit, SES, gender, high school class rank, SAT, ethnicity, and location of students' high school setting (i.e., urban, suburban, and rural high schools)?

The data in Table 25 shows the relationship between the dependent variable last freshman term GPA and the independent variables: Dual credit, poverty, gender, class rank, ethnicity, and high school location. Of these variables, 1st quarter accounted for a 3.4% variance in last freshman GPA, and Black accounted for a 2.9% variance in GPA. Interestingly, dual credit only accounted for a .1% variance in last term freshman GPA.

Table 25
Eta Correlation: Last Term Freshman GPA with Independent Variables 2008-2009

| Independent Variable | Eta | Eta Squared | Percent Variance | ($n$ = 1,154) |
|---|---|---|---|---|
| Dual Credit | .028 | .0007 | .1 | |
| Poverty | .124 | .0153 | 1.5 | |
| Gender | .078 | .0060 | .6 | |
| Class Rank | | | | |
| 1st Q | .184 | .0338 | 3.4 | |
| 2nd Q | .044 | .0019 | .2 | |
| 3rd Q | .145 | .0210 | 2.1 | |
| 4th Q | .162 | .0262 | 2.6 | |
| Ethnicity | | | | |
| Asian | .142 | .0201 | 2.0 | |
| Black | .169 | .0285 | 2.9 | |
| Hispanic | .083 | .0068 | .7 | |
| White | .085 | .0072 | .7 | |
| HS Location | | | | |
| Urban | .085 | .0072 | .7 | |
| Suburban | .098 | .0096 | 1.0 | |
| Rural | .073 | .0053 | .5 | |

The data in Table 26 shows the relationship between the last freshman term GPA and the student's SAT scores. Similar to the 2007-2008 data, all of the SAT scores were found to be significant at the $p < .01$ level (2-tailed). This was assessed two-tailed due to this researcher not sure which direction the correlation would take. Also similar, all of the correlations were weak in their ability to predict last freshman term GPA.

Table 26
Pearson Correlation Coefficient: Last Term Freshman GPA with SAT 2008 2009

| ($n$ = 1,154) | Last Freshman Term GPA | SAT Math | SAT Verbal | SAT Writing |
|---|---|---|---|---|
| Last Freshman Term GPA | 1 | | | |
| SAT Math | .289** | 1 | | |
| SAT Verbal | .230** | .582** | 1 | |
| SAT Writing | .310** | .556** | .745** | 1 |

*Correlation is significant at the p<.05 level (2-tailed)
**Correlation is significant at the p<.01 level (2-tailed)
***Correlation is significant at the p<.001 level (2-tailed)

Table 27 shows the regression analysis of last freshman term GPA with the independent variables: dual credit, class rank, SAT score, gender, poverty, ethnicity, and high school location. The regression analysis was run leaving out: 1st quarter class rank, male, white, and urban to act as comparisons. Very similar to the 2007-2008 data, the same independent variables were shown to be significant. Also all of the relative influences were weak. Dual credit was not shown to be significant predictor of GPA.

Table 27

Regression Analysis: Last Term Freshman GPA by Independent Variables 2008-2009

| ($n$ = 1,154) Independent Variable | Unstandardized Coefficients B | Std. Error | Standardized Coefficients Beta | t | Sig. | Collinearity Statistics Tolerence | VIF |
|---|---|---|---|---|---|---|---|
| *Agency Factors* | | | | | | | |
| Dual Credit | .156 | .333 | .012 | .468 | .640 | .976 | 1.025 |
| Class Rank | | | | | | | |
| 2nd Q | -.272 | .064 | -.117 | -4.248 | .000*** | .903 | 1.107 |
| 3rd Q | -.575 | .091 | -.176 | -6.343 | .000*** | .896 | 1.116 |
| 4th Q | -1.104 | .181 | -.163 | -6.106 | .000*** | .965 | 1.037 |
| SAT | | | | | | | |
| Math | .002 | .000 | .185 | 4.963 | .000*** | .496 | 2.016 |
| Verbal | -.001 | .001 | -.071 | -1.633 | .103 | .378 | 2.649 |
| Writing | .003 | .001 | .196 | 4.698 | .000*** | .393 | 2.545 |
| *Background Factors* | | | | | | | |
| Female | .251 | .061 | .120 | 4.099 | .000*** | .798 | 1.253 |
| Poverty | -.097 | .067 | -0.42 | -1.442 | .149 | .817 | 1.224 |
| Ethnicity | | | | | | | |
| Asian | .211 | .078 | .080 | 2.713 | .007** | .784 | 1.276 |
| Black | -.196 | .087 | -.069 | -2.256 | .024* | .738 | 1.356 |
| Hispanic | -.058 | .076 | -.024 | -.766 | .444 | .693 | 1.443 |
| HS Location | | | | | | | |
| Suburban | .053 | .057 | .025 | .917 | .359 | .905 | 1.105 |
| Rural | -.804 | .316 | -.068 | -2.545 | .011* | .967 | 1.034 |

*$p$ < .05, **$p$ < .01, ***$p$ < .001

**Research Question Six**

Can last freshman term GPA for the 2009-2010 academic school year, be predicted from the following variables: dual credit, SES, gender, high school

class rank, SAT, ethnicity, and location of students' high school setting (i.e., urban, suburban, and rural high schools)?

The data in Table 28 shows the relationship between the dependent variable last freshman term GPA and the independent variables: Dual credit, poverty, gender, class rank, ethnicity, and high school location. Eta squared shows the amount of variance in the dependent variable as influenced by the independent variable. The variables that accounted for the greatest variance were: class 1st quarter, Black, and class 2nd quarter. Dual credit and Gender accounted for the least amount of variance in GPA.

Table 28
Eta: Correlation: Last Term Freshman GPA with Independent Variables 2009-2010

| Independent Variable | Eta | Eta Squared | Percent Variance | (*n* = 1,380) |
|---|---|---|---|---|
| Dual Credit | .050 | .0025 | .3 | |
| Poverty | .128 | .0163 | 1.6 | |
| Gender | .050 | .0025 | .3 | |
| Class Rank | | | | |
| 1st Q. | .209 | .0436 | 4.4 | |
| 2nd Q. | .150 | .0225 | 2.3 | |
| 3rd Q. | .096 | .0092 | .9 | |
| 4th Q. | .075 | .0056 | .6 | |
| Ethnicity | | | | |
| Asian | .113 | .0127 | 1.3 | |
| Black | .207 | .0428 | 4.3 | |
| Hispanic | .104 | .0108 | 1.1 | |
| White | .147 | .0216 | 2.2 | |
| HS Location | | | | |

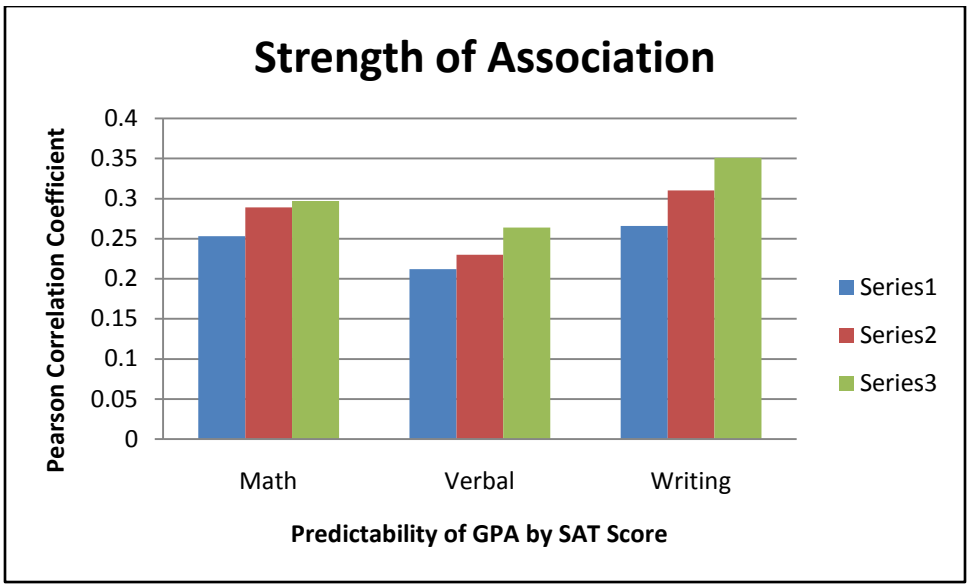
The data in Table 29 shows the relationship between the last freshman term GPA and the student's SAT scores. Similar to the 2007 and 2008 data, all of the SAT

scores were found to be significant. Also similar, all of the correlations were weak in their ability to predict last freshman term GPA. What is very interesting about the data is the rise in ability of the SAT scores to predict the GPA as shown in Figure 7.

Table 29
Pearson Correlation Coefficient: Last Term Freshman Term GPA with SAT 2009-2010

| (*n* = 1,380) | Last Freshman Term GPA | SAT Math | SAT Verbal | SAT Writing |
|---|---|---|---|---|
| Last Freshman Term GPA | 1 | | | |
| SAT Math | .297** | 1 | | |
| SAT Verbal | .264** | .584** | 1 | |
| SAT Writing | .351** | .574** | .767** | 1 |

**Correlation is significant at the p<.01 level (2-tailed)




*Note:* Series 1 is class year 2007, series 2 is year 2008, and series 3 is year 2009.
Figure 7 Strength of Association of GPA with SAT Scores

Table 30 shows the regression analysis of last freshman term GPA with the independent variables: dual credit, class rank, SAT score, gender, poverty, ethnicity, and high school location.

Table 30
Regression Analysis: Last Term Freshman GPA by Independent Variables 2009-2010

| ($n$ = 1,380) Independent Variable | Unstandardized Coefficients B | Std. Error | Standardized Coefficients Beta | t | Sig. | Collinearity Statistics Tolerence | VIF |
|---|---|---|---|---|---|---|---|
| *Agency Factors* | | | | | | | |
| Dual Credit | .454 | .277 | .039 | 1.638 | .102 | .987 | 1.013 |
| Class Rank | | | | | | | |
| 2nd Q | -.456 | .057 | -.199 | -7.992 | .000*** | .917 | 1.091 |
| 3rd Q | -.537 | .105 | -.126 | -5.119 | .000*** | .941 | 1.063 |
| 4th Q | -.647 | .156 | -.101 | -4.141 | .000*** | .957 | 1.044 |
| SAT | | | | | | | |
| Math | .001 | .000 | .122 | 3.617 | .000*** | .495 | 2.019 |
| Verbal | .003 | .000 | .264 | 10.157 | .000*** | .356 | 2.809 |
| Writing | .003 | .000 | .246 | 6.155 | .000*** | .355 | 2.819 |
| *Background Factors* | | | | | | | |
| Female | .139 | .052 | .071 | 2.645 | .008** | .794 | 1.259 |
| Poverty | -.121 | .056 | -.057 | -2.182 | .029* | .818 | 1.222 |
| Ethnicity | | | | | | | |
| Asian | .110 | .065 | .046 | 1.689 | .091 | .761 | 1.313 |
| Black | -.398 | .078 | -.142 | -5.108 | .000*** | .728 | 1.373 |
| Hispanic | -.083 | .067 | -.036 | -1.218 | .224 | .632 | 1.581 |
| HS Location | | | | | | | |
| Suburban | .073 | .049 | .037 | 1.480 | .139 | .903 | 1.107 |
| Rural | -.058 | .293 | -.005 | -.198 | .843 | .980 | 1.021 |

*$p$ < .05, **$p$ < .01, ***$p$ < .001

The regression analysis was run leaving out: 1st quarter class rank, male, white, and urban to act as comparisons. All three of the SAT scores showed a significant but weak positive effect on GPA. When compared to the 1st quarter, the 2nd quarter had a -.199 predictive influence on GPA, the 3rd quarter a -.126, and the 4th quarter a -.101 predictive influence all other variables held constant. Poverty showed a -.057 predictive influence on last term freshman GPA. Black compared with White showed a -.142 predictive influence on last term freshman GPA. For the third year in a row, dual credit was not shown to be significant in its ability to predict last freshman term GPA.

**Predictability of Background and Agency Factors**

In addition, this researcher felt that it was important to look at the differences between the background and the agency factors' predictability of persistence and last term freshman GPA. Therefore, multiple regression was chosen to analyze the relationship between the dependent variables: Persistence and last freshman term GPA, and the background and agency independent variables. First, the relationship between persistence and the background variables: Poverty, gender, ethnicity (African American, Hispanic, White, and Asian), and location of students' high school setting: urban, suburban, and rural were entered into the analysis to see how much of the dependent variable could be predicted. The classes (2007, 2008, and 2009) were analyzed in aggregate. The background factors revealed an Adjusted R Square value of .028 with $p = < .001$. Afterward, the agency variables: Dual credit, SAT scores, and class rank, were entered into the analysis to see if they added to the model. The agency

factors did in fact add to the model, and revealed an Adjusted R Square value of .074 with $p = < .001$. Table 31 shows the model summary.

Table 31

Model Summary of Background and Agency Factors with Persistence

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate | R Square Change | F Change | df1 |
|---|---|---|---|---|---|---|---|
| 1 | .174 | .030 | .028 | .43717 | .030 | 15.837 | 7 |
| 2 | .279 | .078 | .074 | .42676 | .047 | 26.143 | 7 |

Next, the relationship between last term freshman GPA and the background variables: Poverty, gender, ethnicity (African American, Hispanic, White, and Asian), and location of students' high school setting: urban, suburban, and rural were entered into the analysis to see how much of the dependent variable could be predicted. The classes (2007, 2008, and 2009) were analyzed in aggregate. The background factors revealed an Adjusted R Square value of .071 with $p = < .001$. Afterward, the agency variables: Dual credit, SAT scores, and class rank, were entered into the analysis to see if they added to the model. The agency factors did in fact add to the model, and revealed an Adjusted R Square value of .198 with $p = < .001$. Table 32 shows the model summary.

Table 32

Model Summary of Background and Agency Factors with Last Term Freshman GPA

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate | R Square Change | F Change | df1 |
|---|---|---|---|---|---|---|---|
| 1 | .270 | .073 | .071 | .9878253 | .073 | 40.044 | 7 |
| 2 | .449 | .202 | .198 | .9175989 | .129 | 26.143 | 7 |

## Research Hypothesis One

The number of dual credit hours earned by a student for the 2007-2008 academic school years is independent of the student's high school setting (urban, suburban, and rural high schools).

To address research hypothesis one, the Chi-square test of independence was used to analyze the potential relationship between amount of dual credit earned and high school setting: Urban, suburban, and rural. Table 33 shows the numbers of students who had and who did not have dual credit by high school location. The result of the chi-square test of independence showed a Pearson Chi-Square value of 3.036[a], significance of $p$ = .212, and a very small strength of association with Phi = .054, Cramer's V = .054. This does not allow the null hypothesis to be rejected, so this indicates the amount of dual credit is independent of the high school location. However, two of the cells have less than 5, so the results of this test are not valid. Since the sample size was small, the Fisher's Exact Test was run and indicated a significance (2-sided) value of .142, $p$ = <.05, which would not allow the null hypothesis to be rejected.

Table 33
Chi-square Test of Independence: Dual Credit by H.S. Location 2007-2008

| ($n$ = 1,039) | | | District Type | | | |
|---|---|---|---|---|---|---|
| | | | Urban | Suburban | Rural | Total |
| Dual Credit | .00 | Observed | 531 | 473 | 21 | 1025 |
| | | Expected | 532.7 | 470.6 | 21.7 | 1025.0 |
| | 1.00 | Observed | 9 | 4 | 1 | 14 |
| | | Expected | 7.3 | 6.4 | .3 | 14.0 |
| Total | | Observed | 540 | 477 | 22 | 1039 |
| | | Expected | 540.0 | 477.0 | 22.0 | 1039.0 |

## Research Hypothesis Two

The number of dual credit hours earned by a student for the 2008-2009 academic school years is independent of the student's high school setting (urban, suburban, and rural high schools).

To address research hypothesis two, the Chi-square test of independence was used to analyze the potential relationship between amount of dual credit earned and high school setting: Urban, suburban, and rural. Table 34 shows the numbers of students who had and who did not have dual credit by high school location. The result of the chi-square test of independence showed a Pearson Chi-Square value of 17.282[a], significance of $p = < .001$, and a very small strength of association with Phi = .122, Cramer's V = .122. However, according to Huizingh (2007), in order for the chi-square test to be valid, no more than 20% of the expected frequencies can be lower than 5. This test had 3 cells (50%) with expected frequencies lower than 5. Therefore, the null hypothesis that the amount of dual credit is independent of the high school location cannot be confirmed or refuted by this test. However, since the sample size was small, the Fisher's Exact Test was run and indicated a significance (2-sided) value of .012, $p = <.05$, which would allow the null hypothesis to be rejected.

Table 34
Chi-square Test of Independence: Dual Credit by H.S. Location 2008-2009

| (*n* = 1,039) | | | District Type | | | |
|---|---|---|---|---|---|---|
| | | | Urban | Suburban | Rural | Total |
| Dual Credit | .00 | Observed | 579 | 559 | 8 | 1146 |
| | | Expected | 580.9 | 556.1 | 8.9 | 1025.0 |
| | 1.00 | Observed | 6 | 1 | 1 | 8 |
| | | Expected | 4.1 | 3.9 | . 1 | 8.0 |
| Total | | Observed | 585 | 560 | 9 | 1154 |
| | | Expected | 585.0 | 560.0 | 9.0 | 1154.0 |

**Research Hypothesis Three**

The number of dual credit hours earned by a student for the 2009-2010 academic school years is independent of the student's high school setting (urban, suburban, and rural high schools).

To address research hypothesis three, the chi-square test of independence was used to analyze the potential relationship between amount of dual credit earned and high school setting: Urban, suburban, and rural. Table 35 shows the numbers of students who had and who did not have dual credit by high school location. The result of the chi-square test of independence showed a low Pearson Chi-Square value of .734[a], significance of $p$ = .693, and a small strength of association with Phi = .023, Cramer's V = .023. However, this test had 2 cells (33.3%) with expected frequencies lower than 5. Therefore, the null hypothesis that the amount of dual credit is independent of the high school location cannot be confirmed or refuted by this test. Again, since the sample size was small, the Fisher's Exact Test was run and indicated a significance (2-sided) value of .560, $p$ = <.05, which would not allow the null hypothesis to be rejected.

Table 35
Chi-square Test of Independence: Dual Credit by H.S. Location 2009-2010

| ($n$ = 1,380) | | | District Type | | | |
|---|---|---|---|---|---|---|
| | | | Urban | Suburban | Rural | Total |
| Dual Credit | .00 | Observed | 720 | 641 | 9 | 1370 |
| | | Expected | 718.8 | 642.3 | 8.9 | 1370.0 |
| | 1.00 | Observed | 4 | 6 | 0 | 10 |
| | | Expected | 5.2 | 4.7 | .1 | 14.0 |
| Total | | Observed | 724 | 647 | 9 | 1380 |
| | | Expected | 724.0 | 647.0 | 9.0 | 1380.0 |

## Conclusion

Based on findings from this study, all of the independent variables this researcher chose to include in this study were important in different ways. In addition, so were all of the statistical tests and measures of correlation and association. Chapter 5 presents a summary of the findings from chapter 4, draws conclusions from those findings, gives implications, and reveals limitations of the study.

# CHAPTER 5

# SUMMARY, CONCLUSIONS, IMPLICATIONS, AND LIMITATIONS

> In the final analysis, where one goes to school has consequences and we, as educators and members of the larger community, can no longer ignore these inequalities. For this nation to flourish, all schools must be quality and effective schools. Rural, as well as urban, schools need to be supported in new and additional ways so that students from these areas become productive members of an ever-changing complex society. (Bouck, 2004, p. 41)

## Summary of Findings

This study attempted to answer are the following: a) Was student success increased equally for all student groups after the passage of the 2006 Texas's House Bill 1, and b) are the factors at the secondary level that are high school factors (for example, amount of dual credit, high school class rank, and SAT score) stronger predictors than background factors (SES, race, gender, and location of students' high school setting)? The study examined the effects of college readiness, and dual credit programs on college persistence and student success. The focus was on urban, suburban, and rural students who had taken dual credit classes while in high school. Pierre Bourdieu's theory of cultural capital was used for the studies overarching theoretical framework. And although not the original design of the study, the researcher not only attempted to

answer the research questions and hypotheses by years but also in the aggregate. The following sections address each research question and hypotheses and present conclusions from those findings.

**Research Question One**

Can first-to-second-year college persistence for the 2007-2008 academic school year, be predicted from the following variables: dual credit, poverty, gender, high school class rank, SAT, ethnicity, and location of students' high school setting (urban, suburban, and rural high schools)?

An analysis of the 2007 data, shows that persistence can be predicted from some but not all of the independent variables. For example, using logistic regression, the odds of persisting can be predicted from class rank, some of the ethnicities (Asian, and Black), some of the SAT scores (math and writing), and from one of the high school locations (rural). Persistence could not be predicted from dual credit, gender, poverty, one of the SAT scores (verbal), one of the ethnicities (Hispanic), and one of the high school locations (suburban). Using the Phi and Cramer's V Correlation Coefficient showed class rank and ethnicity had a significant correlation with persistence but the strength of the association was weak. Using the Point Biserial correlation indicated all three SAT scores had a significant correlation with persistence but that the association was weak.

**Research Question Two**

Can first-to-second-year college persistence for the 2008-2009 academic school year, be predicted from the following variables: dual credit, poverty, gender, high school class rank, SAT, ethnicity, and location of students' high school setting (urban, suburban, and rural high schools)?

An analysis of the 2008 data, showed similar but not exactly the same results. For example, using logistic regression, the odds of persisting can be predicted from class rank, some of the ethnicities (Asian and Black), one of the SAT scores (math), and from gender. Persistence could not be predicted from dual credit, some of the SAT scores (verbal and writing), poverty, one of the ethnicities (Hispanic), or any of the high school locations. Using the Phi and Cramer's V Correlation Coefficient showed class rank, ethnicity, and gender had a significant correlation with persistence but the strength of the association was weak. Using the Point Biserial correlation again indicated all three SAT scores had a significant correlation with persistence but that the association was weak.

**Research Question Three**

Can first-to-second-year college persistence for the 2009-2010 academic school year, be predicted from the following variables: dual credit, poverty, gender, high school class rank, SAT, ethnicity, and location of students' high school setting (urban, suburban, and rural high schools)?

An analysis of the 2009 data again showed similar but not exactly the same results as the previous two years. For example, using logistic regression, the odds of

persisting can be predicted from class rank (third year in a row), some of the ethnicities (Asian and Black), and one of the SAT scores (writing). Persistence could not be predicted from dual credit, some of the SAT scores (math and verbal), gender, poverty, one of the ethnicities (Hispanic), or any of the high school locations. Using the Phi and Cramer's V Correlation Coefficient showed class rank, ethnicity, but not gender, had a significant correlation with persistence but again the strength of the association was weak. Using the Point Biserial correlation again indicated all three SAT scores had a significant correlation with persistence but that the association was weak.

**Research Question Four**

Can last freshman term GPA for the 2007-2008 academic school year, be predicted from the following variables: dual credit, poverty, gender, high school class rank, SAT, ethnicity, and location of students' high school setting (urban, suburban, and rural high schools)?

An analysis of the 2007 data, shows that last freshman term GPA can be predicted from some but not all of the independent variables. For example, Eta shows the amount of variance in the dependent variable can be accounted for by the independent variable. So applied to this situation, it shows how much of the last term freshman GPA is due an individual independent variable all other variables held constant. For the 2007 year data, the percent variance accounted for by the independent variables ranged from .2 percent to 3.4 percent. The Pearson Correlation Coefficient indicated that all of the SAT scores were significant in their ability to predict last term freshman GPA, but that all of the correlations were weak. Using regression analysis,

several of the independent variables showed significance in predicting last term freshman GPA: Class rank, some SAT scores (math and writing), gender, some ethnicities (Asian and Black), and one high school location (rural). Dual credit, one of the SAT scores (verbal), poverty, one of the ethnicities (Hispanic), and one of the high school locations (suburban) were not significant in their ability to predict.

**Research Question Five**

Can last freshman term GPA for the 2008-2009 academic school year, be predicted from the following variables: dual credit, poverty, gender, high school class rank, SAT, ethnicity, and location of students' high school setting (urban, suburban, and rural high schools)?

An analysis of the 2008 data, shows that last freshman term GPA can be predicted from some but not all of the independent variables. Eta showed the amount of variance in the dependent variable can be accounted for by the independent variables ranged from .1 percent to 2.9 percent. The Pearson Correlation Coefficient again indicated that all of the SAT scores were significant in their ability to predict last term freshman GPA, and that all of the correlations were weak. Using regression analysis, several of the independent variables showed significance in predicting last term freshman GPA: Class rank, some SAT scores (math and writing), gender, some ethnicities (Asian and Black), and one high school location (rural). Dual credit, one of the SAT scores (verbal), poverty, one of the ethnicities (Hispanic), and one of the high school locations (suburban) was not significant in their ability to predict.

**Research Question Six**

Can last freshman term GPA for the 2009-2010 academic school year, be predicted from the following variables: dual credit, poverty, gender, high school class rank, SAT, ethnicity, and location of students' high school setting (urban, suburban, and rural high schools)?

An analysis of the 2009 data, shows that last freshman term GPA can be predicted from some but not all of the independent variables. Eta showed the amount of variance in the dependent variable can be accounted for by the independent variables ranged from .3 percent to 4.4 percent. The Pearson Correlation Coefficient again indicated that all of the SAT scores were significant in their ability to predict last term freshman GPA, and again that all of the correlations were weak but stronger than the 2008 data. Using regression analysis, several of the independent variables showed significance is predicting last term freshman GPA: Class rank, all SAT scores, gender, poverty, and one ethnicities (Black). Dual credit, two of the ethnicities (Asian and Hispanic), and both of the high school locations were not significant in their ability to predict.

**Background and Agency Factors**

In addition, this researcher felt that it was important to investigate the background and the agency factors' predictability of persistence and last term freshman GPA. The background factors alone were able to only predict .028 of persistence. When combined with the agency factors, .074 of persistence was able to be predicted. With last term freshman GPA, the background factors alone were able to only predict .071.

When combined with the agency factors, .198 was able to be predicted. This would seem to indicate that through agency, students are able to improve their situation regardless of poverty, ethnicity, gender, or high school location.

**Research Hypotheses: One, Two, and Three**

The number of dual credit hours earned by a student is independent of the student's high school setting (urban, suburban, and rural high schools). Unfortunately, the numbers of dual credit students were too small in the sample for the Chi-square Test of Independence to run with the results being valid.

**Aggregated Research Data**

An analysis of the aggregated 2007, 2008, and 2009 data, showed that persistence can be predicted from most of the independent variables using various tests. Using logistic regression, dual credit, poverty, gender, class rank, ethnicity, and high school location can all predict persistence. Using the Point Biserial correlation it was shown SAT scores can predict persistence. Using ETA, one can show a .3 to 3.9 variance in the dependent variables from an independent variable, all others held constant. Using Pearson Correlation Coefficient, last term freshman GPA can be predicted from all of the SAT scores. Using regression analysis, last term freshman GPA was able to be predicted from dual credit, all of the class ranks, most of the SAT scores, gender, poverty, some of the ethnicities, and two of the high school locations were able to predict last term freshman GPA. SAT verbal and one ethnicity were not able to predict last term freshman GPA by using regression analysis.

In addition, by combining the data for the years 2007, 2008, and 2009, it was possible to discover some information that may not have been noticed otherwise. For example, it was shown a student who has dual credit had 3.6 times the odds of persisting when compared to a student who did not have dual credit, all other variables held constant. Also, for the first time in this study, it was shown dual credit does have a small influence on last term freshman GPA.

However, by keeping the data for the study's year separate, some trends were discovered. The odds of a student persisting not in the 1st quarter of their high school class, when compared to a student in the 1st quarter, seems to be getting worse over the three years of the study (shown in figure 4). Compared to White students, the odds of Asian students persisting are twice as much, Black students half as much, and Hispanic students almost the same (shown in figure 5). Finally, the ability of the SAT scores to predict last term freshman GPA increased substantially over the three-year period of the study.

## Conclusions

Based on findings from this study, both of the dependent variables, and all of the independent variables this researcher chose to include in this study were important in different ways. Although last freshman GPA and persistence both are indicators of student success they are not the same. As could be seen from the data, some of the independent variables showed greater predictability with one of the dependent variables and not the other. It was also important to find out that some of the variables were significant in predictive ability but the strength of association was weak.

Pierre Bourdieu's theory of cultural capital was used for the studies overarching theoretical framework. In light of this, this study looked at agency factors as well as background factors in predicting student success. It was postulated that maybe agency factors, factors students had some control over, might have more predictability or strength of association over the background factors students could not change. This is important not only for students in college, but has other ramifications as well. The results of this study show students can overcome habitus through agency and can take control of their own educational destiny.

## Implications

As high schools and colleges work together to make the transition from high school to college more seamless, there will be more laws to address inequities. Texas' House Bill One was created with good intentions and has had good results. Policy makers would do well to achieve with future laws what this law has achieved. This law has provided opportunity for all groups of students, not just the privileged, in all different locations across the state of Texas to take and complete college-level coursework. Although this law was not funded, high schools and colleges worked together to make the opportunity of 12 hours of college credit a reality.

This researcher would suggest that future policies related to this law would contain either direct funding to high schools and/or colleges or indirect funding by way of tax incentives or college tuition forgiveness. Based on the higher percentage of students from poverty in this sample (28%) and the low numbers of students with dual credit ($n$ = 32), money may be an issue. Currently, the cost of this program is the

responsibility of the families and poverty still is one of the greatest barriers keeping students from attending college. Therefore, even though the courses are available, some students may not take the opportunity because the cost is prohibitive.

In addition to policy implications, there are many practical implications as well. School administrators can to use information from this study to show their school boards the reasons behind the need expand the access of dual credit to all student groups. Counselors can use information to promote SAT study courses and to help parents with encouraging their sons/daughters into taking a more advanced curriculum. Parents, seeing the value of dual credit, may be more inclined to help pay for books, tuition, and fees associated with dual credit. Finally, students may benefit motivationally from this study by seeing a connectedness of high school courses to college courses and then to future careers.

This researcher recommends that more research be conducted in the area of factors that contribute to college readiness including dual credit programs. Furthermore it is suggested that researchers use Bourdieu's concept of cultural capital as a lens because it does suggest critical variables, namely agency variables that affect student success. This study showed a slight advantage of agency factors over background factors, but that may be a result of the small number of students who had taken dual credit classes in this study. Much more research, quantitative as well as qualitative, needs to be done on this topic. For example:

1. Do the odds of a student with dual credit persisting go down as a student moves from the sophomore to junior and then senior year when compared to a student without dual credit?
2. Do the odds of a student in the1st quarter of their high school class persisting go down as a student moves from the sophomore to junior and then senior year when compared to a student who was not in the 1st quarter of their class?
3. What can be learned to help all ethnic groups? Why do Asian students have greater odds persisting than white students?
4. Does dual credit affect students differently based on the location of their high school: Urban, suburban, and rural?

## Limitations

The merit of the study was its ability to add to, confirm, or refute research on dual credit programs, college persistence, student success, student demographics, and student high school setting. This study has the following limitations:

1. This study is limited in scope, due to using only first-time Texas public undergraduate students from high school graduating class years 2007 to 2009 who entered one selected public research university in Texas. Students who enter other colleges and universities who do not have the same characteristics or demographics may respond differently regarding college persistence and student success.

2. Also, all data has some errors; therefore, the validity of the conclusions reached must be viewed in light of possible data entry errors.
3. Further, although the design of the study reduces the likelihood of bias, some bias is always possible in drawing conclusions, and making inferences and generalizations. To control and reduce bias, this researcher was explicit in explaining the treatment of data as much as possible.
4. Finally, the actual numbers of students and student groups, who had taken dual credit classes while in high school, and who entered the selected public research university, were substantially less than was predicted at the time of the graduate proposal defense. The final sample contained 1,849 urban students, 1,684 suburban students, but only 40 rural students and 32 students who had dual credit. The low numbers with these last two groups caused problems with some of the statistical analysis.

## Final Thoughts

This study attempted to find out if a law that was passed had an adverse or positive effect on different groups of students. What was found was students do have some control over their educational future and have the ability to increase their odds of being successful in their educational pursuits. Although ethnicity, gender, poverty, and high school location are factors, this study suggests that they are not as strong as individual choice in determining college success.

# APPENDIX A

## TEA'S DEFINITIONS OF TEXAS' PUBLIC SCHOOL DISTRICT TYPES

1. Major Urban (10)

   A district is classified as major urban if: (a) it is located in a county with a population of at least 735,000; (b) its enrollment is the largest in the county or at least 75 percent of the largest district enrollment in the county; and (c) at least 35 percent of enrolled students are economically disadvantaged. A student is reported as economically disadvantaged if he or she is eligible for free or reduced-price meals under the National School Lunch and Child Nutrition Program.

2. Major Suburban (78)

   A district is classified as major suburban if: (a) it does not meet the criteria for classification as major urban; (b) it is contiguous to a major urban district; and (c) its enrollment is at least 3 percent that of the contiguous major urban district or at least 4,500 students. A district also is classified major suburban if: (a) it does not meet the criteria for classification as major urban; (b) it is not contiguous to a major urban district; (c) it is located in the same county as a major urban district; and (d) its enrollment is at least 15 percent that of the nearest major urban district in the county or at least 4,500 students.

3. Other Central City (39)

A district is classified as other central city if: (a) it does not meet the criteria for classification in either of the previous subcategories; (b) it is not contiguous to a major urban district; (c) it is located in a county with a population of between 100,000 and 734,999; and (d) its enrollment is the largest in the county or at least 75 percent of the largest district enrollment in the county.

4. Other Central City Suburban (154)

A district is classified as other central city suburban if: (a) it does not meet the criteria for classification in any of the previous subcategories; (b) it is located in a county with a population of between 100,000 and 734,999; and (c) its enrollment it at least 15 percent of the largest district enrollment in the county. A district also is other central city suburban if: (a) it does not meet the criteria for classification in any of the previous subcategories; (b) it is contiguous to another central city district; (c) its enrollment is greater than 3 percent that of the contiguous other central city district; and (d) its enrollment exceeds the median district enrollment of 739 students for the state.

5. Independent Town (71)

   A district is classified as independent town if: (a) it does not meet the criteria for classification in any of the previous subcategories; (b) it is located in a county with a population of 25,000 to 99,000; and (c) its enrollment is the largest in the county or greater than 75 percent of the largest district enrollment in the county.

6. Non-Metropolitan: Fast Growing (24)

   A district is classified as non-metropolitan: fast growing if: (a) it does not meet the criteria for classification in any of the previous subcategories; (b) it has an enrollment of at least 300 students; and (c) its enrollment has increased by at least 20 percent over the past five years.

7. Non-Metropolitan: Stable (227)

   A district is classified as non-metropolitan: stable if: (a) it does not meet the criteria for classification in any of the previous subcategories; and (b) its enrollment exceeds the median district enrollment for the state.

8. Rural (427)

   A district is classified as rural if it does not meet the criteria for classification in any of the previous subcategories. A rural district has either: (a) an enrollment of between 300 and the median district

enrollment for the state and an enrollment growth over the past five years of less than 20 percent; or (b) an enrollment of less than 300 students.

9. Charter School Districts (205)

Charter school districts are open-ended school districts chartered by the State Board of Education. Established by the Texas Legislature in 1995 to promote local initiative, charter school districts are subject to fewer regulations than other public school districts. Generally, charter school districts are subject to laws and rules that ensure fiscal and academic accountability but that do not unduly regulate instructional methods or pedagogical innovation. Like other public school districts, charter school districts are monitored and accredited under the statewide testing and accountability system.

# APPENDIX B

# CODING OF INDEPENDENT VARIABLES

| Variables | Coding | Definition |
|---|---|---|
| *Class Rank* | | |
| 1st Q | 1 = In first quarter, 0 = Else | Refers to which quarter a student belongs, academically by percent, of his/her high school class. |
| 2nd Q | 1 = In second quarter, 0 = Else | |
| 3rd Q | 1 = In third quarter, 0 = Else | |
| 4th Q | 1 = In fourth quarter, 0 = Else | |
| *Dual Credit* | 1 = Student has dual credit<br>0 = No dual credit | Student was given credit by both their high school and college for the same class. |
| *Ethnicity* | | |
| Asian | Asian = 1, Else = 0 | Refers to a group of humans, or race, that share the same physical features such as skin color. |
| Black | Black = 1, Else = 0 | |
| Hispanic | Hispanic = 1, Else = 0 | |
| White | White = 1, Else = 0 | |
| *Gender* | | |
| Female | Female = 1, Else = 0 | Refers to sexual category. |
| Male | Male = 0 | |
| *HS Location* | | |
| Urban | Urban = 1, Else = 0 | High school location type determined by the TEA |
| Suburban | Suburban = 1, Else = 0 | |
| Rural | Rural = 1, Else = 0 | |
| *Last Term GPA* | Last Freshman Term Cumulative GPA | Student's Grade Point Average, the last semester they were classified as a college freshman. |
| *Persistence* | Persistence = 1, Else = 0 | Student earned enough credits to change from being classified as a college freshman to a sophomore. |
| *Poverty* | Poverty = 1, Else = 0 | Residing in a zip code area that is above the 2007 national average. |
| *SAT* | | |
| Math | Max SAT Math Score | The numerically largest Scholastic Aptitude Test score a student submitted on their college application. |
| Verbal | Max SAT Verbal Score | |
| Writing | Max SAT Writing Score | |

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# BIOGRAPHICAL INFORMATION

Charles Rowett has been in public school education for over 20 years. He received his Bachelor's in Philosophy from TCU and Master's in Education in Teaching from UTA. He has served as a teacher, coach, assistant principal, high school principal and athletic director. He has enjoyed serving in low performing and exemplary schools; in schools with high levels of poverty and in affluent schools; and in urban, suburban, and rural environments. He currently resides in Fort Worth, Texas with his wife of 23 years and son. He is interested in continuing his research on ways to make the transition from high school to college easier and plans on moving into higher education himself, helping students to become teachers and principals. Charles enjoys riding his new Harley Davidson Dyna-Wideglide which he received for finishing his doctorate.