
A Study of Dual Credit Access and Effectiveness in the State of Texas

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Executive Summary

Executive Summary

In 2010, with the support of the Greater Texas Foundation (GTF), the Bush School of Government and Public Service at Texas A&M University initiated a study of dual credit opportunities in the state of Texas. Through a Capstone course directed by Prof. Jeryl L. Mumpower, Director of the Master of Public Service and Administration Program, this group was charged with analyzing and presenting data related to both the degree of access to dual credit resources throughout Texas, as well as the effectiveness of dual credit opportunities by type. The Greater Texas Foundation further charged the Capstone group with examining the dual credit opportunities for minority, low-income, and rural populations. Throughout a year-long course of study, the Capstone team worked to collect data regarding these issues. We hope that this study will provide a valuable resource for our client, the Greater Texas Foundation, as well as for researchers and practitioners in Texas and throughout the nation.

In examining dual credit in the state of Texas, the Capstone team identified seven research questions of particular interest to GTF, falling within two topic areas: access to dual credit and the effectiveness of current dual credit programs.

Access to Dual Credit Programs

1. Where are dual credit programs available in the state of Texas?
2. How many students participate in dual credit programs?
3. What is the level of participation for rural, economically disadvantaged, and minority students?
4. What factors affect whether students participate in dual credit courses?

Effectiveness of Dual Credit Programs

5. How does postsecondary performance of dual credit participants compare to students who didn't participate in dual credit programs?
6. Do certain high schools have dual credit programs with graduates who fare better than those from other programs?
7. Which dual credit models have the best rates of postsecondary enrollment and graduation among their graduates?

This study has involved two primary efforts. The first was an extensive review of relevant literature to provide a thorough backdrop for analyses of the Texas situation. The second was original analyses of data collected and compiled by members of the Bush School Capstone team.

Literature Review

Access

Postsecondary access for students across the United States has become an important goal for educational institutions around the nation. Since the passage of the Higher Education Act of 1965 (Calderone 2010, 1), the barriers that once existed for low income and minority students have begun to fall. Krueger (2006, 1) asserted that:

Although more students today begin college than 20 years ago, greater proportions are not graduating. Nationally, for every 100 9th-grade students, 68 graduate from high school, 40 immediately enter college, 27 are still enrolled in their sophomore year and 18 graduate within 150% time with either an associate's or bachelor's degree...The United States cannot afford human capital loss of this scale and remain globally competitive.

The advent and implementation of dual credit programs is one way in which states are attempting to prepare their students to enter postsecondary educational institutions. Dual credit opportunities are provided through programs that “are designed to promote college readiness and facilitate the transition to enrollment in postsecondary institutions” (Bhatt 2009, 1). Such programs are intended to improve a student's chances at moving on to postsecondary education, and are being used throughout the United States. Dual credit opportunities are not the only implementation method for credit-earning opportunities, however. Options for earning college credit while enrolled in high school, within the state of Texas in particular, have developed rapidly in the past several years, signifying a firm commitment on the part of the state and educators to provide educational advancement opportunities to students at the high school level, and range from AP/IB to Technical Preparation courses. As such, the relative impact of dual credit, by model of implementation, is an issue of importance for both secondary and higher education institutions.

With attention turning toward increasing rates of participation in dual credit programs both nationally and within Texas, educators and legislators are taking note of data showing a disparity between the dual credit participation rates of minority and non-minority students and among students of varying socioeconomic statuses. While the United States experienced a 20 percent increase in immediate postsecondary enrollment between 1972 and 2007, the gap between low-income and high-income student enrollment has remained steadfast at 23 percent (Calderone 2010, 1); in fact, only 31 percent of students from low-income backgrounds go on to attend some form of postsecondary education as compared to 56 percent of middle-income and 75 percent of high-income students (Pell Institute for the Study of Opportunity in Higher Education 2005). In addition, ethnicity plays an important part in determining access to dual credit opportunities, particularly within the state of Texas. Dual credit participation is increasing state-wide, however the participation for low-income and minority students is still in stark contrast to that of white students; a study conducted by the Texas Higher Education Coordinating Board (THECB) (2008,

3) showed that “there are significant demographic disparities among student groups participating in dual credit courses.”

Furthermore, rural access to dual credit programs is a topic that has witnessed relatively little coverage throughout the body of literature. Waits, Setzer and Lewis (2005) conducted one of the few in-depth analyses on access to dual credit programs in rural areas. Based on a national sample, this research analyzed the different types of dual credit programs offered across school types. They found that suburban schools made dual credit available more often than did the other school types. Rural schools provided greater access to dual credit than did urban schools, but schools in urban settings were more likely to provide dual credit courses on a college campus. This pattern would seem logical, given the remoteness of rural schools and their distance from potential college partners. Public high schools located in rural areas were more likely than high schools in other locales to report that they offered only dual credit courses, as opposed to other means of obtaining college credit while still in high school (most notably Advanced Placement courses). Also, the authors found that schools in rural areas and towns were both more likely than either schools in cities or suburban areas to offer courses for dual credit through distance education.

In Texas, rural students make up only 13.8 percent of high school graduates. Rural students participate in dual credit programs at a higher rate than students in other types of schools, however, making up 20.7 percent of Texas dual credit students (Eklund 2009). Eklund (2009) found that Texas females were much more likely to take dual credit courses than males, but that the difference was less pronounced in rural high schools, both for students who were economically disadvantaged and those who were not. Her analysis of regional differences gave additional support for the conclusion that dual credit participation is generally stronger in rural areas. In contrast, conducting a variable exposure Poisson regression of 2009-10 Texas data, Friedman et al. (2011) found that rural location was a negative predictor of dual credit participation. The rural demographic makes up an ever-shrinking portion of Texas high school students. However, it is important to provide rural students with a level of service that is on par with their more urban counterparts, ensuring that this important population does not go underserved.

A central area of concern for each of these target groups, affordability, is the most common causal thread running through the literature on participation in Texas’ dual credit programs (Katy ISD 2010) and is a key to student participation across the nation. According to a 2010 report, Texas has an unusually high percentage of low-income students (Southern Education Foundation 2010, 6), and with media reports (FOX News Austin 2011) of a 72 percent rise in tuition rates for college since 2003 the state has taken steps to provide access to more affordable and accessible higher education. A common theme in dual credit and educational literature in general is that affordable education provides a stepping stone for students to become more productive members of society (Bernet 2010; Communities Foundation of Texas 2009; Cullen 2010; Jackson 2010; Texas Valley Communities Foundation 2009, 31).

It is routinely pointed out that the state of Texas is on the cutting edge of dual credit, and with the help of technology and innovation the educational institutions in the state will continue to provide such opportunities to students (Scott 2010). Provided that adequate funds for program maintenance and expansion are available within individual Independent School Districts (ISDs) and college/university systems, the state should continue to see an increase in dual-credit enrollments, via both community colleges and other higher education institutions. Low-income students will have the ability to take advantage of dual credit programs as these programs continue to become available in geographically proximate areas and will have the opportunity to gain a college education where before they would not have had the option. Over the last few years, the state of Texas has made dual credit opportunities more readily available through legislation requiring schools to offer dual credit courses and by ensuring that adequate and accessible funding is provided to students (Shieh 2011). These developments, in combination, have led to an overall increase in the number of students participating in dual credit programs.

Effectiveness

For the purposes of this report, we define the effectiveness of dual credit programs in terms of impact on schools and student populations. In some of the research, effectiveness is equated with efficiency in terms of implementation, but very little conclusive data exists which solely examines the question of overall impact. According to Karp and Jeong (2008), there is a dearth of information related to dual credit effectiveness of school and student populations because of a lackluster history of comprehensive data collection attempts to date. However, Karp, et al. (2007) found various impacts on dual credit student enrollment in Florida and New York City. This study found that dual credit courses appear to be especially beneficial for male students, students from low-income families, and those who struggled academically in high school.

As of yet, there is still incomplete information in the literature about dual credit *effectiveness*, as Karp and Jeong (2008) asserted, but there are some key points that can be extracted from the body of research. The literature does provide a limited amount of insight into the effectiveness of student performance. Previous research shows that dual credit students achieve higher persistence and graduation rates in postsecondary institutions than non-participants. Friedman and colleagues recommended that the Texas State Legislature measure demand-side performance – how effectively students perform in courses and programs for dual credit and how effectively and efficiently high schools support students’ enrollment and participation in the courses and programs – against criteria established by the state, and make public the results (Friedman et al. 2011, 69). Unfortunately, no such information has been made available as of the present.

The alignment of dual credit enrollment programs with a defined set of goals is central to success for effective students and dual enrollment programs. However, the literature does not provide a clear consensus on the central arbiters of dual credit effectiveness, particularly in regard to model preference. Student motivation is an important factor in determining dual credit effectiveness, but currently the field of study on this topic is virtually non-existent. This was clearly a significant setback in our research; our main interest focused on how to improve effectiveness for first generation, rural, economically disadvantaged, and minority students. Without evidence

aimed at describing that motivation component, it is difficult to provide a comprehensive picture of the dual credit arena in Texas for the target population.

Literature Review Conclusions

The dual credit literature charts a gradual progression of the popularity and evolution of dual enrollment programs during the last two decades. As stated in the access section, continued funding will ensure the vitality of dual credit programs. In addition, greater access to dual credit courses will provide more low-income, minority, and rural students with the opportunity to take advantage of a program that may assist in postsecondary pursuits. According to research, legislative policies in Texas, such as Section 28.009 of the Texas Education Code, have provided more funding for dual credit courses throughout the State. Since implementation, the state has seen higher levels of dual credit participation overall. However, the overall lack of research pertaining to dual credit's effectiveness, as compared to dual credit access, allows considerably less insight into this important trend. What is known is that dual credit students tend to perform better than non-dual credit participants in a postsecondary context. The research also shows that there is a higher level of dual credit participation by economically disadvantaged and ethnic minorities than experienced a decade ago, yet there is not a substantive field of research to derive academic consensus on effectiveness within these subgroups. Anecdotal evidence is available now addressing this area, but almost no quantitative data is available. The literature also concludes that the alignment of dual enrollment programs with expected goals and outcomes is essential to successful students and dual enrollment programs.

Data Analysis

To examine access to dual credit programs in Texas, the Capstone team created a dataset containing information on each high school campus in the State. First, the Capstone accessed the National Center for Education Statistics (NCES) Common Core of Data (more specifically the Public Elementary/Secondary School Universe Survey Data: 1986–Present). Second, the Capstone received data from the THECB regarding the total number of dual credit students and dual credit semester credit hours attempted at campuses across the state of Texas for the academic year 2007-2008. The two data sources (NCES and THECB) were merged, allowing the Capstone to match key demographic information about each campus from the NCES data with the dual credit data from THECB. All campuses not listed in the THECB data did not report dual credit programs and remained in the Capstone dataset.

Access

Using the merged dataset described above, the Capstone first analyzed the questions related to dual credit access in the state of Texas. To examine access questions, it was necessary to calculate participation rates and the average semester dual credit hours earned. Dual credit participation was calculated by dividing the number of students who participated in dual credit by the total number of students enrolled in grades 9-12 at the school campus. The data field for average semester credit hours was calculated by dividing the number of semester credit hours

earned at each campus by the number of students that attempted dual credit. The high school campus is the unit of analysis in this research.

In academic year 2007-2008, 95 percent of the students in the state of Texas are enrolled at campuses that offer dual credit options, with over 70,000 students participating in some form of dual credit opportunity. Our data, based on the demographics of interest: locale, ethnicity, and socioeconomic status, show trends that are generally similar to those presented in comparable statewide analyses of dual credit participation (Eklund 2009; Friedman et al. 2011). Our analysis found that schools located in towns and rural locales tend to have higher rates of dual credit participation than those in cities and suburbs.

We also found an inverse relationship between the percentage of a school's population made up of minority students and the participation rates, in that schools with higher proportions of minority students had lower rates of dual credit participation. Consistent with our findings, most dual credit studies examining race and ethnicity identified white students as the most dominant group participating in dual credit courses. Our data also showed an inverse relationship between the percentage of the student population that was economically disadvantaged and dual credit participation. As the percentage of students qualifying for free or reduced lunch increased, the percent of students participating in dual credit decreased. This result matches the findings from Friedman et al.'s (2011) report, in which economically disadvantaged students tend to participate in dual credit at a much lower frequency compared to students who are not identified as economically disadvantaged.

It is instructive to examine how interactions among the three focal variables – ethnicity, socioeconomic status, and locale – are related to participation rates. The participation rates in high-minority schools are not constant across economic levels. Rather it ranges from the highest observed rate of participation in the richest high minority schools to the very lowest observed rate for the poorest high minority schools. A somewhat similar, but less pronounced, pattern can be seen for schools with the lowest rates of minority enrollment. Additionally, participation rates within suburbs, towns, and rural areas vary little across both the economic and minority categories; however, participation rates in cities decrease substantially as campuses become more economically disadvantaged and have higher percentages of minority students.

Effectiveness

In regard to postsecondary performance, we found a positive relationship between dual credit participation, and both the first year persistence rate and the college graduation rate. Dual credit participants were more likely to persist in college to a second year in both two year and four year public institutions in Texas than those students who did not participate in dual credit options. From 2004-2008, students who attempted more than 12 dual credit hours had higher persistence rates than those who attempted fewer than 12 dual credit hours. Our findings are consistent with previous research. Institutional data from Monroe Community College (MCC) in New York revealed that 93 percent of dual credit students returned to the spring semester of 2001,

compared to 81 percent of non-dual credit students (Monroe Community College 2003), however, the study did not control for students' prior-academic performance. Another study by Karp et al. (2007) on dual enrollment in Florida and New York City found a multitude of impacts on participating students. Controlling for observable student and school characteristics, the researchers identified positive relationships between dual enrollment participation and all longer-term outcomes studied, including second-year and final grade point averages, persistence to the second year of college, and total postsecondary credits earned.

As for the graduation rate, dual credit participants had higher four-year and five-year graduation rates than their non-dual credit peers at each public institution in Texas. With regard to which dual credit model works best among their graduates, the first year persistence rate of four-year public institutions where dual credit was earned ranged from 80.4 percent to 97.2 percent in 2008. For two-year public institutions, the first year persistence rate ranged from 75.1 percent to 95.2 percent. These findings are consistent with the findings from Karp et al. (2007). Unfortunately, we were unable to conclusively determine if there were any specific models of dual credit implementation that served to more effectively prepare students for postsecondary success, or to determine if graduates from certain high schools were more likely to succeed in a postsecondary context due to the limitations of our data set.

Conclusions and Recommendations

Access

When evaluating access, the literature review shows that the overall rate of participation in dual credit programs has increased. In addition, increased school size by population correlates positively with a heightened likelihood of the availability of a dual credit program; however, among all secondary institutions featuring dual credit programs, participation rates are likely to be considerably lower in larger schools. Three central subgroup characteristics related to participation rates were also identified: rural populations, percentage of minority population, and percentage of economically disadvantaged population. While rural populations correspond with higher rates of participation, both percentage of minority population as well as percentage of economically disadvantaged population demonstrate a negative relationship with participation rates.

Effectiveness

The evidence from both our literature review and our data analysis of the Texas dual credit environment is generally consistent with arguments about the merits of dual credit programs. Both persistence and graduation rates tend to trend higher for dual credit students. However, as a result of the Texas Success Initiative, one generally has to be a reasonably good student to gain access to dual credit, so it is not clear the degree to which dual credit is a contributing causal factor to later superior performance of dual credit students. Further research will be necessary to determine if a direct causal link exists between dual credit participation and postsecondary success.

Recommendations for Future Research

The absence of certain pieces of data severely limited the comprehensiveness of our final result. Future studies would benefit considerably from additional information primarily related to the question of effectiveness; chiefly, longitudinal data which measures GPA/GPR of students who completed dual credit during their secondary schooling, as well as 6-year graduation rates for those same students would provide invaluable information in assessing the effectiveness of dual credit as a whole. In addition, if data were available that indicated models of dual credit implementation, by campus, that would enable future researchers to compare various models of implementation to comprehensively measure effectiveness. Furthermore, an evaluation of dual credit implementation models used in high performing community college programs would serve as an excellent complement to this study. By providing thoughtful analysis of existing engagement techniques, future research may be able to provide thorough recommendations for encouraging access and participation processes. The availability of Advanced Placement (AP)/International Baccalaureate (IB) courses can often serve as a confounding variable in dual credit analyses; a comprehensive data set noting AP/IB participation by jurisdiction would allow for a more thorough analysis.

It is also our recommendation that, in future studies of dual credit in Texas, case studies be a part of the research plan. Case studies could provide further insights on dual credit that may not be explained in the data. Specifically, we recommend that two case study models should be a part of future research. One case study should target current students (both participants of dual credit and those who did not participate) to analyze the present support, opinions and options surrounding dual credit opportunities in a localized jurisdiction. Primarily, this study would be aimed at understanding our fourth question of analysis related to what factors affect student decisions regarding participation in dual credit. The second case study will focus on past participants and administrators of dual credit to investigate how dual credit had prepared them for postsecondary enrollment. These case studies can provide valuable direction to researchers in regards to targeting potential causality for participation in dual-credit programs, and may in fact, provide useful quantitative and qualitative data in its own right.

Introduction

Introduction

In 2010, the Bush School of Government and Public Service at Texas A&M University began preparation for a collaborative effort with the Greater Texas Foundation (GTF) in order to study the environment related to dual credit opportunities throughout the state of Texas. Through a Capstone course chaired by Professor Jeryl Mumpower, Director of the Master of Public Service and Administration Program, this group would be charged with analyzing and presenting data related to both the accessibility of dual credit resources throughout Texas, as well as the effectiveness of dual credit opportunities. As per the request of the Greater Texas Foundation, the Bush School Capstone group was further charged with examining the relationship that exists between dual credit opportunities and the minority, low-income, and rural populations targeted by GTF. Throughout a year-long course of study, the Capstone team has worked to collect and analyze data that will speak to each of these issues in turn. It is our hope that this study will provide a valuable resource for our client, Greater Texas Foundation, as well as for researchers and practitioners both in Texas and throughout the nation, in evaluating how dual credit opportunities affect minority and low income populations, and the means by which dual credit has been implemented and has spread geographically through the State.

This research has been accomplished through two primary efforts: one, an extensive review of relevant literature to provide a thorough backdrop of analysis for a comprehensive evaluation of the Texas situation, and the other a study of data collected and compiled by members of the Greater Texas Foundation/ Bush School Capstone team. These two sections will be presented in the following paper, beginning with our literature review. Following the presentation of evidence from previous literature, our data collection and analysis results and future recommendations will be presented in turn.

Research Questions

Research Questions

In examining dual credit in the state of Texas, the Capstone team has identified several research questions, falling within two topic areas: access to dual credit and the effectiveness of current dual credit programs.

Access to Dual Credit Programs

1. Where are dual credit programs available in the state of Texas?
2. How many students participate in dual credit programs?
3. What is the level of participation for rural, economically disadvantaged, and minority students?
4. What factors affect whether students participate in dual credit courses?

Effectiveness of Dual Credit Programs

5. How does postsecondary performance of dual credit participants compare to students who didn't participate in dual credit programs?
6. Do certain high schools have dual credit programs with graduates who fare better than those from other programs?
7. Which dual credit models have the best rates of postsecondary enrollment and graduation among their graduates?

Literature Review

Literature Review

Dual credit has been researched for at least the last 20 years, especially as participation by schools and students has increased nationally. This literature review will explore the national and statewide research pertaining to dual credit *access* and *effectiveness*. Dual credit access addresses the availability and equity of dual credit programs throughout various communities and socioeconomic levels. The effectiveness of dual credit relates to the impact on schools and student populations.

This literature review begins with an overview of dual credit access in Texas and around the country. Subsequently, the review will discuss research trends in dual credit participation and dual credit program models. Then the access section will introduce the research on dual credit participation by subgroups of interest—low-income, minority, and rural student populations. The access discussion closes by addressing the cost and availability factors affecting student participation rates.

The following section presents research on dual credit effectiveness. In particular, research related to postsecondary student performance, assessment studies of dual credit programs, and evaluations of the effectiveness of different dual credit models. The student performance discussion contains a comprehensive discussion on dual credit program alignment issues and participant success.

Dual Credit Access

Postsecondary access for students across the United States has become an important goal for educational institutions around the nation. Since the passage of the Higher Education Act of 1965 (Calderone 2010, 1) the barriers that once existed for low income and minority students have begun to fall. Krueger (2006, 1) made a strong case for improvements in opportunities for postsecondary education when he commented:

The transition to a knowledge-based economy is fueling the demand for well-educated, technically proficient workers – in all sectors, across a wide range of occupations and even for entry-level positions. New civic demands also call for a highly educated populace. Although more students today begin college than 20 years ago, greater proportions are not graduating. Nationally, for every 100 9th Grade students, 68 graduate from high school, 40 immediately enter college, 27 are still enrolled in their sophomore year and 18 graduate within 150 percent time with either an associate's or bachelor's degree. Far too many students experience substantial challenges in negotiating the transition from high school to college, resulting in a choice by many students to drop out of high school or college altogether. The result is that fewer than 20 percent of the 9th Graders entering the education pipeline will graduate with a college degree by the age of 24. The United States cannot afford human capital loss of this scale and remain globally competitive.

The advent and implementation of dual credit programs is one way in which states are helping to prepare their students to enter postsecondary educational institutions. Dual credit opportunities are provided through programs that “are designed to promote college readiness and facilitate the transition to enrollment in postsecondary institutions” (Bhatt 2009, 1). Such programs are one way of improving a student’s chances at moving on to postsecondary education and are being used throughout the United States.

Dual Credit and Other Options for Earning College Credit while in High School

Options for earning college credit while enrolled in high school, within the state of Texas in particular, have developed rapidly in the past several years, signifying a firm commitment on the part of the state and educators to provide educational advancement opportunities to students at the high school level. Options for high school students to earn college credit include:

- Dual Credit Courses
- Advanced Placement Courses
- International Baccalaureate Courses
- Technical Preparation Courses
- Articulated Postsecondary Courses
- Early College High School Courses
- T-STEM
- Online Courses

Dual Credit Courses are curricula:

...through which a student may earn high school credit for successfully completing a college course that provides advanced academic instruction beyond, or in greater depth than, the Texas Essential Knowledge and Skills (TEKS) for a corresponding high school course. The ‘dual credit’ earned is college credit and high school credit for one course (Texas Education Agency 2011, 1).

This is a distinct concept that does not include the remainder of college preparatory courses, as such courses do not, by definition, provide college credit as a result.

According to the Texas Education Agency (2008, 3):

The *Advanced Placement* Program and the *International Baccalaureate* Diploma Programme are advanced academic programs that expose secondary school students to rigorous, college-level academic content. The Advanced Placement Program offers students the opportunity to take one or more advanced level courses and examinations from six academic areas: art and music, English, other languages, mathematics and computer science, science, and social science and history. Although most students participate in AP courses before taking the

corresponding examinations, they may take AP examinations without having taken the courses.

The International Baccalaureate Diploma Programme is a high school curriculum for students ages 16-19 that is anchored by three core components: a Theory of Knowledge (TOK) course; Creativity, Action, and Service (CAS) activities; and an extended essay project based on original, independent research. Six academic subject groups build on the core components: Language A1 (first language), Second Language, Individuals and Societies, Experimental Sciences, Mathematics and Computer Science, and The Arts.

Technical Preparation courses are those courses conducted in conjunction with technical or vocational schools to prepare students for direct workplace experiences.

Articulated postsecondary courses are those courses that are approved by an articulation board that assist a student in moving from one level of education to the next (Smith 2010).

According to the Early College High School Initiative (2011):

Early college high schools blend high school and college in a rigorous yet supportive program, compressing the time it takes to complete a high school diploma and the first two years of college. [S]chools are designed so that low-income youth, first-generation college goers, English language learners, students of color, and other young people underrepresented in higher education can simultaneously earn a high school diploma and an Associate's degree or up to two years of credit toward a Bachelor's degree—tuition free.

T-STEM stands for Texas Science, Technology, Engineering, and Mathematics Initiative. According to the Texas Education Agency (2008):

The T-STEM Initiative includes academies, professional development centers, and a network all designed to improve instruction and academic performance in science and mathematics-related subjects at secondary schools.” Various institutions across the state offer courses designed to direct students toward higher education and vocations in the sciences. Courses are offered through a variety of institutions including 51 operating T-STEM Academies, including 20 campuses Grades 9-12 and 31 campuses Grades 6-12.

Participation in Dual Credit

National participation in dual credit programs, according to a study commissioned for the Indiana Commission for Higher Education in 2009, is increasing, with 71 percent of high schools around the country providing opportunities for dual credit (Bhatt 2009, 1) during the 2002-2003 academic year alone. According to the authors, the expectations are that such numbers are increasing as “states and districts develop policies to support and facilitate obtaining credit to

promote and ease the transition from high schools to postsecondary institutions.” Krueger (2006, 2) states, “Currently, dual-enrollment policies exist at the state, board, or institutional level in 47 states and their popularity seems to be growing.”

Several sources give good examples of the upward trend of dual credit. The NCES (Planty and Provasnik 2007, 6) in particular provides support for the argument that enrollment has increased in the past several years. This study finds that a very high percentage (82 percent) of large high schools (1200 or more students) offering dual credit courses, with the percentage decreasing in smaller institutions, but only dropping to 63 percent in schools with less than 500 students. In large high schools, Advanced Placement courses were more prevalent (97 percent vs. 82 percent) but in smaller schools (less than 500 students) dual credit courses were more apt to be offered (63 percent vs. 40 percent). Of significant note is that, particularly that by region, the NCES study shows that jurisdictions classified as towns offered the highest percentage of dual credit courses (79 percent), with those classified as cities offering the fewest dual credit courses at 65 percent. Also of importance, the data showed that, with rising minority enrollment, dual credit opportunities decreased, with 76-78 percent of schools with 20 percent or less minority enrollment offering dual credit, while only 58 percent of schools with more than 50 percent minority enrollment offered dual credit courses.

Krueger (2006, 2) stated:

According to the Prichard Committee in Kentucky, the number of students enrolled in the state’s dual enrollment program grew from 6,281 in 2000 to 14,123 in 2005. The Center for an Urban Future estimates the number of colleges offering dual enrollment courses in New York grew from six in to 17 in a single year. In Virginia, the number of students participating in dual enrollment programs rose from 2,000 to 6,700 in a six-year period. And in the Philadelphia area, the number of high schools offering dual enrollment rose from 75 to 112 between 2003 and 2005.

Other relevant statistics include (National Center for Education Statistics 2005):

- During the 2002-03 school year, 70% of public high schools nationally offered courses for dual credit.
- 92% of schools nationally offering courses for dual credit offered such classes with an academic focus, and 51% reported offering dual credit courses with a career and technical/vocational focus.
- Nationally, of schools offering dual credit courses on a postsecondary campus, 82% reported that these courses enrolled both high school and postsecondary students. Of schools offering technical/vocational dual credit courses on a postsecondary campus, 78% reported that these courses contained both high school and postsecondary students.

In Texas, the participation rate for dual credit programs has been steadily increasing, as shown by a 2008 Texas Higher Education Coordinating Board study (Table 1) and the follow-up table detailing the 2007 – 2010 school year dual credit enrollments:

Table 1. Dual Credit Enrollment from Fall 1999 - Fall 2007

Year (Fall)	Students Enrolled in Dual Credit
1999	11,921
2000	17,784
2001	22,812
2002	28,454
2003	31,757
2004	38,082
2005	42,167
2006	57,554
2007	64,910

Source: Texas Higher Education Coordinating Board (2008)

Table 2. Number of Students Enrolled in Courses for Dual Credit by Grade and Year

Grade	2007–08	2008–09	2009–10	Average
Grade 9	3,373	4,876	4,578	4,276
Grade 10	5,548	6,523	6,140	6,070
Grade 11	24,611	29,115	35,044	29,590
Grade 12	38,269	43,699	48,470	28,913
Other	2	3	0	2
Total	71,803	84,216	94,232	83,417

Source: Friedman et al. 2011

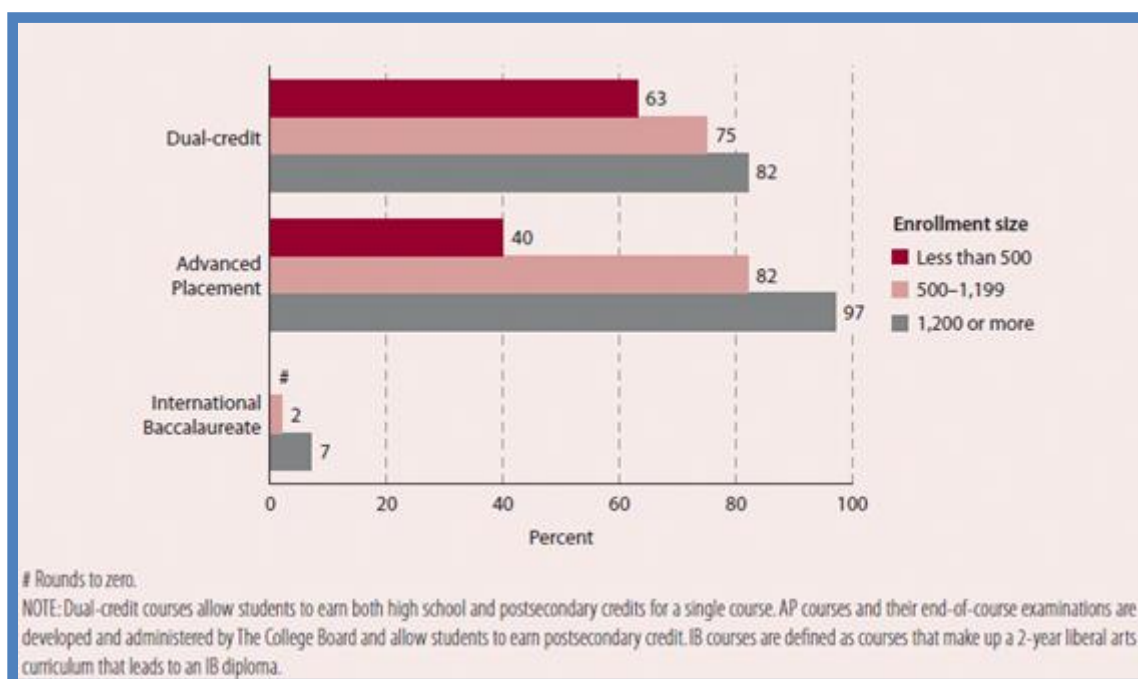
Access to college credit is one of the objectives behind both national and Texas-specific dual credit opportunities. Courses can be taught at various levels and locations, including high school classrooms, college or university classrooms, or third-party facilities. The Texas Senate Higher Education Interim Committee in 2010 suggested that “whenever possible, students should be brought to the college campus and taught there” (Work 2010). However, many opportunities exist for college credit to be taken throughout the high school experience across the state, and not just in college classrooms. The University of New Mexico, Taos pointed out that “Historically, not all students in the state have had the same opportunities to benefit from dual credit courses. The new Statewide Dual Credit Program offers a program to students throughout the state—whether you live in Farmington, Albuquerque or Hobbs” (UNMT 2011).

Nationally, according to Swanson (2008, 56):

The overwhelming majority of colleges, eighty percent, offer their dual credit enrollment courses on the college campus, while fifty-five percent of colleges offer classes only in the high schools. Of those programs holding classes in the high schools, over one quarter of the courses are taught by college instructors, thirty-two percent by a high school based adjunct professor, and the remainder by a combination of high school and college based teachers.

There is certainly evidence available to support such claims. For instance, in a national survey conducted by the U.S. Department of Education in 2002-2003 (Figure 1) college credit opportunities in public schools focused primarily on dual credit programs and Advanced Placement courses. Though the information in 2003 showed a greater prevalence of strictly AP courses in large institutions (97 percent of 1200+ student respondent institutions vs. 82 percent for dual credit programs), the opportunity for students to participate in programs to earn college credit while still in high school was significant, with over 50 percent of institutions of all sizes offering some sort of dual credit option (lowest percentage reported was 63 percent of “less than 500 student” institutions offering dual credit programs).

Figure 1. Percentage of Public High Schools that Offered Dual-Credit Courses, Advanced Placement (AP), and International Baccalaureate (IB), by School Enrollment: 2002-2003



Reproduced From: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System, “Dual Credit and Exam-based Courses,” (Waits, Setzer, and Lewis 2005)

The Southern Regional Education Board reported (Figure 3) that within its member states during the 2008-2009 academic year, .5 percent of the undergraduate credits awarded by four-year colleges and universities, 3 percent of credits at two year colleges, and 4.6 percent of the credits at technical institutes of colleges were awarded to students still in high school.

Figure 2. Percent of Undergraduate Credit/Contact Hours Taken by High School Students at Public Postsecondary Education Institutions

	Percent, 2008-09			Percentage-Point Change, 2007-08 to 2008-09		
	Four-Year Colleges and Universities	Two-Year Colleges	Technical Institutes or Colleges	Four-Year Colleges and Universities	Two-Year Colleges	Technical Institutes or Colleges
Average of states reporting	0.5	3.0	4.6	NA	NA	0.5
Alabama	—	—	—	—	—	—
Arkansas	1.8	6.2	—	0.4	-0.1	—
Delaware	—	—	NA	—	—	NA
Florida	0.3	1.6	—	*	—	—
Georgia	0.4	1.5	3.3	—	—	-0.2
Kentucky	0.9	6.3	9.3	0.2	-0.4	-2.8
Louisiana	1.0	3.5	10.7	0.5	0.8	4.6
Maryland	—	—	NA	—	—	NA
Mississippi	—	0.8	NA	—	—	NA
North Carolina	0.4	4.1	NA	0.2	0.3	NA
Oklahoma	0.5	2.7	—	*	0.1	—
South Carolina	0.2	2.7	NA	*	0.5	NA
Tennessee	0.5	3.5	—	0.1	0.5	—
Texas	0.2	6.4	NA	*	4.4	NA
Virginia	0.1	8.7	NA	*	0.3	NA
West Virginia	1.0	5.3	—	-0.1	-0.2	—

* Less than 0.1 percentage point.
 "NA" indicates not applicable. There was no institution of this type in the state, the state did not report in both years or the regional average was not comparable year-to-year.
 "—" indicates not available.

Reproduced From: SREB Fact Book on Higher Education (2009), Supplements Table 37

Offering such opportunities not only serves the needs of the students but benefits both the educational institutions and state government itself. In an article highlighting the dual credit situation in Illinois, a career-oriented program called Career Vision (2009) pointed out several benefits to dual credit programs within that state:

- Facilitates the transition between high school and college
- Enhances readiness for college level work and reduces need for remedial courses
- Reduces high school drop out rates
- Increases curriculum options and degree of academic challenge
- Raises student motivation and aspiration
- Increases postsecondary enrollment

- Higher college grade point averages
- Reduces cost of attendance
- Increases student retention in college
- Reduces the time to graduation

Swanson (2010) presented a similar analysis of benefits to providing dual credit and dual enrollment opportunities to high school students. The research pointed out that dual credit programs provided an opportunity for:

- Preparing for the academic rigors of college
- Exposing students to both academic and non-academic aspects of college
- Assisting with transitions to college life
- Exposing first generation students to college routines, expectations, and career possibilities
- Activating students' visualization of themselves as "college material"
- Offering new high school courses in both the academic and the vocational sectors
- Reducing college costs and time to degree through earning college credits in high school
- Improving relationships between secondary and postsecondary institutions

Within the state of Texas:

A variety of courses for dual credit are available to students in both academic and career or technical areas. In the core academic areas, students most frequently were offered language arts courses in general English as well as reading and journalism; math courses in general math as well as algebra and precalculus or calculus; science courses in areas such as physics, chemistry, animal/aquatic/equine science, [etc.]. Finally, students were offered courses for many career or technical paths such as business/entrepreneurial/ management, culinary arts/food production, [and] automotive technology.... (Friedman et al. 2011, 21).

The Texas Higher Education Coordinating Board (2008, 3) specifies student eligibility for dual credit as:

- The student is in the eleventh or twelfth grade and demonstrates college readiness by achieving the minimum passing standards under the provisions of the Texas Success Initiative, or
- The student is an eleventh grade student who achieves a score of 2200 on mathematics and/or a score of 2200 on English/Language Arts with a writing subsection score of at least 3 on the tenth grade TAKS relevant to the courses to be attempted, or
- The student achieves a combined score of 107 on the PSAT/NMSQT with a minimum of 50 on the critical reading and/or mathematics test relevant to the courses to be attempted, or

- The student achieves a composite score of 23 on the PLAN with a 19 or higher in mathematics and English. An eligible high school student who has enrolled in dual credit under this provision must demonstrate eligibility to enroll in dual credit courses in twelfth grade, and
- The student meets all of the college's regular prerequisite requirements designated for that course (e.g., minimum score on a specified placement test, minimum grade in a specified previous course, etc.), and
- The student has at least junior year high school standing, with exceptions to this requirement for students with demonstrated outstanding academic performance and capability (as evidenced by grade-point average and PSAT/NMSQT scores).

In the state of Texas:

College-readiness legislation [previously referred to as House Bill 1] passed in 2006 includes provisions that require all school districts to implement a program by the fall of 2008 in which students will be able to earn the equivalent of 12 hours of college credit while in high school (TEC Sec. 28.009). These requirements may be met by offering dual credit for college courses, advanced technical courses, Advanced Placement courses, and/or International Baccalaureate courses (THECB 2008, 2).

Many media sources and publications throughout the state of Texas point out that community colleges have taken the most active role in providing dual credit opportunities to students (Giguere 2010; Houston Community College 2011; Kerrigan and Slater 2010; Ruark 2011; Rubenstein 2008). Ruark (2011) examined several Texas community colleges and found that enrollment for new students had skyrocketed over the past year or more. The role of dual credit programs on increasing enrollment at two such community college campuses, in San Angelo and Big Spring, was highlighted. There are several benefits for students with access to local community colleges: immediate access to local college resources, affordability due to less travel, immediate class opportunities, and the ability to focus on both high school courses and college courses while being able to attend both such institutions to get both such experiences.

Participation by Low-Income and Minority Students

Even though dual credit programs are increasingly popular and utilized around the nation, one common thread appears again and again: the level of access afforded to low income and minority students. Nationally and regionally, some key facts are leading educators to assess the ways in which they can offer dual credit to these demographics. According to information compiled by the Institute for Higher Education Policy (Calderone 2010, 1), the following are key statistics in assessing access to dual credit opportunities:

- “While the United States experienced a 20 percent increase in immediate postsecondary enrollment between 1972 and 2007, the gap between low-income and high-income

student enrollment has remained steadfast at 23 percent (NCES 2009)” (Calderone 2010, 1).

- “Only 31 percent of students from low-income backgrounds go on to attend some form of postsecondary education as compared to 56 percent of middle-income and 75 percent of high-income students (Pell Institute for the Study of Opportunity in Higher Education 2005)” (Calderone 2010, 1).
- “Among the highest academically qualified, only 47 percent of low income students went on to attend a four-year institution as compared to 67 percent of high performing, high income students (ACSFA 2002)” (Calderone 2010, 1).

With attention turning toward increasing rates of participation in dual credit programs both nationally and within Texas, educators and legislators are taking note of data showing a disparity between minority and non-minority and socioeconomic status participation rates. Acknowledgement of the disparity in numbers is leading, according to a Jobs for the Future (2008) analysis, to a push for increased minority and low-socioeconomic status student enrollment nationwide. Figure 4 below shows several states that have taken an interest in minority participation in dual credit programs since the mid-1990s, including Florida, Utah, New York, Washington, Illinois, and Virginia. While the study notes that cross-state reference should be avoided, looking simply at the numbers within each state tells a significant story: within Florida alone, the overall increase in dual enrollment courses across all ethnicities was 20 percent between 1998 and 2003. Most telling within that state is the 34 percent increase in black student participation and 58 percent increase in Latino participation between those same years. Only Virginia reported a significant decline in black student participation, but did report a 200 percent increase in “unspecified” ethnic participation. Every state examined in that particular study saw an overall increase in dual credit participation in the years leading up to 2003.

Figure 3: Dual Enrollment for Increasing Postsecondary Success for Underrepresented Students in Case Study States

	STUDENTS IN CREDIT COURSES	CREDITS/ COURSES	INCREASE IN PARTICIPATION	MINORITY PARTICIPATION	OTHER COMMENTS
CASE STUDY STATES					
Florida	34,762	90,756 courses 11,347 FTE	2% increase from 2002-03 to 2003-04; 20% increase from 1998-99 to 2002-03	9% black 10 % Hispanic 4% Asian Less than 1% Native American 1998-2003 increase: 34%, black; 58%, Latino	Several dual enrollment high schools give AA degree
Utah	23,384	153,727 credits 5,000+ courses	6.8% increase from 2002-03 to 2003-04; 100% since 1995	Not available	Since 2000, 270 students have earned AA in high school and New Century Scholarships
CUNY	14,170	54,492 credits 19,520 enrollments	10% increase 2003-04 over students in college-credit courses in 2002-03	22.2% black 20.2% white 18.8% Hispanic 20% Asian 5.4% Other 13.3% Unknown	32.4% of NYC public high school students who entered CUNY in fall 2003 had College Now experience
SELECTED OTHER STATES					
Washington	15,610 Running Start 13,690 Tech Prep	9,533 FTE 86,189 credits	6% increase from 2002-03	17% students of color	10% of juniors and seniors; 788 AA degrees
Illinois	20,405	28,994 credits	625% 1990-2001 35% 2002-03	7% black 6.4% Hispanic 4.6% Asian/Pacific 1.9% Native American	9% of all high school students participated
Virginia	13,915	Not available	4.4% increase from 2002-03	Increase: 2.8% Asian 15.4% Hispanic 200% Unspecified Decrease: 10.9% black 14.3% Hawaiian 85.9% American Indian	Piloting Governor's Initiative: "Senior Year Plus"; under previous plan, districts could ask students to pay
Note: This data is not comparable across states and should be read with caution. Some states count FTEs, others count courses and credits. * Without state dual enrollment legislation, the City University of New York, the largest urban postsecondary system in the country, and the New York Department of Education, the largest urban school district in the country, have established a high school/postsecondary partnership that rivals in size those of entire states. Sources: Florida: Impact of Dual Enrollment on High Performing Students, Data Trend #26, Florida Department of Education (March 2004); Dual Enrollment students are More Likely to Enroll in Postsecondary Education, Fast Fact # 79, Florida Departments of Education, March 2004; personal communication, Patricia W. Windham, October 2004, Florida Department of Education. Utah: Personal communications: Brett Moulding, Utah State Department of Education, November 2004; Dr. Gary S. Wixom, Assistant Commissioner, Utah System of Higher Education; and Concurrent Enrollment Summary, Utah State Office of Education—Summary 2003-2004 School Year, September 24, 2004. CUNY: College Now, December 9, 2004, PowerPoint, prepared by College Now for conference: "College in High School: For Whom and For What," City University of New York, Graduate Center. Washington: Running Start, 2003-04 Annual Progress Report, State Board for Community and Technical Colleges, State of Washington. Illinois: 2003-2004 Census of High School Students Enrolled in Community College Courses for High School Credit, Finding and Data Tables, Illinois State Board of education, Data Analysis and Progress Reporting, September 2004. Virginia: Personal communication, Doris Brown, Data Management Analyst, Educational Information Management, Virginia Department of Education, February 2005.					

Reproduced From: "Head Start on College: *Dual Enrollment Strategies In New England 2004–2005*" (Hoffman and Robins 2005, 8)

Within the state of Texas, ethnicity plays an important part in determining access to dual credit opportunities. As noted earlier, dual credit participation is increasing state-wide, however the participation for low-income and minority students is still in stark contrast to that of white students. The THECB (2008, 3) showed that “there are significant demographic disparities among student groups participating in dual credit courses.” Figure 2 below, from a 2003-2003 national study released by the U.S. Department of Education, showed that the percentage of Advanced Placement courses offered in high minority enrollment schools was higher than those in lower minority-populated schools, there was a significant decline in the percentage and actual number of specific “dual credit” courses offered as minority enrollment increased (from 76 percent of schools offering dual credit courses in “less than 6 percent” minority enrollment schools to 58 percent of schools offering dual credit courses in “50 percent or more” minority enrollment institutions).

Figure 4. Number and Percentage of Public High School that Offered Dual Credit, Advanced Placement (AP), and International Baccalaureate (IB) courses, by Selected School Characteristics: 2002-2003

School characteristic	Total number of high schools	Offered dual-credit courses		Offered Advanced Placement courses		Offered International Baccalaureate courses	
		Number	Percent	Number	Percent	Number	Percent
All public high schools	16,500	11,700	71	11,000	67	390	2
Enrollment size							
Less than 500	7,400	4,700	63	3,000	40	#	#
500 to 1,199	5,000	3,700	75	4,100	82	70	2
1,200 or more	4,100	3,300	82	3,900	97	290	7
School locale							
City	2,700	1,800	65	2,100	77	150	6
Urban fringe	4,100	3,100	74	3,600	87	180	4
Town	2,400	1,900	79	1,700	72	201	11
Rural	7,200	5,000	70	3,600	50	#	#
Region							
Northeast	2,800	1,600	58	2,300	84	30	1
Southeast	3,500	2,400	69	2,400	69	170	5
Central	5,200	4,100	80	2,800	54	50	1
West	5,100	3,600	71	3,500	69	150	3
Percent minority enrollment							
Less than 6 percent	5,600	4,300	76	3,300	58	#	#
6 to 20 percent	3,800	3,000	78	2,600	70	90	2
21 to 49 percent	3,200	2,300	72	2,400	75	150	5
50 percent or more	3,600	2,100	58	2,500	69	150	4

Rounds to zero.
 † Interpret data with caution (estimates are unstable).
 ‡ Reporting standards not met (too few cases).
 NOTE: Dual-credit courses allow students to earn both high school and postsecondary credits for a single course. AP courses and their end-of-course examinations are developed and administered by The College Board and allow students to earn postsecondary credit. IB courses are defined as courses that make up a 2-year liberal arts curriculum that leads to an IB diploma. Percentages are based on unrounded numbers. Detail may not sum to totals because of rounding or missing data. For the FRSS study sample, there were 29 cases for which the percent minority enrollment in the school was missing. Those cases were included in the totals and in analyses by other school characteristics.

Reproduced From: U.S. Department of Education, National Center for Education Statistics, Fast Response Survey System (FRSS), “Dual Credit and Exam-based Courses,” (Waits, Setzer, and Lewis 2005).

According to a recent report commissioned by the Texas Education Agency:

Most students who enrolled in courses for dual credit were in Grades 11 and 12, with Grade 12 students enrolling at the highest rates. In addition, the number of students in Grades 11 and 12 who were enrolled in courses for dual credit increased consistently over the three years examined, as did overall enrollments in these courses. Between 2007–08 and 2009–10, the number of Grade 11 students who were enrolled in courses for dual credit increased by 42%, and the number of Grade 12 students who were enrolled in courses for dual credit increased by 27%. In 2009–10, these enrollments represented about 17% of Grade 12 students and 11% of Grade 11 students within the state as a whole (Friedman et al. 2011, 15-17).

Table 3. Number of Students Enrolled in Courses for Dual Credit by Grade and Year

Grade	2007–08	2008–09	2009–10	Average
Grade 9	3,373	4,876	4,578	4,276
Grade 10	5,548	6,523	6,140	6,070
Grade 11	24,611	29,115	35,044	29,590
Grade 12	38,269	43,699	48,470	28,913
Other	2	3	0	2
Total	71,803	84,216	94,232	83,417

Source: Public Education Information Management System (Texas Education Agency 2011)

The report also deconstructed dual credit enrollment in terms of ethnicity:

The majority of students enrolled in courses for dual credit were either white or Hispanic. On average, 46% of students enrolled in courses for dual credit were white, 40% were Hispanic, and 10% were African American. Less than 5% were Asian/Pacific Islander. The percentages for students from each of these groups remained fairly stable across the three years examined. In 2009–10, 35% of all high school students in Texas were white, 46% were Hispanic, 14% were African American, and 5% were Asian/Pacific Islander. Less than 1% of students were categorized as “other.” White students thus were overrepresented in courses for dual credit in 2009–10, and other racial/ethnic groups generally were underrepresented; this was particularly the case for African-American students (Friedman et al. 2011, 16-17).

Table 4. Percentage of Students Enrolled in Courses for Dual Credit by Race/Ethnicity and Year

Race/Ethnicity	2007–08	2008–09	2009–10	Average
Asian/Pacific Islander	4.60%	4.20%	3.50%	4.10%
African American	9.80%	10.50%	8.40%	9.60%
Hispanic	37.40%	39.70%	41.60%	39.60%
White	47.80%	45.30%	44.80%	46.00%
Other	0.30%	0.30%	1.80%	0.80%
Total students	71,803	84,216	94,232	83,417

Source: Public Education Information Management System (Texas Education Agency 2011)

Further, the report breaks down dual credit enrollment by economic status:

On average, 37% of students who were enrolled in courses for dual credit were economically disadvantaged (eligible for free or reduced-price lunch or other economic disadvantage). There was a slight increase in the number of economically disadvantaged students across the three years examined. In 2009–10, approximately 50% of all high school students were economically disadvantaged; economically disadvantaged students thus were underrepresented in enrollment in courses for dual credit (Friedman et al. 2011, 17).

Table 5. Percentage of Students Enrolled in Courses for Dual Credit by Economic Status and Year

Economic Status	2007–08	2008–09	2009–10	Average
Economically disadvantaged	34.00%	38.00%	37.90%	36.60%
Not economically disadvantaged	66.00%	62.00%	62.10%	63.40%
Total students	71,803	84,216	94,232	83,417

Source: Public Education Information Management System (Texas Education Agency 2011)

As is evident through all of this research, both socioeconomic status and ethnicity are associated with participation in dual credit coursework. While data is not necessarily clear-cut on the issue, there is evidence that areas with fewer students, students with low socioeconomic status, and those with diverse ethnic heritage participate at a lower level than those students who attend more populous high schools, are at a higher socioeconomic level, and are not of minority status.

Examination of the percentages in Tables 5 and 6 below show clearly that both African American and Hispanic ethnic groups fall behind in enrollment in dual credit programs within Texas. Though white students make up only 35 percent of the student population they make up over 50 percent of the dual credit enrollees. In contrast, Hispanic students make up 47 percent of the overall student population but have only a little over 38 percent enrollment representation in dual credit programs.

Table 6. Dual Credit Participation in the State of Texas, Fall 2007

Ethnicity	# of Students	Percentage
White	32,595	50.22%
Hispanic	24,877	38.32%
African American	3,405	5.25%
Asian/Pacific Islander	1,921	2.96%
Other	2,112	3.25%

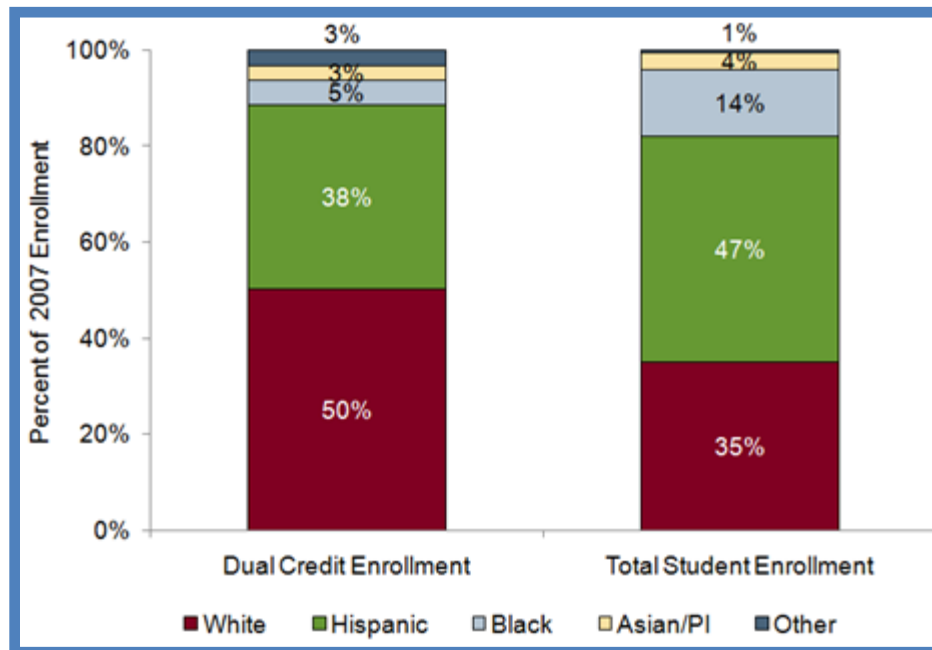
Source: Texas Higher Education Coordinating Board 2008

**Table 7. 2007 Student Enrollment Data in the State of Texas,
All Grade Levels, By Ethnicity**

Ethnicity	# of Students	Percentage
White	1,626,638	35%
Hispanic	2,203,340	47%
African American	666,009	14%
Asian/Pacific Islander	159,221	3.50%
Native American	16,285	0.50%

Source: Texas Higher Education Coordinating Board 2008

Figure 5. Percentage of Dual Credit and Total Student Enrollment by Ethnic Category in the State of Texas



Reproduced From: Texas Higher Education Coordinating Board 2008

Geographic location has also been shown to be a determining factor in dual credit enrollment in the state of Texas. In a major profile of the Rio Grande Valley of Texas, it was discovered:

[d]espite a surge of economic growth and recent positive forecasts for job creation in this region of the state, the Valley remains one of the poorest and highly illiterate areas of the country. Decades of inequitable school funding at the K-12 and postsecondary levels have conspired to perpetuate poor-college going rates among Valley residents (Texas Valley Communities Foundation 2009, 31).

In Figure 6 below it should be noted that such low-income areas of the state as the Upper Rio Grande and the Northwest have significantly lower enrollment in dual credit programs than higher income areas such as the Dallas-Fort Worth Metroplex.

Figure 6. Dual Credit Course Enrollment by Type of Course and HS Graduation Year (by Coordinating Board Region) in the State of Texas

Type of Dual Credit	Variable	2004	2005	2006	2007	Grand Total
Academic	CB Region					
	Count→	17,783	20,134	21,462	25,056	84,435
	High Plains	7.4%	8.5%	7.8%	7.1%	7.7%
	Northwest	3.9%	3.2%	2.5%	2.7%	3.0%
	Metroplex	12.7%	13.2%	13.3%	17.5%	14.4%
	Upper East	3.5%	4.5%	4.1%	3.9%	4.0%
	Southeast	3.8%	3.4%	3.5%	3.2%	3.4%
	Gulf Coast	27.3%	25.5%	26.5%	26.1%	26.3%
	Central	8.7%	10.2%	10.7%	10.8%	10.2%
	South Texas	26.9%	25.1%	25.5%	21.9%	24.6%
	West	4.8%	4.3%	3.1%	3.5%	3.8%
	Upper Rio Grande	1.1%	2.2%	3.0%	3.2%	2.5%
Non-Academic	Count→	1,177	1,496	1,820	2,601	7,094
	High Plains	3.4%	5.6%	3.7%	3.2%	3.9%
	Northwest	1.2%	1.2%	0.5%	0.5%	0.8%
	Metroplex	26.1%	23.2%	15.5%	9.7%	16.8%
	Upper East	2.1%	1.6%	0.9%	0.6%	1.1%
	Southeast	0.4%	0.1%	0.8%	1.1%	0.7%
	Gulf Coast	10.1%	11.8%	23.8%	20.9%	17.9%
	Central	7.6%	6.8%	3.8%	4.7%	5.4%
	South Texas	38.7%	42.6%	47.3%	50.2%	46.0%
	West	10.4%	6.9%	3.0%	8.5%	7.1%
	Upper Rio Grande	0.0%	0.3%	0.5%	0.5%	0.4%
Both	Count→	1,244	1,339	1,607	2,414	6,604
	High Plains	12.1%	19.0%	18.5%	14.9%	16.1%
	Northwest	2.7%	3.3%	2.1%	1.3%	2.2%
	Metroplex	16.3%	9.7%	8.3%	4.3%	8.7%
	Upper East	5.2%	6.6%	4.9%	3.7%	4.9%
	Southeast	0.7%	1.7%	1.4%	1.8%	1.5%
	Gulf Coast	9.8%	11.6%	12.1%	11.7%	11.4%
	Central	5.9%	5.6%	6.1%	5.0%	5.6%
	South Texas	32.8%	35.2%	40.3%	51.2%	41.8%
	West	8.5%	5.6%	5.2%	5.7%	6.1%
	Upper Rio Grande	5.9%	1.8%	1.1%	0.4%	1.9%

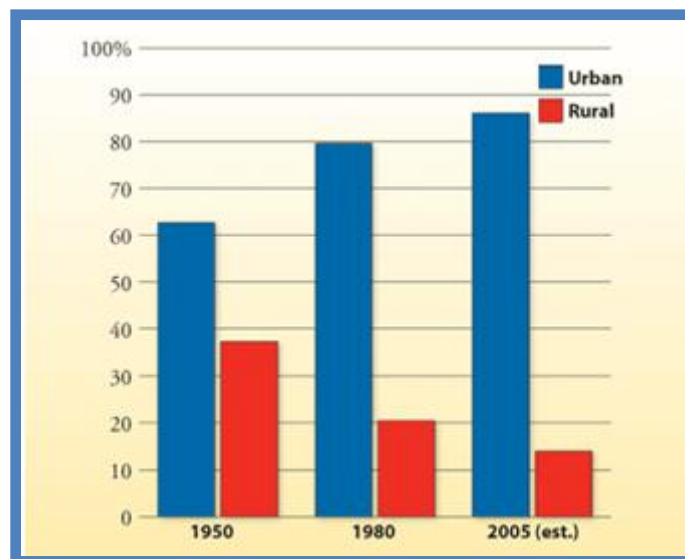
Reproduced From: Eklund 2009

Governor Rick Perry focused on higher education within Texas in his 2011 State of the State Address (Shieh 2011). He challenged the state's colleges and universities to find a way to offer a bachelor's degree for a total of \$10,000. That is a tall order considering the fact that Texas' two largest public universities, The University of Texas at Austin and Texas A&M University, currently cost more than \$16,000 per year. However, the governor insisted that with a greater focus on distance education, and more specifically dual credit options, higher education could be affordable for everyone.

Participation by Rural Student Populations

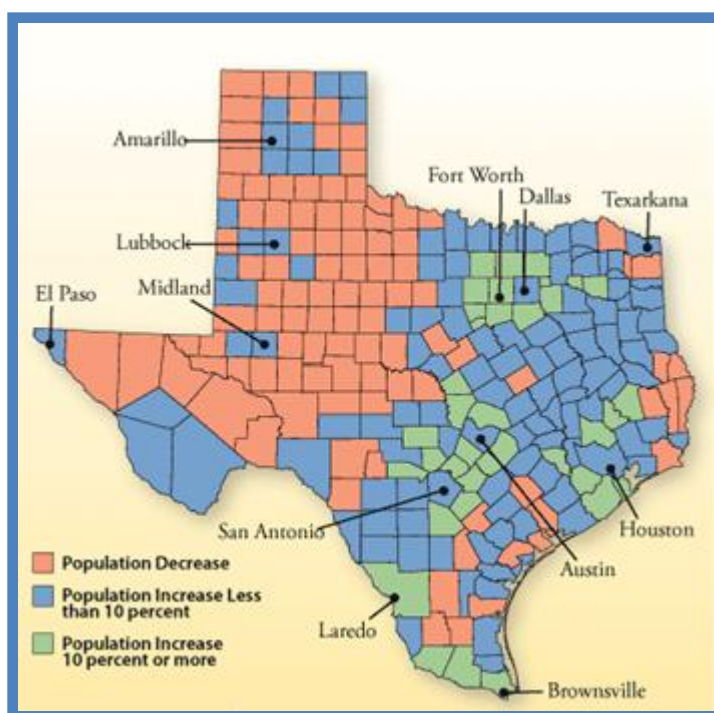
The state of Texas has over 3.6 million people living in the rural portions of the State (Texas Comptroller of Public Accounts 2011). While this only amounts to 17.5 percent of the total population, and population estimates indicate a continuing decline in the proportion (as noted in Figures 7 and 8), it is important to the future of the State to educate the children in this vast area of Texas. Rural activities such as farming and ranching are vital to the future of the Texas economy, and educating students in these industries will ensure the rural economy's future.

Figure 7. Urban/Rural Divide Within the State of Texas, 1950-2005



Reproduced From: Texas Comptroller of Public Accounts 2011

Figure 8. Population Growth and Decline in the State of Texas, by County



Reproduced From: Texas Comptroller of Public Accounts 2011

Despite the importance of the topic, there has been very little academic research studying the effects of dual credit in rural portions of the State. This seems to be the pattern across the Nation as well.

Our review of the literature found very little in terms of academic research for any part of the United States, with the exception of one study of students in rural Washington. The study delved into the reasons causing rural Washington State high school students to decide to participate in dual enrollment (Johnson and Brophy 2006). The authors found that socioeconomic and social reasons were the main underlying factors in students' decisions. Students were attracted to the program because of the ability to save money and shorten the time to earn a degree from a university. Students were also attracted to taking classes that prepared them for college classes, both academically and socially. Being around students who were serious about their academic advancement was a large draw for the 12th graders in the study group. The study briefly mentioned that the percentage of rural students participating in dual credit programs was approximately equal with that of their non-rural counterparts. However, the study did not provide a causal explanation for this finding.

Results from this study suggest that socioeconomic and social factors influence why students in rural Washington State chose to be in the program. The research also indicated that economic

incentives might not be a critical factor in their decision making processes. Rural students who enroll in the program may be aware of the economic incentives, but come from comparatively wealthy families. Family wealth may simply be an indicator of the reasons they were attracted to the programs, such as family expectations and support. Many times, these are also the students who do well enough to gain entrance into the program, which, again, may be due to the support and expectations of their family.

Factors Affecting Student Participation: Affordability and Availability

Colleges around the country and across the state of Texas highlight the affordability and access that they consider inherent attributes of dual credit programs. These are the major factors that affect student participation in dual credit programs. Del Mar College (2011), for instance, outlined several reasons why dual credit is beneficial for students, including:

- Low Cost: Students receive a tuition waiver and only pay registration fees
- Convenience: Students live at home and are enrolled in courses taught at the high school campus, at the college, or online
- Courses Transfer: Dual Credit courses are fully transferable to Texas public colleges and universities and may transfer to other private and national colleges and universities
- Student Services: Students have access to college academic and career planning services, full resources at the libraries, use of the physical fitness facilities, computer labs, academic support services, Writing and Student Centers, and campus events.

Affordability is the most common thread running through the literature on Texas-specific dual credit programs (Katy ISD 2010) and is a key to student participation across the nation. According to a 2010 report, Texas has an unusually high percentage of low-income students (Southern Education Foundation 2010, 6), and with media reports (FOX News Austin 2011) of a 72 percent rise in tuition rates for college since 2003 the state has taken steps to provide access to more affordable and accessible higher education. A common theme in dual credit and educational literature in general is that affordable education provides a stepping stone for students to become more productive members of society (Bernet 2010; Communities Foundation of Texas 2009; Cullen 2010; Jackson 2010; Texas Valley Communities Foundation 2009).

Current research points to several key facts that often prevent low-income students from achieving success in postsecondary education. An Institute for Higher Education Policy (Calderone 2011, 2) report stated that “unquestionably, the college cost climate has changed dramatically over the last several decades, with U.S. colleges and universities introducing steep increases in the price of tuition.” The report goes on to explain that:

Educational research also indicates the following trends:

- Low-income students are more apt to delay postsecondary entry immediately following high school (Engle and Tinto 2008).
- Low-income students are more likely than any other income group to work at least 30 hours per week while maintaining a full course load (ACE 2006).
- Low-income students are at greater risk for assuming higher levels of post-graduation debt (Price 2004).
- Low-income students have the greatest tendency for interrupted and part-time enrollment due to cost concerns (Goldrick-Rab 2006).

Several counties in Texas have been highlighted in the news and in educational resources as case studies for low-income success of dual credit programs. Hidalgo and El Paso ISDs in particular have been featured as success cases for the implementation of programs that help students move easily from a high school to college setting in an affordable manner, allowing them access to opportunities that they might otherwise not have been able to achieve (Kerrigan and Slater 2010). The town of Hidalgo, Texas, along with much of the Rio Grande Valley, was highlighted for its commitment toward supporting students in moving from high school to postsecondary education (Hamilton 2010), noting, “An exceptional level of collaboration between local leaders in public and higher education...” along with the development of early-college high school-type programs in the Hidalgo school district, were singled out as factors that have placed Hidalgo High School and ISD on the road to educational success. According to Hamilton (2010):

In the 1980s, when Texas’ education-accountability systems were put into place, Hidalgo’s high school was ranked in the bottom 10 percent of the state’s schools in academic performance. The student population is 99 percent Hispanic, 89 percent of students are economically disadvantaged and 70 percent are considered ‘at risk’ by the standards of the Texas Education Agency. Today, Hidalgo students graduate at higher rates than the state average, and 98 percent — compared with 81 percent statewide — complete a recommended or distinguished curriculum as defined by the state.

According to a Texas Higher Education Coordinating Board interim report (2008, 2):

State law allows both school districts and colleges to obtain state funding for dual credit courses. Decisions about who pays for tuition, fees, and other costs are made at the local level and vary from district to district according to the memoranda of understanding agreed to by the school or school district and the college or university. Costs to the student also vary according to the agreements between higher education institutions and school districts.

One of the key advantages for low-income students in particular, not only in Texas but across the nation, is the affordability of dual credit programs. Though students do normally have to pay for text books, tuition and fees are usually covered by the state or the educational institutions. An article from Coppell, Texas points out that “the issue that lies within dual credit is the fact that students have to pay for textbooks, with rates that rise to astronomical levels: the current economics textbook for the course at North Lake is \$203. Though the classes are free, there is contemplation over the fact that these classes may cost money in the future” (Kumar 2011).

The primary costs of dual credit programs within the state of Texas can be summarized as follows:

- Cost of instruction (i.e., instructor salaries or course-based payments to per-course adjunct professors for teaching courses for dual credit)
- Cost of textbooks used by students in courses for dual credit
- Administrative costs associated with running dual credit programs at the LEA and community college levels
- Transportation costs associated with student travel to and from college campuses to attend courses for dual credit (Friedman et al. 2011)

Funding sources to meet these costs and provide dual credit opportunities at a discounted or free price to students include (Friedman et al. 2011, 46):

State funding

- State appropriations to community colleges for courses for dual credit
- State funding provided to LEAs (e.g., Foundation School Program (FSP), State Compensatory Education funds, High School Allotment funds, funds allocated through state discretionary and formula-funded grants) used by LEAs for courses for dual credit

Revenues derived from student/family payments

- Student payments to community colleges for tuition/fees for courses for dual credit
- Student payments for textbooks for courses for dual credit

Federal funding

- Federal funds used by LEAs for courses for dual credit
- Federal funds used by community colleges for courses for dual credit

Local and other funds

- Local funds used by LEAs for courses for dual credit
- Local funds used by community colleges for courses for dual credit
- Other funds used for courses for dual credit

Of note, the report which determined these cost analyses pointed out:

[f]our-year institutions were excluded from the analysis of how dual credit programs in Texas are funded. Because of timing, data collection complexities, and budget constraints, revenue and expenditure data were not systematically collected from four-year universities to allow for their inclusion in statewide cost estimates (Friedman et al. 2011, 46).

The affordability of dual credit opportunities in Texas is made possible because of the efforts of state and federal actors, along with local legislators and involved persons. The following were found to be the results of a state-wide analysis (Friedman et al. 2011, 66):

- The state of Texas, through state appropriations to community colleges and state funding to Local Education Agencies (LEAs), pays for the majority (60.9%) of costs associated with dual credit courses for high school students.
- Of the state funds used for dual credit, approximately 59% were distributed to LEAs through funding, and the remaining 41% were provided to community colleges through state appropriations.
- A substantial proportion (32%) of state funds used by LEAs to support dual credit were utilized to pay for tuition and fees to Institutes of Higher Education (IHEs) on behalf of students (19%) and for textbooks (13%) for courses for dual credit.
- Local (e.g., local taxes, dual credit tuition waivers and scholarships, endowment funds for needy students) and other funds (e.g., private foundation grants) used by community colleges account for approximately 12.8% of costs associated with delivering courses for dual credit to high school students in Texas.
- Local (e.g., local taxes) and other funds used by LEAs account for approximately 5.9% of costs associated with delivering courses for dual credit to high school students in Texas. Sampled LEAs rarely reported that they provide transportation for students taking courses for dual credit at nearby IHEs. These transportation costs are borne by students and their families.
- Students and their families pay for an estimated 18.3% of costs associated with dual credit courses through the payment of tuition and fees to community colleges and the purchase of course textbooks. The largest proportion of student-paid costs for courses for dual credit (64%) is accounted for by payments for course textbooks, which average approximately \$120–\$125 per course.
- Thirty-six percent of student-paid expenses for courses for dual credit are accounted for by tuition and fee payments to IHEs. Federal funds cover a small proportion (2.2%) of the cost of dual credit programs, and the vast majority of these federal funds (97%) were used by LEAs.

Access Conclusion

It is frequently pointed out that the state of Texas is on the cutting edge of dual credit (Jobs for the Future 2008; Jackson 2010; Help and Teach Our Children 2011), and with the help of technology and innovation (Scott 2010) the educational institutions in the state will continue to provide such opportunities to students. Provided that adequate funds are available within individual ISDs and college/university systems, the state should continue to see an increase in enrollment in community colleges and other higher education institutions. Low-income students will have the ability to take advantage of dual credit programs as these opportunities continue to become more readily available in their areas, and as a result, these students will have the opportunity to gain a college education where before they would not have had the option. Over the last few years the state of Texas has made dual credit opportunities more readily available as a consequence of new legislation (Shieh 2011) requiring schools to offer dual credit courses and by providing more funding and more accessible funds to students. All of these factors have led to an increase in the numbers of students participating in dual credit programs.

Dual Credit Effectiveness

For purposes of this report, we define the effectiveness of dual credit programs in terms of their overall impact on schools and student populations. In some of the research, effectiveness is described in tandem with efficiency. The most recent research on dual credit effectiveness comes from a recent American Institutes for Research (AIR) (Friedman et al. 2011) report submitted to the Texas Education Agency (TEA). The report includes a comprehensive literature review, surveys from Texas school officials, TEA and THECB enrollment and sample data.

According to Karp and Jeong (2008), there is a dearth of information related to dual credit effectiveness of school and student populations. However, Karp et al. (2007) found various impacts on dual credit student enrollment in Florida and New York City. This study found that dual credit courses appear to be especially beneficial for male students, students from low-income families, and those who struggled academically in high school.

The following sections discuss the literature pertaining to postsecondary student performance, assessment studies of dual credit programs, and evaluations of the effectiveness of different dual credit models.

Texas Postsecondary Student Performance

An important aspect of effectiveness is postsecondary performance of dual credit students. Extensive information in this regard is not readily available; the Capstone team was unable to gain access to individual student records because of the privacy provisions of the Family Educational Rights and Privacy Act (FERPA), and it is likely that similar barriers have prevented significant research endeavors in this field.

The available literature mainly pertains to student performance during dual credit enrollment. The recent AIR report outlined dual credit student performance on the recent TAKS test:

The findings regarding student performance in courses for dual credit were generally positive. Virtually all students (99.9%) who enrolled in courses for dual credit were reported as completing these courses, and most (94% or more across different subject areas) also received passing grades for the affiliated high school course. At least 95% of students who were enrolled in courses for dual credit in 2009–10 also met basic TAKS proficiency standards in all subject areas on the 2010 TAKS (Friedman et al. 2011, 70).

Another central issue is how postsecondary performance of students earning college credit during high school compares to students who didn't earn similar credit. Keng and Dodd (2008) studied these issues in Texas. Their study followed AP students who earned college credit with their AP Exam grade (AP Credit), AP students who did not earn college credit with their AP Exam grade (AP No Credit), non-AP students who were concurrently enrolled in a college-level course while they were still in high school (Concurrent), and a group of non-AP students that were matched on high school academic achievement to the AP Credit students (Non-AP) (Keng and Dodd 2008, 2). Concurrent enrollment is synonymous with dual credit, but differs slightly. The National Alliance of Concurrent Enrollment Partnerships (NACEP 2011) defines concurrent enrollment programs as college courses offered to high school students: in the school, during the regular school day, and taught by high school teachers. The major trends throughout all the subjects in the aforementioned study are presented in Figure 9 below.

Figure 9. Summary of Primary Trends Observed Across AP Exams

<i>AP Examination</i>	<i>Trend 1^a</i>	<i>Trend 2^b</i>	<i>Trend 3^c</i>
AP Biology	√	√	√
AP Calculus AB	√		√
AP Calculus BC	√	√	
AP Chemistry	√	√	
AP Macroeconomics	√		
AP English Language and Composition	√	√	√
AP English Literature and Composition	√	√	√
AP Government and Politics: United States	√		
AP History: United States	√	√	
AP Spanish Language	√		
^a (Trend 1) The AP Credit group significantly outperformed the other groups on most outcome measures.			
^b (Trend 2) The Concurrent group earned significantly more subject credit hours than the AP No Credit and Non-AP groups.			
^c (Trend 3) The Non-AP group significantly outperformed the AP No Credit group in the GPA-dependent measures.			

Reproduced From: Keng and Dodd 2008

As displayed in Figure 9, the concurrent enrollment group fell between the group of students with AP exams and without AP exams. Eklund (2009) added to this research by evaluating the

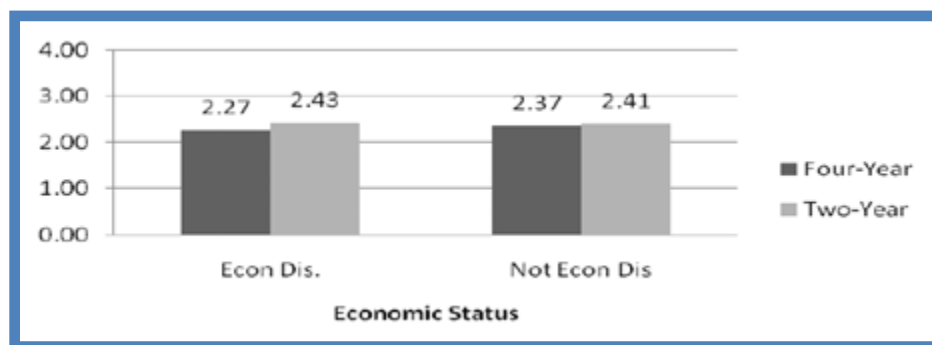
influence of college credit delivery opportunities within the P-16 framework. The research explored alignment issues that influence the delivery of dual credit programs and the tracking of dual credit participants in Texas—matching dual credit inputs/objectives with outputs/outcomes. Eklund reported that students who took non-academic dual credit courses had slightly lower GPAs than those who took academic dual credit courses. Eklund (2009) found a decline over time in the mean freshman GPA of Texas students who took dual credit courses, as shown in Figures 10 – 12. She suggested that this might be due to the addition of students in dual credit programs or the inclusion of more middle-performing and at-risk students (Eklund 2009, 210).

Figure 10. Mean College Freshman GPA of 2004-2007 Texas High School Graduates who took Dual Credit Courses by High School Graduation Year, 2004-2007

	2004	2005	2006	2007	All Years
Count	14,108	15,975	17,544	20,741	68,368
Mean GPA	2.787	2.746	2.729	2.694	2.734
Standard Deviation	0.827	0.85	0.854	0.87	0.854

Source: Eklund 2009

Figure 11. Freshman GPA of 2004-2007 Texas High School Graduates by Economic Status and Type of College Enrollment



Source: Eklund 2009

Figure 12. Mean Freshman GPA of 2004-2007 Texas High School Graduates by Type of Course and HS Graduation Year

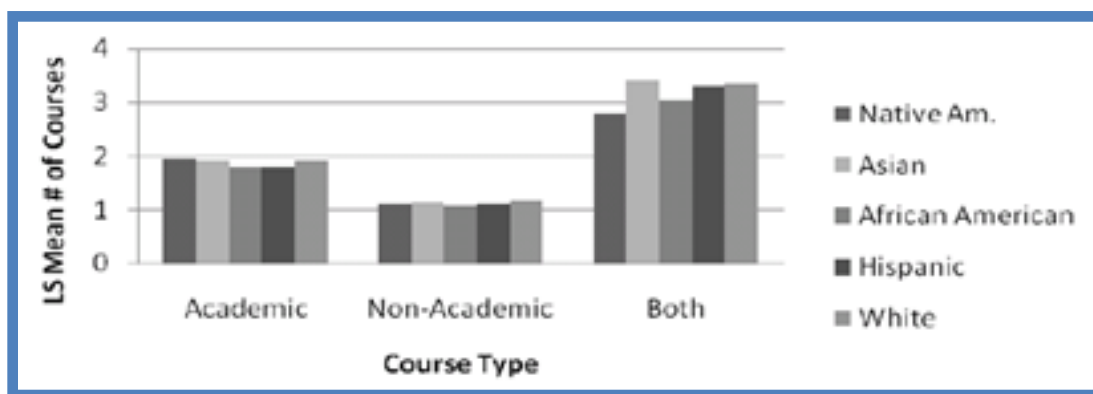
Type of Dual Credit	Year			
	2004	2005	2006	2007
Academic	2.804	2.765	2.755	2.732
Non-Academic	2.496	2.442	2.398	2.294

Source: Eklund 2009

According to Eklund (2009, 215), “...there may be a [statistically significant] relationship between the proportion of dual credit participants in a region and the average number of dual credit courses that each participant completes.” For example, the Tukey-Kramer test conducted during the study found significant differences between several regions in the mean number of dual credit courses taken proportional to the number of enrolled students. The Upper Rio Grande region showed the lowest mean number of courses taken by each student and the West and High Plains regions showed the highest. Consequently, the study found the Upper Rio Grande valley had fewer overall students taking dual credit courses and the West and High Plains regions had a higher number of such students, proportionally. Moreover, “[e]xamining within group interactions for GPA differences by region reveals that students from the Upper Rio Grande region had significantly higher least square mean GPAs than students from each of the other regions in the study except the Upper East” (Eklund 2009, 228).

Further, the Eklund study also concluded that, “[f]or economic status and economic status by ethnicity, no effect size was found. The small effect sizes suggest that there might be little practical significance to the study of the number of dual credit courses taken” (Eklund 2009, 226). The study included a large population of dual credit coursetakers taking between one and 14 courses, however the majority were enrolled in one to three courses. Therefore, Eklund suggested that descriptive and qualitative data analysis provides more insight into dual credit participation than the number of courses taken.

Figure 13. Dual Credit Courses Attempted by Type of Course and Ethnicity for 2004-2007 Texas Public High School Graduates

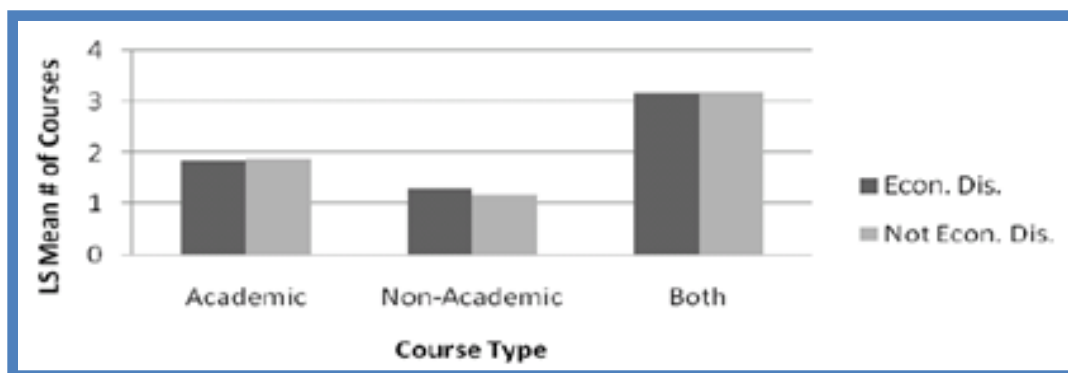


Source: Eklund 2009

Figures 13-15 illustrates that all ethnic groups are participating in both academic and non-academic dual credit courses at a comparable rate to whites. In addition, both economically disadvantaged and non-economically disadvantaged students on average take the same number of dual enrollment courses. However, economically disadvantaged students take slightly more non-academic dual enrollment courses and non-economically disadvantaged students take slightly more academic courses. Finally, these groups also take relatively the same number of dual credit courses from two and four year institutions.

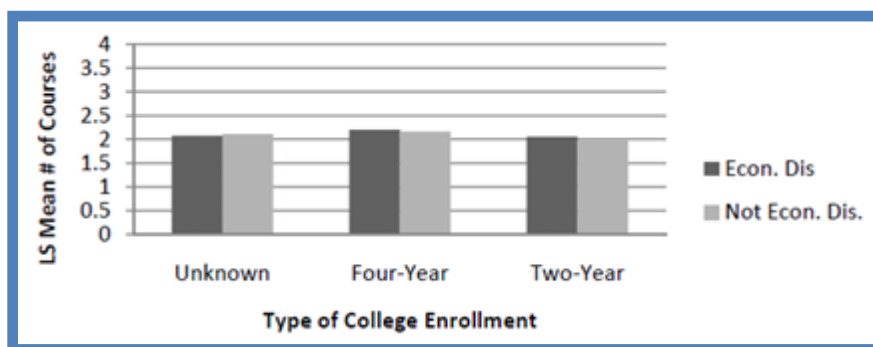
Concluding, Eklund (2009) noted that underrepresented minority and low-income students are participating in dual credit at higher rates, likely due to the growth of early college high schools. However, overall participation rates are still lower than whites in these subgroups.

Figure 14. Dual Credit Courses by Type of Course and Economically Disadvantaged Status for 2004-2007 Texas Public High School Graduates



Source: Eklund 2009

Figure 15. Dual Credit Courses by Economic Status and Type of Enrollment for 2004-2007 Texas Public High School Graduates



Source: Eklund 2009

National Postsecondary Student Performance: Alignment

Turning to studies with a national focus or on states other than Texas there have been few efforts to directly compare the efficacy of Advanced Placement (AP) and International Baccalaureate (IB) against that of the dual credit system. Based on our research, the attempt to directly compare dual credit with AP and IB courses is extremely difficult, as AP and IB courses rarely match exactly with course offerings at the university level, whereas dual enrollment courses are generally designed to mirror existing course structures.

Regardless of the model, research has focused mainly on the transition of students from high school to college. According to Bailey, Hughes, and Karp (2002) this transition can be unsuccessful due to a variety of reasons. Some of the reasons are that, "...students may be unsure of how to apply for college or how to pay for it; they could be academically unprepared for higher education; or they may face what can be a frustrating task of balancing school and work while searching for a course of study that will place them in a meaningful career path" (Bailey, Hughes, and Karp 2002, 2). Bailey and colleagues argue for stronger communication and collaboration between secondary and postsecondary systems; communication will help students understand what they need to know and be able to do to achieve the ambitions that so many have (Bailey, Hughes, and Karp 2002). Furthermore, dual credit cohesion will also assist with the psychological transition to college.

According to Dr. Lesley Mace (2009), Economics Professor at Auburn University Montgomery, when dual credit goals and strategies are clear, students perform better. Mace (2009) found that dual credit students received higher grades than non-dual credit participants and that students taking dual credit through distance learning perform better than students taking courses in the classroom. Mace (2009, 37) is a dual credit instructor and uses the same textbook, syllabus and grading standards for distance education and regular students to preserve the integrity of her Macroeconomics course. Here is a brief synopsis of her methodology and results:

I [Mace] compared my grades in my dual enrollment classes to the grades earned in same course I taught on campus to traditional college students during the same time period. To eliminate bias from my own teaching methods, a sample taken from spring semester 2007 of Macroeconomics courses taught on campus by other faculty members is compared to the outcomes for my own dual enrollment Macroeconomics classes....Both sets of data prove unequivocally that the dual enrollment students outperformed students in regular classes (Mace 2009, 44).

Mace stressed to her students the importance of taking dual credit for an academic challenge and not to be too concerned about GPA when students worry about negative effects from dual credit courses. According to Mace, to achieve desired results schools should move towards overcoming administrative and technology issues by establishing good relationships with high school facilitators. Furthermore, tuition will always be an issue, but providing alternatives to students may remove this barrier. Both students and administrators need to clarify the goals and benefits of dual enrollment for successful outcomes.

National Postsecondary Student Performance: Success

In 2006, Carl Krueger, a policy analyst in both the Information Clearinghouse and the Postsecondary and Workforce Development Institute at the Education Commission of the States, found a clear connection between dual credit participant success and educational attainment. The research found dual enrollment shortens the time-to-degree cycle of a student. Most importantly, African American students in Florida who participated in dual enrollment programs enrolled in postsecondary education at higher rates than peers who do not, 70 percent to 45 percent (Krueger 2006, 3).

Swanson (2008) conducted a study that also confirmed the success rates of dual enrollment students. Swanson found:

- Dual enrollment fosters more positive attitudes towards earning postsecondary degrees in students who did not previously hold these attitudes.
- Dual enrollment participation greatly improves students' propensity to persist in college.
- This persistence in turn improved greatly the likelihood that dual enrollment students would graduate from college with bachelor's or graduate level degrees.

Another key finding is that students who have participated in dual enrollment programs do not experience higher levels of college degree attainment than non-participants (Swanson 2008, 344). Although seemingly contradictory, this only occurred when dual enrollment participation was included alone as a single indicator in the regression models. However, the study also found that dual credit participation played an important role in postsecondary success and toward persistence in college and BA or advanced degree attainment (Swanson 2008, 343).

Assessment of Dual Credit Programs

Friedman et al. (2011) provide an excellent summary discussion of recent research on the assessment of dual credit programs:

- "...according to 2008 report from Lynch and Hill, more low-income students in Georgia were 'taking college-level courses than would have been expected based on historical data.' The researchers also note that high school students who were enrolled in courses for dual credit were more likely to transition into a two- or four-year Georgia public college" (Friedman et al. 2011, 3).
- "A recent research study conducted in Ohio found that dual enrollment students 'appear to be more likely to go to college and even more likely to go to college in Ohio, are more likely to attend a university campus than a two-year college, seem to have higher retention rates and persistence, and seem to require less remediation' than their non-dual-enrollment peers (Cubberley 2009, 82)" (Friedman et al. 2011, 3).
- "...the efficient use of state resources requires a full understanding of the outcomes of dual credit programs, for which, as previously mentioned, there is a dearth of information in the current body of research. Identifying more and less successful programs and initiatives may provide states with the information they need to continue to support or selectively fund programs. However, in order to do so, researchers need comprehensive, longitudinal, student-level data to measure program outcomes" (Friedman et al. 2011, 5).

Friedman and colleagues recommended that the Texas State Legislature pay more attention to demand-side performance – how effectively students perform in courses and programs for dual credit and how effectively and efficiently high schools support students' enrollment and participation in the courses and programs – against criteria established by the state, and making public the results (Friedman et al. 2011, 69). Total enrollment in dual credit programs is up, but

there are variations in participation among multiple subgroups. The main reason is the academic eligibility requirements necessary to participate in dual credit programs. For example, “...student subgroups that have lower average achievement are likely to be underrepresented among students who enroll in courses for dual credit” (Friedman et al. 2011, 69). Therefore, more studies need to be conducted in order to properly assess the effectiveness of dual credit programs nationally and statewide.

Assessment of Dual Credit Models

As presented in the access literature review section, there are multiple college credit provision models. To date, there has been no conclusive data on the most effective dual credit models. Eklund (2009) discussed the slight difference in the performance of dual credit students compared to non-participants in English courses and social studies courses (81). In examining non-dual credit models of college preparatory curriculum, Friedman et al. (2011) reported that most respondents viewed IB and AP as either effective or very effective in preparing students for college. The total sample included 36 administrators from Texas Local Education Agencies (LEAs) and 34 administrators or staff from Texas high schools. Surveys were conducted by phone. As displayed in Figure 16 below, the vast majority of the respondents offered more AP courses than IB courses. Furthermore, all respondents found IB courses to be effective or very effective—none responded unfavorably about this dual credit model.

Figure 16. Effectiveness of Advanced Course Offerings in Aiding College Enrollment

How effective are these programs/practices in helping students enroll in college?	N	Very Ineffective	Ineffective	Effective	Very Effective	Missing
Courses for dual credit	34	11.8%	0.0%	20.6%	67.6%	-
AP classes	27	7.4%	11.1%	33.3%	44.4%	3.7%
IB programs	4	-	-	25.0%	50.0%	25.0%

Note. This question was asked only of those respondents who reported that their high school offered these courses. In addition, among those respondents who reported that their high school offered AP or IB courses, some did not answer this question (those coded as “Missing”).

Source: High School Administrator Telephone Survey, Research Study of Texas Dual Credit Programs and Courses, Friedman et al. 2011

In addition to this research, the dual credit programs at Lamar University in Beaumont, Texas offer emerging technologies to achieve similar results. During a 2010 Legislative Hearing on Dual Credit, Lamar University Executive Director of the Division for Distance Learning Paula Nichols outlined the dual credit program. The university has four dual credit delivery methods and two are non-traditional. The Lamar Early Access Program (LEAP) is a dual credit program in partnership with school districts features university professors teaching at the high school campus. Additionally, the university offers dual credit through two electronic delivery systems—SouthEast Texas Technology Education Network (STEEN) and Texas Virtual School Network.

Effectiveness Conclusion

As discussed in the preceding sections, there is incomplete information in the literature about dual credit *effectiveness*. The literature provides some insight into the effectiveness of student performance and an assessment of dual credit programs and models. Previous research shows that dual credit students perform better than non-participants due to a variety of issues, including higher persistence rates. Furthermore, the literature suggests there is increased participation by various subgroups—including the economically disadvantaged and ethnic minorities. As discussed, dual enrollment program alignment is central to success for effective students and dual enrollment programs. However, the literature does not provide a consensus on what is the key to dual credit effectiveness. Student motivation is an important factor to dual credit effectiveness, but currently the field of study on this topic is virtually non-existent. This was clearly important for our research; our main interest focused on how to improve effectiveness for first generation, rural, economically disadvantaged, and minority students. Unfortunately, the literature does not offer unequivocal research to understand this tenet of dual credit effectiveness.

Dual Credit Literature Review Conclusion

The dual credit literature charts a gradual progression of the popularity and evolution of dual enrollment programs during the last couple decades. As stated in the access section, continued funding will ensure the vitality of dual credit programs. In addition, greater access to dual credit courses will provide more low-income, minority, and rural students with the opportunity to take advantage of a program that might assist in postsecondary pursuits. According to the research, legislative policies in Texas have provided more funding for dual credit courses throughout the state. Thus, the state has seen higher levels of dual credit participation.

However, the deficiency of research pertaining to dual credit effectiveness provides less insight into this equally important trend. What is known is that dual credit students perform better than non-dual credit participants. The research also shows there is more dual credit participation by economically disadvantaged and ethnic minorities, yet there is no consensus on effectiveness within these subgroups. Anecdotal evidence is available now addressing this area, but almost no quantitative data is available. One reason for this oversight might be the difficulty in obtaining data because of privacy laws—i.e. FERPA. The literature also concludes that dual enrollment program alignment is essential to successful students and dual enrollment programs. The next section will discuss our data findings, which suggest that more longitudinal data needs to be collected to increase dual credit knowledge related to access and effectiveness.

Data Analysis

Data Analysis

Data Methodology

The Capstone created two separate datasets, using multiple sources of information. The first data set was used to examine questions related to student access to dual credit programs; the second data set was used to answer questions related to the effectiveness of dual credit programs. The Capstone's efforts to collect data on dual credit students in Texas encountered several significant barriers. First and foremost, student privacy is protected under the Family Educational Right to Privacy Act (FERPA). As a result, the Capstone was unable to access information about individual students. Consequently, the unit of analysis for most of our analyses is at the campus level for both high schools and institutions of higher education.

To examine access to dual credit programs in the state of Texas, the Capstone created a dataset containing information on each high school campus in the state of Texas. First, the Capstone accessed the National Center for Education Statistics (NCES) Common Core of Data (more specifically the Public Elementary/Secondary School Universe Survey Data: 1986–Present). Using this dataset, the team filtered for only schools in Texas that had a high grade of 9, 10, 11, or 12. Second, the Capstone received data from the THECB regarding the total number of dual credit students and dual credit semester credit hours attempted at campuses across the state of Texas for the academic year 2007-2008. The data provided by THECB contained the total enrollment in dual credit classes by student and semester credit hours at all school campuses that offered dual credit programs. Some campuses had fewer than five students enrolled in dual credit programs or fewer than seven dual credit semester credit hours recorded and the data were masked to protect student privacy. The two data sources (NCES and THECB) were merged, allowing the Capstone to match key demographic information about each campus from the NCES data with the dual credit data from THECB. All campuses not listed in the THECB data did not offer dual credit programs and remained in the Capstone dataset. Using the complete dataset described above, the Capstone computed basic descriptive statistics to illustrate differences amongst key subgroups.

There were some potential concerns regarding the completeness of the data set, which the Capstone mitigated through several steps. First, the dataset included every high school campus in the State to ensure all students, campuses, independent school districts, and counties in the state were included. Second, the data set was compared to the data in recent comparable research. TEA released a report produced by the American Institutes for Research (AIR) in March 2011 that examines the characteristics of dual credit students in the state of Texas from 2006-2010. The American Institutes for Research (Friedman et al. 2011) was able to access all dual student records and thus had a more comprehensive data set than was available for the Capstone's analyses. The AIR (Friedman et al. 2011) report included 71,803 dual credit students for 2007-2008, as compared to our data set, which includes 70,631 dual credit students for the same time period. The two data sets were of quite comparable size. Our data set contained only

1,172 fewer dual credit students (approximately 1.6 percent less) than Friedman et al.'s data set. The close congruence between the two data sets added to our confidence that our data set was reasonably complete.

Dual credit programs can be offered in several different forms. The data collected by THECB and used in this analysis only includes dual credit courses for students that meet dual credit qualifications. Dual credit courses include academic courses as well as technical courses, which consist of approximately 12 percent of the dual credit courses reported in the dataset (Eklund, 2011). Advanced Placement and International Baccalaureate courses are not included.

To examine the effectiveness of dual credit in the state of Texas, the Capstone created a second dataset primarily utilizing data from the THECB. The data set includes information on retention and graduation rates of students who had completed dual credit courses prior to enrolling in higher education. Data is organized by both the institution where dual credit was attempted and by the institution the student enrolled in prior to completing high school. The data set includes information from six years, spanning from 2004 to 2009. Some schools were dropped from the analysis because the number of students for the institution was too low to permit meaningful comparisons with other institutions. The specific criteria for dropping schools from analyses are discussed in greater detail later in the relevant sections. In addition, the Capstone collected overall graduation rate data on each institution of higher education from the Integrated Postsecondary Education Data System (IPEDS), a part of NCES.

It is important to note that the most complete dataset on dual credit students and their postsecondary education outcomes available to the Capstone team is from the academic year 2007-2008. Because of the rapid changes in dual credit policies and practices in the state of Texas, some of the analyses reported here are likely to be out of date already, even though the analyses are based on the most up-to-date data presently available. In light of the rapid change and growth in dual credit programs in Texas, the questions addressed in this report will need to be regularly re-addressed making use of new and timely data.

Access to Dual Credit Programs

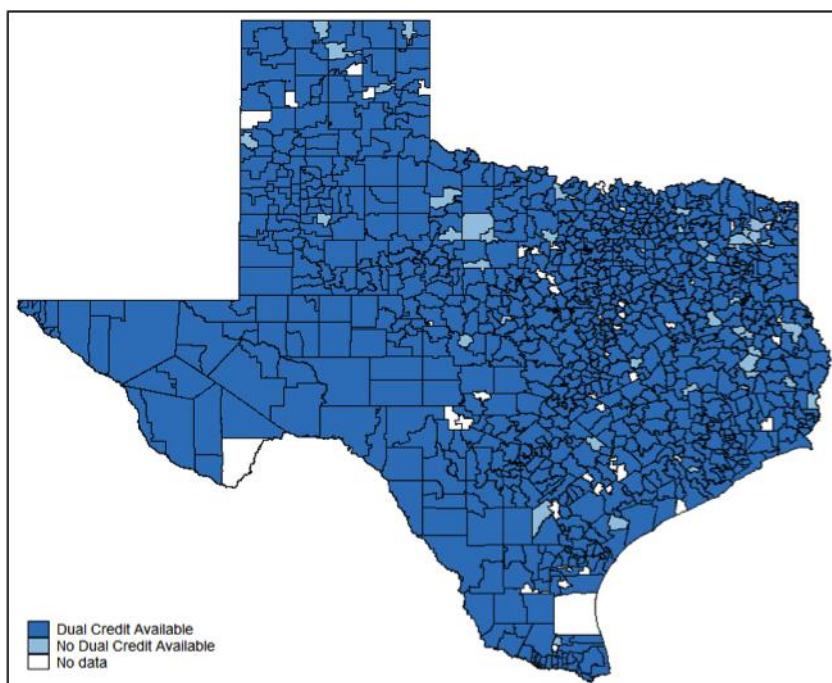
Using the dataset described above, the Capstone first analyzed the access in the state of Texas. To examine access questions, it was necessary to calculate participation rates and the average semester dual credit hours earned. Dual credit participation was calculated by dividing the number of students who participated in dual credit by the total number of students from the relevant group enrolled at the campus. This was intended to counteract the effects of variation in school size within the data. The average number of semester credit hours was calculated by dividing the number of total credit hours attempted by the number of students participating in dual credit. For certain populations of interest, the schools were divided into quartiles for analysis. The high school campus is our unit of analysis so there are equal numbers of campuses in each quartile, but differing numbers of students. Using quartiles allowed the Capstone to segment the campuses into groups for comparison purposes.

Question 1: Where are dual credit programs available in the state of Texas?

Our data set of combined NCES and THECB data includes information on 2,751 high schools in 1,114 school districts in the state of Texas. The THECB data reports students taking dual credit courses in 1,467 high schools across the state of Texas. The high schools reporting dual credit participation serve 94.9% of high school students in the state of Texas in 2008. Dual credit programs were present in all counties in Texas except Kenedy County and Loving County, neither of which have secondary schools.

Figure 17 illustrates where dual credit programs are available within the state of Texas, according to data provided by the Texas Higher Education Coordinating Board. Schools districts with functional dual credit programs are shown in dark blue, whereas school districts with no dual credit program are colored in light blue. The school districts colored white had no data available.

Figure 17. Dual Credit Program Availability in Texas School Districts in 2008



Source: Texas Higher Education Coordinating Board

Question 2: How many students participate in dual credit programs?

In fiscal year 2007-2008, THECB collected data on 70,631 dual credit students. Table 8 shows the total number of dual credit students in the state of Texas who attended Texas public high schools, according to the data provided by THECB.

Table 8: Number of Dual Credit Students in Texas During Academic Year 2007-2008

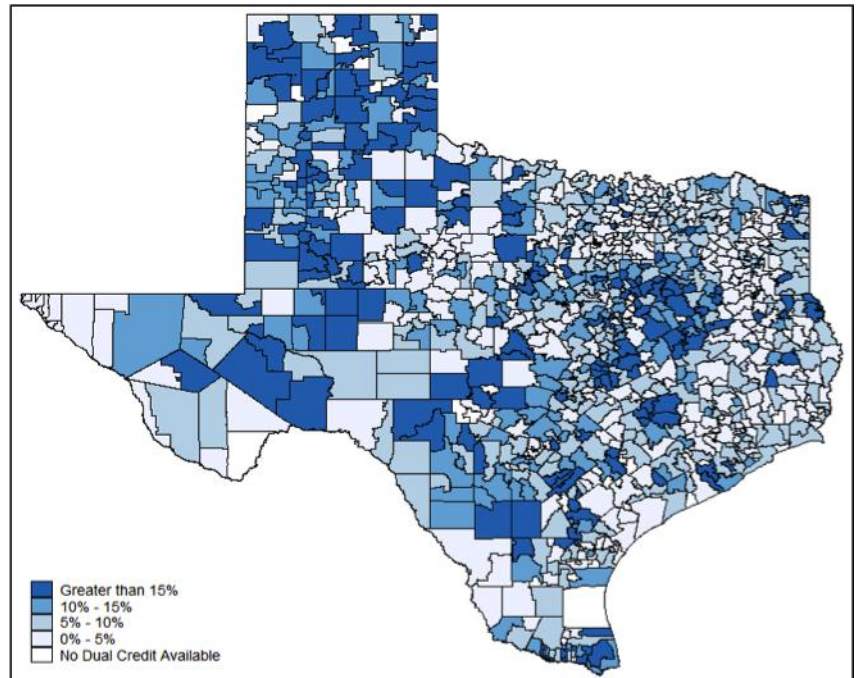
Academic Year	Dual Credit Participants	Total HS Enrollment	Participation Rate
2007-2008	70,631	1,300,074	5.43%

Source: National Center for Education Statistics, Texas Higher Education Coordinating Board

In order to provide a quick glimpse of trends in dual credit participation, maps of each of the criteria for analysis were used. These maps use a color gradient to demonstrate the prevalence of each variable at the school district level. As such, the divisions of the quartiles do not match exactly with the campus-level analysis to be discussed below. There are also a number of school districts for which no data was available. These are shown by white shading in all maps.

When mapping dual credit participation rates in Texas, the natural division at 25%, 50%, and 75% did not seem appropriate. Most of the school districts across the state had participation rates well below 15 percent. Therefore, the divisions are mapped in increments of 5 percent with the final category showing all districts with a participation rate of greater than 15 percent. In all cases, the colorization becomes darker as the density of the variable increases.

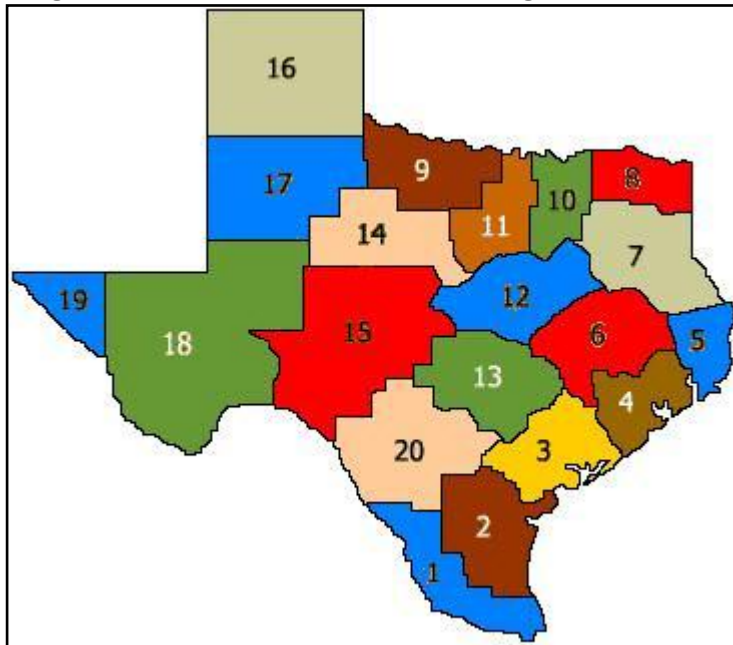
Figure 18. Dual Credit Participation Rates in Texas School Districts in 2008



Source: Texas Higher Education Coordinating Board

An analysis of dual credit participation in the TEA Education Service Center (ESC) Regions (Figure 19) presented findings that were consistent with the campus-level analysis (Table 8). In regions that account for the greatest proportions of the overall population, there were generally lower dual credit participation rates. Notably, ESC region 4, which covers the Houston metropolitan area of Texas accounted for approximately 21.74 percent of the total student population within the sample, but the region only had a participation rate of approximately

Figure 19. Education Service Center Regions in Texas



Reproduced from: Texas Education Agency

4.27 percent. Conversely, ESC regions 16, 17, and 18 each accounted for slightly more than 1.5 percent of the student population within the sample, but these regions had the highest dual credit participation rates, ranging from 9.72 percent to 12.34 percent. The major exception to this trend was ESC region 19, which covers the El Paso area. This region only accounted for 4 percent of the student population within the data set, while having a participation rate of less than 1 percent. However, it should be noted that more recent data, which were unavailable for use during this study, indicate that the El Paso area has experienced tremendous growth in dual credit participation. The THECB reported that for the Fall of 2007, "...there were 422 dual credit enrollments at El Paso CC. By Fall 2010 there were 2,326," (Eklund 2011).

Table 9. Average Semester Credit Hours Attempted, Dual Credit Participation, and Total Enrollment in Texas During Academic Year 2007-2008, by Education Service Center

Region	Average Semester Credit Hours	DC Participation Rate	Total HS Enrollment	Percent of Population
1	8.03	10.40%	100,564	7.74%
2	6.44	6.37%	29,917	2.30%
3	8.42	6.48%	15,327	1.18%
4	6.81	4.27%	282,698	21.74%
5	6.67	4.19%	23,268	1.79%
6	7.21	6.05%	45,767	3.52%
7	6.95	4.86%	46,590	3.58%
8	8.29	7.62%	16,253	1.25%
9	8.08	6.44%	11,271	0.87%
10	7.98	3.47%	194,288	14.94%
11	6.12	2.96%	142,074	10.93%
12	7.81	8.12%	40,287	3.10%
13	5.76	7.49%	95,937	7.38%
14	6.47	4.89%	14,643	1.13%
15	6.61	8.40%	14,113	1.09%
16	9.55	12.34%	22,732	1.75%
17	8.81	10.43%	21,621	1.66%
18	7.97	9.72%	21,571	1.66%
19	9.21	0.83%	52,194	4.01%
20	8.37	5.98%	105,915	8.15%
Total	-	-	3,044	100%

Source: National Center for Education Statistics, Texas Higher Education Coordinating Board

Question 3: What is the level of participation for rural, minority, or economically disadvantaged students?

Population Density Analysis

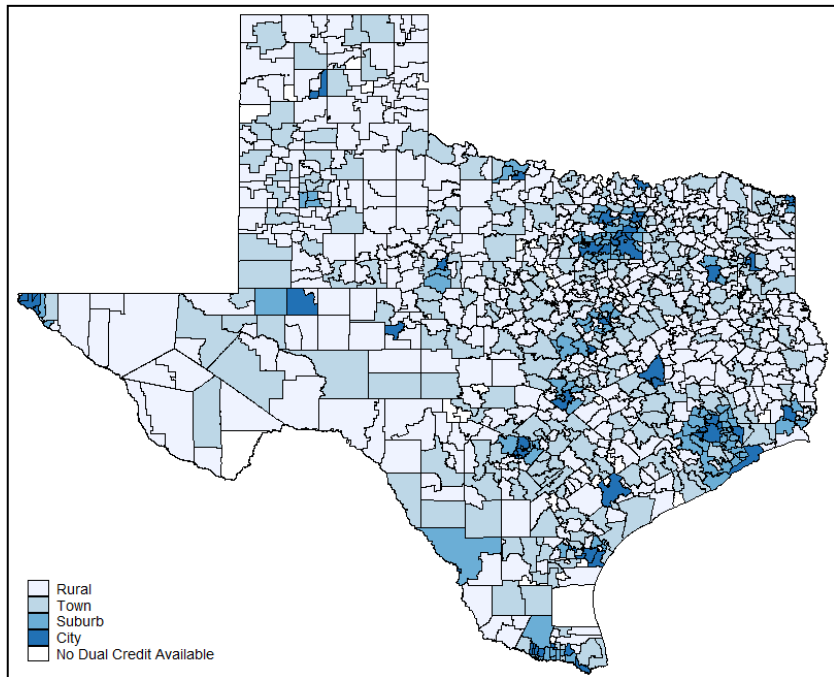
One of the Greater Texas Foundation populations of interest is rural students. Locale type is broken into twelve designations as a function of population density and urbanicity, ranging from large cities to remote rural areas, as defined by NCES (definitions for each of these categories may be found in Appendix E. These twelve designations were aggregated into four broader categories to simplify the analysis. These locale types, from most to least urban, are: city, suburb, town, and rural. Next, the number of semester credit hours attempted by those students

who participated in dual credit courses was calculated. Additionally, the average rate at which students in grades 9-12 in each category participated in dual credit courses was determined.

Locale was mapped in terms of the degree to which an area is considered rural or urban (Figure 20). This map differs greatly from the dual credit participation rates map (Figure 21). The Panhandle region of Northern Texas is very lightly shaded, indicating that it is a very rural area of the state. In Figure 21, this region is very dark, indicating that dual credit participation rates are high in these areas. The same can be said about far West Texas and Central Texas in both maps.

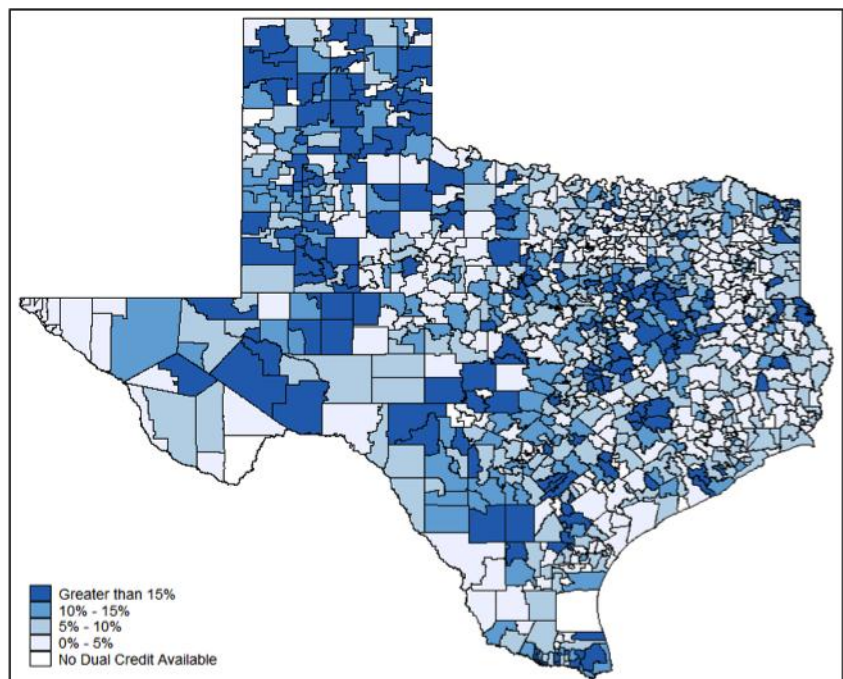
As shown in Figure 22, schools in locales classified as towns had the highest percentage of students participating in dual credit courses; 7.92 percent of the student population in schools located in towns participated in dual credit. The second highest rate of participation was in rural populations, followed by students attending schools in suburb areas, and finally those in cities, who participated at only a rate of 4.14 percent of the student body in grades 9-12. The aggregated data for dual credit students during the academic year of 2007 - 2008 are found in Figure 22.

Figure 20. Locale Descriptions of Texas School Districts in 2008



Source: National Center for Education Statistics

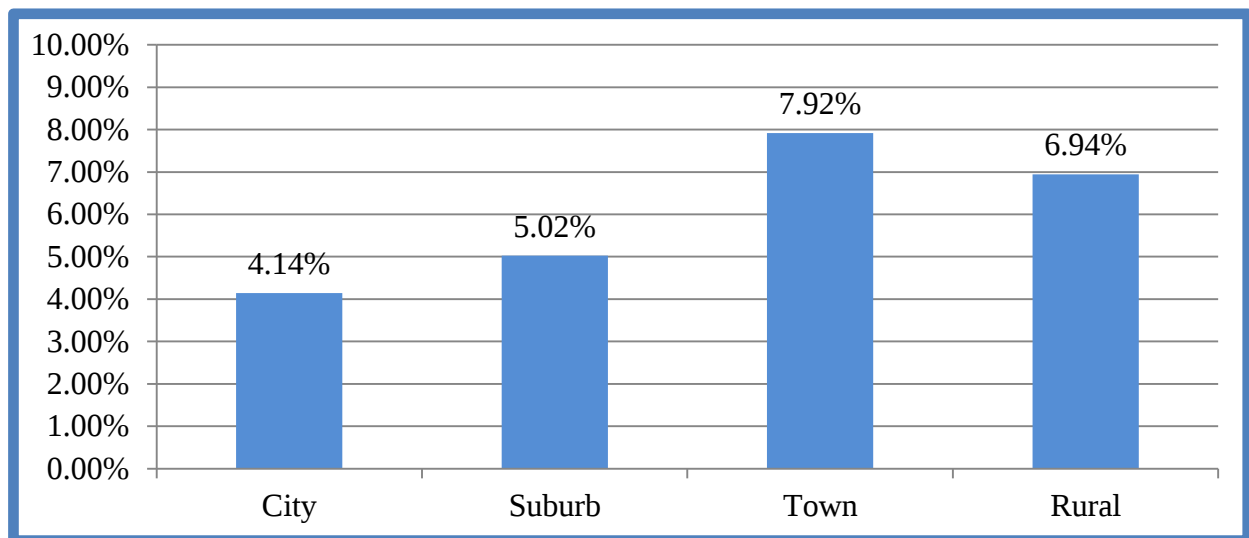
Figure 21. Dual Credit Participation Rates in Texas School District in 2008



Source: Texas Higher Education Coordinating Board

It is important to note that dual credit qualifications require that students be in 11th or 12th grade to enroll in dual credit courses, or receive special permission as a 9th or 10th grade student. This analysis utilized the total high school enrollment to calculate dual credit participation rates and as such should mitigate for the effects of varying dropout rates to some degree.

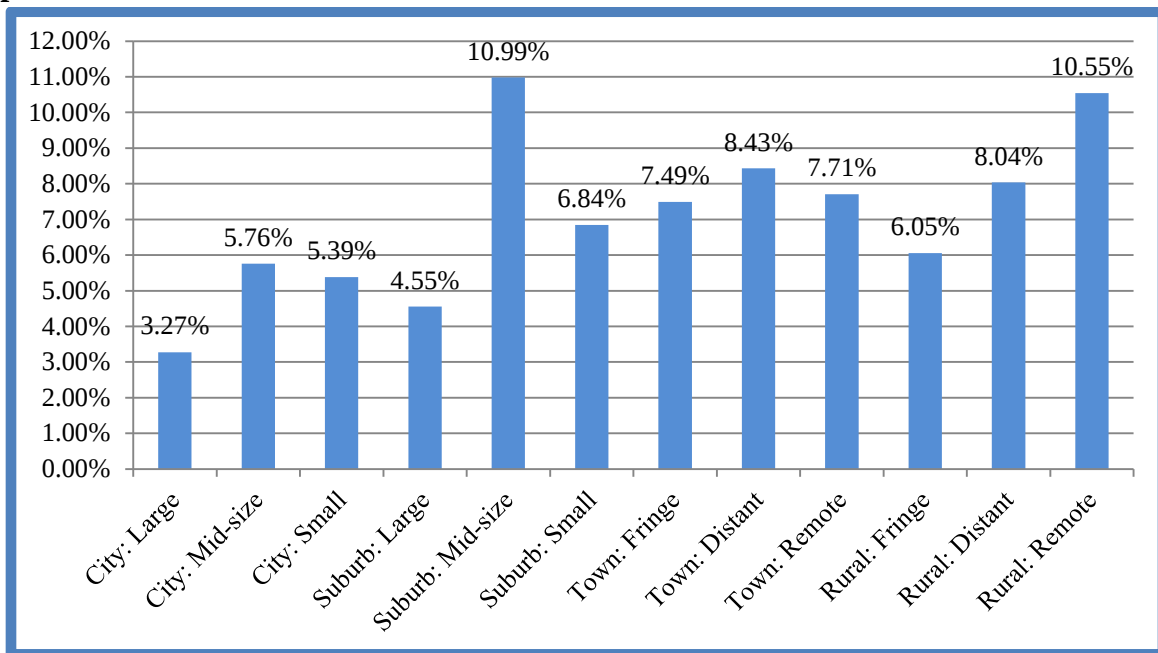
Figure 22. Dual Credit Participation Rates in Texas During Academic Year 2007-2008, by Aggregated Locale Categories



Source: National Center for Education Statistics, Texas Higher Education Coordinating Board

As can be seen in Figure 23, disaggregating the four categories of population density revealed that the relationship between population density and dual credit participation is less than perfectly clear. Schools in cities and large suburbs had the lowest percentage of students participating in dual credit courses. The highest participation rates were found in mid-sized suburbs with an average dual credit participation rate of 10.99 percent and in remote rural areas with a rate of 10.55 percent, but the students in those areas made up only 1.34 percent and 1.99 percent (Appendix A) respectively of the overall student population. Likewise, the participation rate of students at schools in large cities was 3.27 percent and large suburbs was 4.55 percent, representing the lowest participation rates among the twelve categories, but the students from these areas made up 25.05 percent and 22.94 percent (Appendix A) of the total population, respectively.

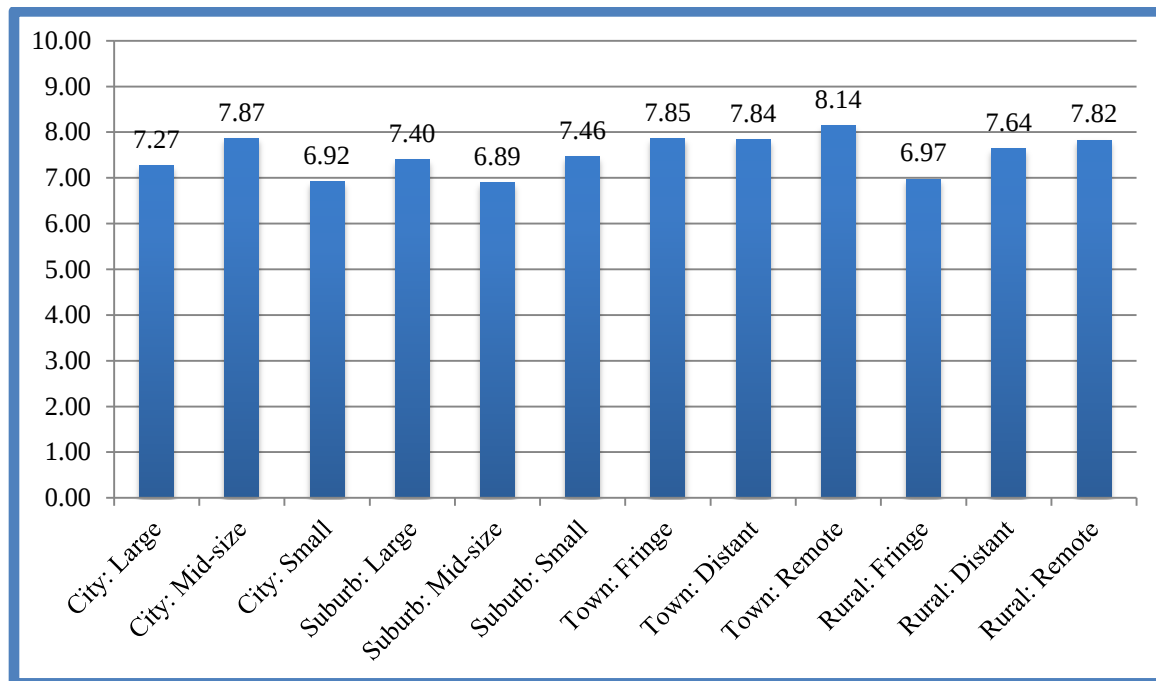
Figure 23. Dual Credit Participation Rates in Texas During Academic Year 2007-2008, by Expanded Locale Code



Source: National Center for Education Statistics, Texas Higher Education Coordinating Board

Figure 24 shows the average number of semester credit hours attempted by students attending the schools from the various locale types within the state of Texas. There does not appear to be a correlation between the number of credit hours attempted and locale type. Also, these averages only reveal a total difference of 1.25 semester credit hours between the lowest and highest numbers of semester credit hours attempted.

Figure 24. Average Semester Credit Hours Attempted by Dual Credit Participants in Texas During Academic Year 2007-2008, by Expanded Locale Code



Source: National Center for Education Statistics, Texas Higher Education Coordinating Board

Ethnicity Analysis

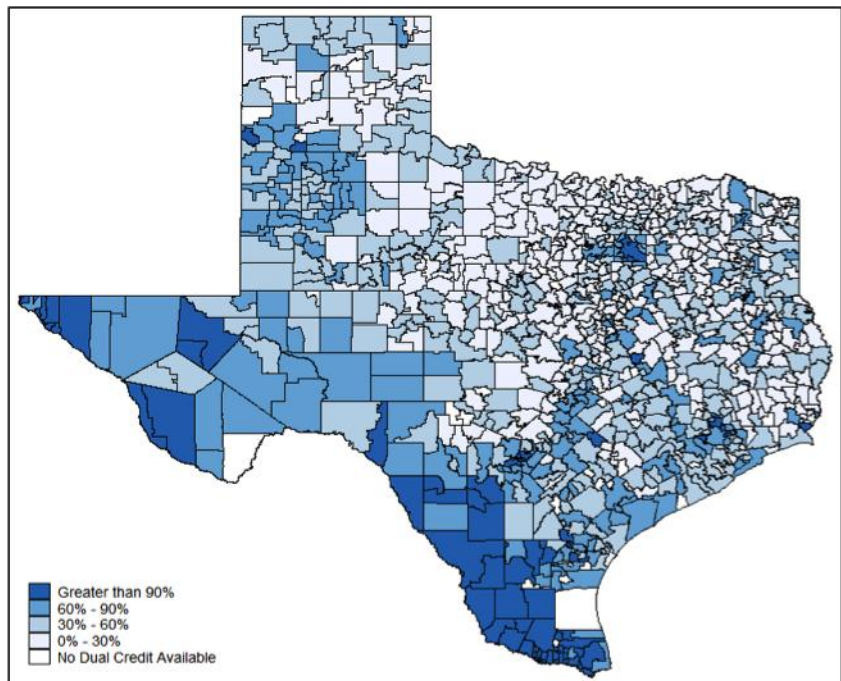
The Capstone also examined dual credit participation rates in terms of the ethnic composition of each school. For the sake of analysis, the schools were grouped into quartiles, and the categories were ranked in ascending order based on the prevalence of minority¹ students as a percentage of the total population of each school. That is, schools falling in the first quartile had the lowest proportion of minorities; while those schools grouped into the fourth quartile had the highest percentage of minority students. In terms of total enrollment, this did not create an even divide amongst the quartiles. The data indicate that larger schools generally had proportionally greater minority populations.

¹ For the purposes of this analysis, minority is defined as all ethnicities not categorized as white, non-Hispanic, which is consistent with the definition provided by NCES. This term is used despite the large number of majority-minority districts

When viewing the map of Minority Percentages in Texas School Districts, the most telling areas to consider are far West Texas and the middle and upper Rio Grande areas (Figure 25). The Dual Credit Participation Rates map shows both of these regions to have been relatively low in dual credit participation rates (Figure 26). However, on Figure 25, both of these regions are darkly shaded, indicating a high percentage of minority students in these school districts. These maps seem to point toward an inverse relationship between the percentage of minority students in Texas school districts and dual credit participation rates.

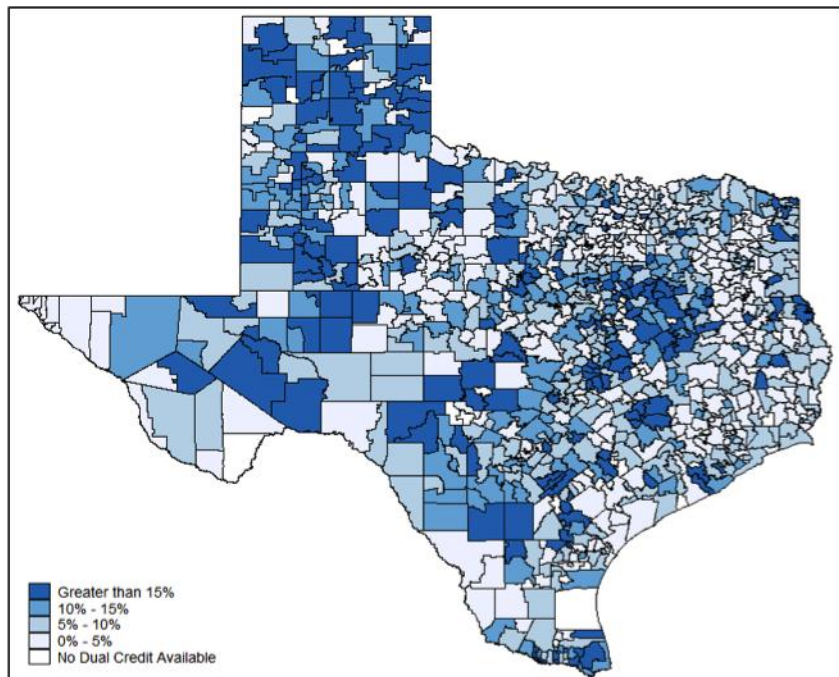
Schools with greater proportions of minority students tended to have much lower participation rates in dual credit programs. As can be seen in Figure 27, in the quartile with the lowest proportion of minority students, 7.14 percent of students participated in dual credit, whereas the group with the greatest proportion of minorities had only 4.66 percent of students participate in dual credit.

Figure 25. Minority Student Population Percentages in Texas School Districts in 2008



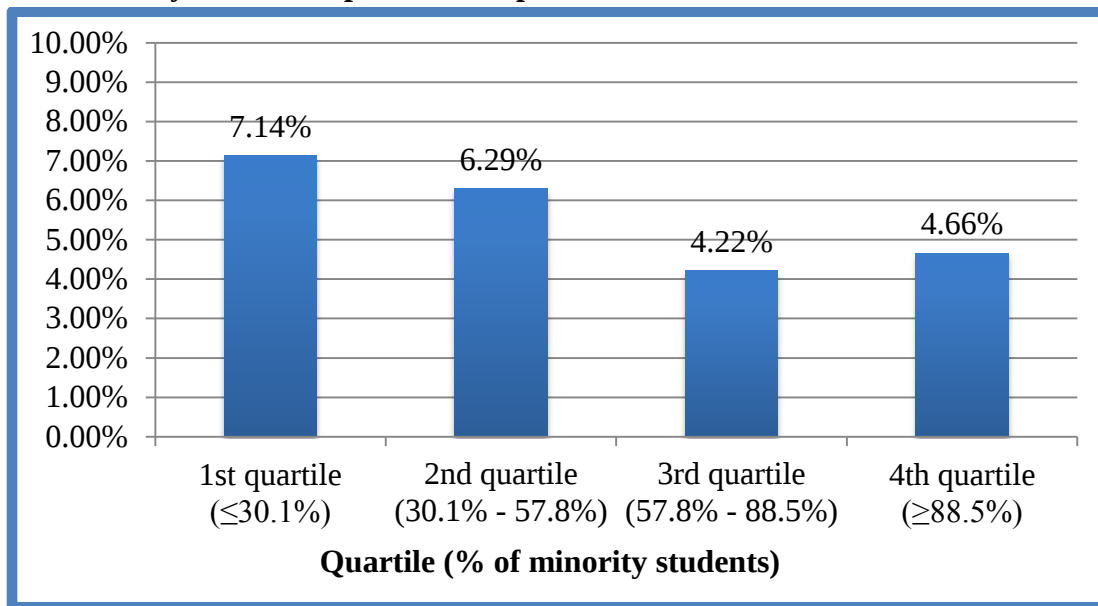
Source: National Center for Education Statistics

Figure 26. Dual Credit Participation Rates in Texas School Districts in 2008



Source: Texas Higher Education Coordinating Board

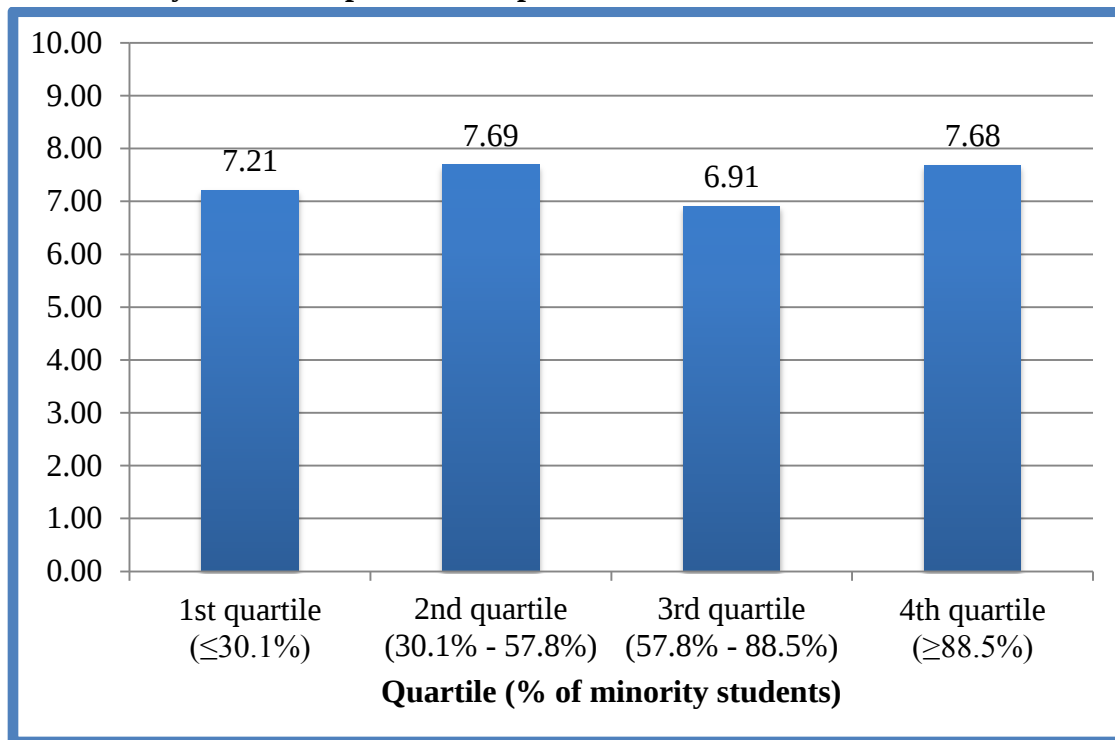
Figure 27. Dual Credit Participation Rates in Texas During Academic Year 2007-2008, Based on Minority Student Population Proportion



Source: National Center for Education Statistics, Texas Higher Education Coordinating Board

The data also indicate that all students in dual credit programs took about the same number of semester credit hours regardless of the minority proportions. Figure 28 shows the average dual credit hours attempted by students within each quartile. In all quartiles, the range is approximately seven to eight semester credit hours completed.

Figure 28. Average Semester Credit Hours in Texas During Academic Year 2007-2008, Based on Minority Student Population Proportion



Source: National Center for Education Statistics, Texas Higher Education Coordinating Board

Economically Disadvantaged Analysis

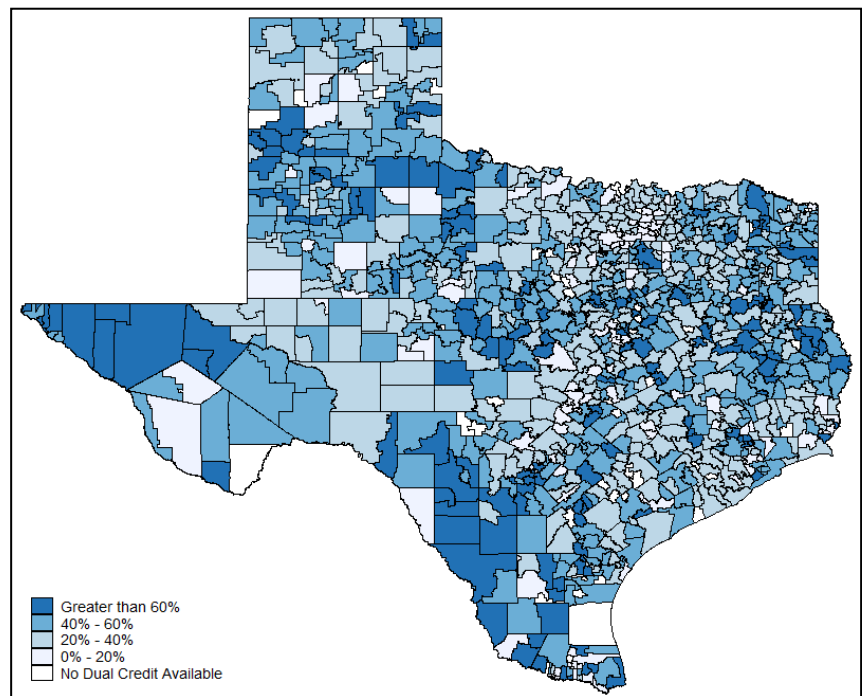
The third factor that was analyzed was the relationship between socioeconomic status and dual credit participation. In the absence of income data for each school district, the number of students qualifying for free and reduced-price lunch programs was used to indicate a degree of wealth in each school. This is a common proxy variable for socioeconomic status.

Again, the schools were grouped into quartiles using the same procedure that was used for the analysis of ethnicity. Schools in the first quartile had the lowest percentages of students qualifying for the free and reduced-price lunch program, whereas schools in the top quartile had the greatest percentages of students qualifying for the program. Schools that are grouped into the fourth quartile are considered to be the most economically disadvantaged, whereas schools in the first quartile are considered to be the least economically disadvantaged. Again, there was an uneven distribution of total student enrollment across these groupings. As the proportion of students qualifying for the free or reduced-price lunch program increased, the total enrollment decreased.

In Figure 29, a darker shade indicates a greater proportion of students who qualified for the free or reduced-price lunch program.

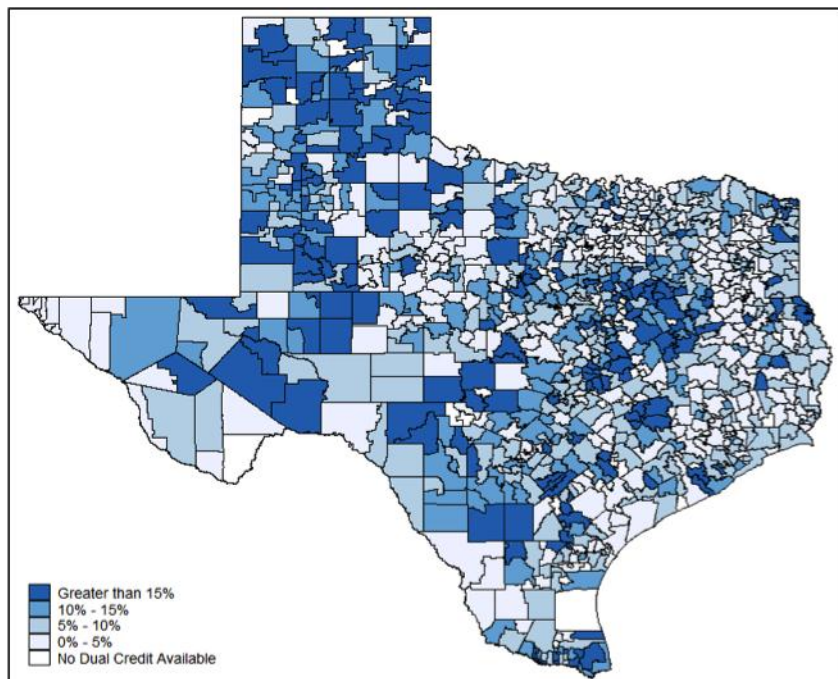
With this map, schools in the Panhandle region of Northern Texas appear to have had generally lower rates of economically disadvantaged students, while students in this region had higher levels of participation in dual credit programs as shown in Figure 30. Similarly, this map indicates that schools in far West Texas and in the Texas-Mexico border region of South Texas had higher proportions of economically disadvantaged students, while Figure 30 shows the region to have had lower dual credit participation rates. However, it should be noted that the one exception to this can be found in the lower Rio-Grande Valley. This map also seems to point to an inverse relationship between the percentage of economically disadvantaged students in Texas school districts and dual credit participation rates.

Figure 29. Economically Disadvantaged Percentages in Texas School Districts in 2008



Source: National Center for Education Statistics

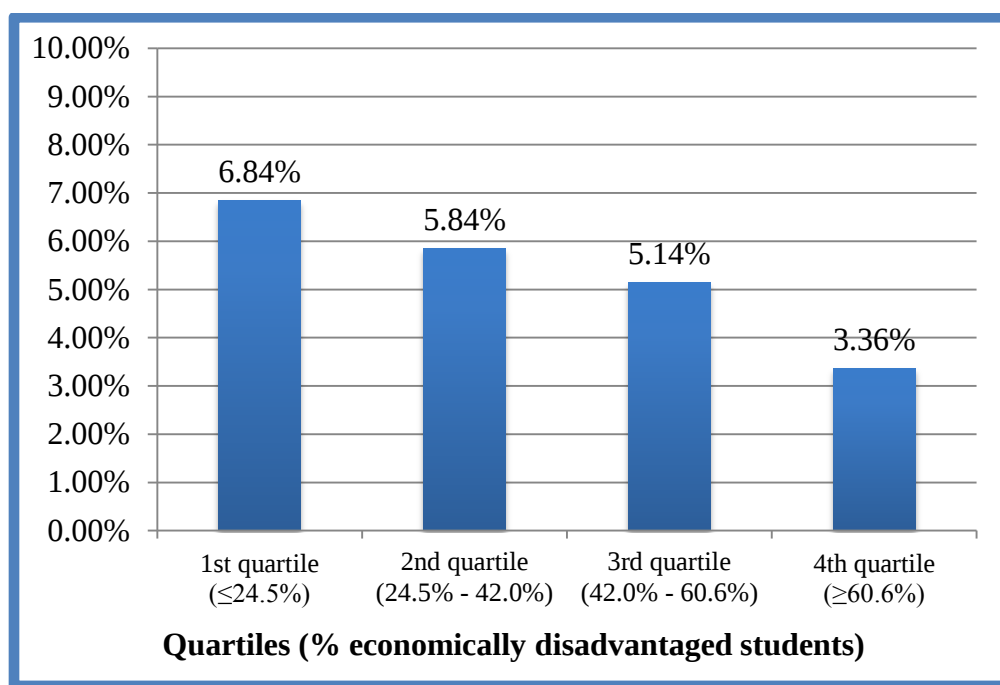
Figure 30. Dual Credit Participation Rates in Texas School Districts in 2008



Source: Texas Higher Education Coordinating Board

The results of this analysis followed a similar pattern to the findings of the ethnicity analysis. The data indicate that in schools with the greatest proportion of economically disadvantaged students, there was a tendency for students to participate in dual credit at a much lower frequency (Figure 31). Schools with the fewest economically disadvantaged students (or first quartile) had a participation rate of 6.84 percent, while schools with the greatest percentage of economically disadvantaged students (or fourth quartile) had a participation rate of only 3.36 percent

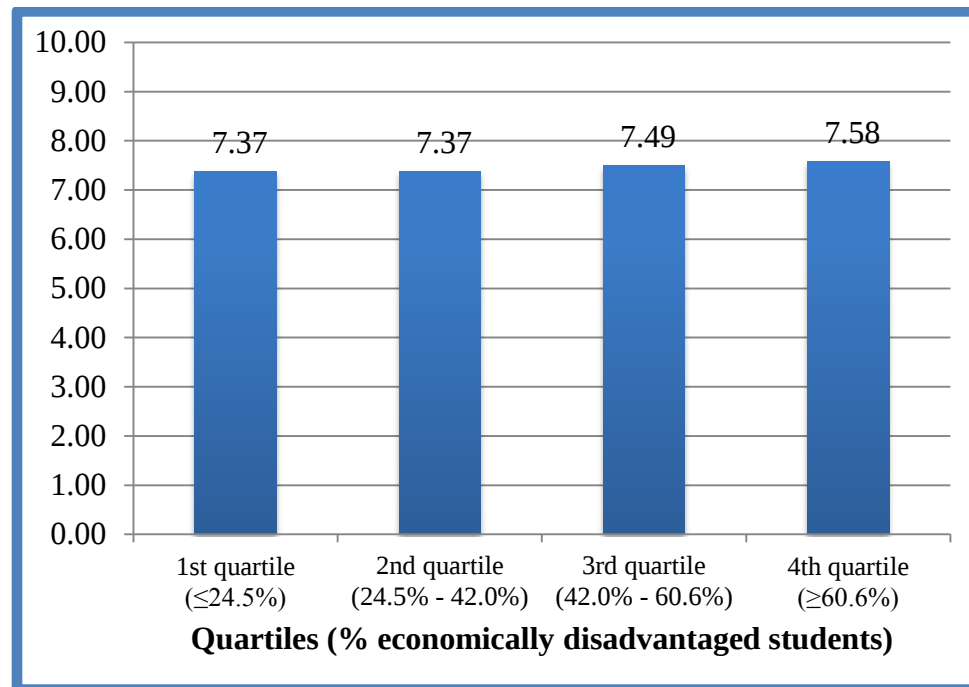
Figure 31: Dual Credit Participation Rates in Texas During Academic Year 2007-2008, Based on Economically Disadvantaged Population Proportion



Source: National Center for Education Statistics, Texas Higher Education Coordinating Board

Similar to the minority population analysis, the data indicate that all students in dual credit programs take about the same number of semester credit hours regardless of socioeconomic status. In all quartiles, the range is approximately seven to eight semester credit hours completed.

Figure 32. Average Semester Credit Hours Attempted in Texas During Academic Year 2007-2008, Based on Economically Disadvantaged Population Proportion



Source: National Center for Education Statistics, Texas Higher Education Coordinating Board

Question 4: What factors affect whether students participate in dual credit courses?

As discussed in the methodology section, the Capstone team was limited in terms of the type of information accessible. FERPA restrictions prevented the team from accessing individual student records. The analysis and discussion of dual credit with respect to the Greater Texas Foundation's target populations (rural, minority, and economically disadvantaged students) provides some indication as to which types of schools have high levels of participation in dual credit programs.

It is informative to examine how interactions among the three focal variables – ethnicity, economic status, and locale – are related to participation rates. Table 10 shows participation rates, dividing up the schools in terms of both ethnicity and economic status simultaneously. This table shows that the participation rate for schools with a high percentage of minority students differs considerably as a function of the level of economic disadvantage. For schools that are simultaneously in the fourth quartile for percentage of minority students and the first quartile for percentage of economically disadvantaged students – i.e., schools, with more than 88.5 percent minority student enrollment and fewer than 24.5 percent economically disadvantaged students – the participation rate is 10.97 percent, the highest of any cell in the table. In other words, the

participation rate at high-minority enrollment schools that are comparatively wealthy was quite different from the participation rate for poor high minority enrollment schools when contrasting the 10.97 percent participation rate in high minority enrollment schools in the wealthiest quartile, to the 3.13 percent rate in high minority enrollment schools in the poorest quartile.

We see that the participation rates in high-minority schools are not constant across economic levels. Rather it ranges from the very highest observed rate of participation in the wealthiest high minority schools to the very lowest observed rate for the poorest high minority schools. A somewhat similar, but less pronounced, pattern can be seen for schools with the lowest rates of minority enrollment. In the wealthiest schools with low minority enrollment the participation rate was 7.48 percent, but dropped to 3.97 percent in the poorest schools with low minority enrollment. The number of students in wealthy schools with low minority rates was only 40,698– not an inconsequential number, but far lower than the 202,032 students who attend schools that were simultaneously in the poorest quartile and the quartile with the highest minority enrollments.

Table 10. Dual Credit Participation Rates by Ethnic Minority Quartiles and Economically Disadvantaged Population Quartiles (n=dual credit student enrollment)

		Minority Student Population Quartiles				
		1 st Quartile (<30.1%)	2 nd Quartile (30.1% - 57.8%)	3 rd Quartile (57.8% - 88.5%)	4 th Quartile (>88.5%)	Total
Economically Disadvantaged student Quartiles	1 st Quartile (<24.5%)	7.48% (n=9410)	5.63% (n=9177)	4.30% (n=850)	10.97% (n=4464)	6.84% (n=23,901)
	2 nd Quartile (24.5% - 42.0%)	6.64% (n=4548)	6.97% (n=10,411)	3.98% (n=5195)	6.60% (n=1883)	5.84% (n=22,037)
	3 rd Quartile (42.0% - 60.6%)	6.97% (n=1478)	6.50% (n=4111)	4.55% (n=6152)	4.60% (n=3967)	5.14% (n=15,708)
	4 th Quartile (>60.6%)	3.97% (n=65)	5.27% (n=246)	3.94% (n=2343)	3.13% (n=6331)	3.36% (n=8985)
	Total	7.14% (n=15,501)	6.29% (n=23,945)	4.22% (n=14,540)	4.66% (n=16,645)	5.43% (n=70,631)

Source: National Center for Education Statistics, Texas Higher Education Coordinating Board

The Capstone conducted a parallel analysis of participation rates within locales across the minority and economically disadvantaged variables. Table 11 shows participation rates, dividing up the schools in terms of both locale and minority student populations simultaneously. Participation rates for campuses in suburb, town, or rural areas were similar across all economic levels. There was considerable variation, however, for schools within the city locale. The low-minority city campuses had a participation rate of 7.66 percent, one of the highest in the table.

This rate dropped to 2.29 percent in the high-minority city campuses. Low-minority city campuses only served 17,450 students, however. In stark contrast, high-minority city campuses enrolled 234,210 students.

Table 11. Dual Credit Participation Rates by Locale and Ethnic Minority Quartiles (n=dual credit student enrollment)

		Minority Student Population Quartiles				
Locale		1 st Quartile (<30.1%)	2 nd Quartile (30.1% - 57.8%)	3 rd Quartile (57.8% - 88.5%)	4 th Quartile (>88.5%)	Total
	City	8.79% (n=1534)	6.01% (n=6926)	3.33% (n=5121)	3.40% (n=7969)	4.14% (n=21,550)
	Suburb	4.10% (n=2315)	5.56% (n=6609)	2.92% (n=2501)	7.28% (n=5461)	5.02% (n=16,886)
	Town	7.23% (n=2879)	8.33% (n=4499)	8.53% (n=3098)	6.56% (n=819)	7.92% (n=11,295)
	Rural	8.48% (n=8773)	6.40% (n=5911)	5.51% (n=3820)	6.69% (n=2396)	6.94% (n=20,900)
	Total	7.14% (n=15,501)	6.29% (n=23,945)	4.22% (n=14,540)	4.66% (n=16,645)	5.43% (n=70,631)

Source: National Center for Education Statistics, Texas Higher Education Coordinating Board

Table 11 shows participation rates, dividing the schools in terms of both locale and economic status simultaneously. The participation rate for schools in cities differed substantially as a function of the percentage of economically disadvantaged students. Participation rates for campuses in suburb, town, or rural areas were similar across all economic categories. In cities, however, the participation rate ranged from 7.66 percent for the wealthiest campuses, to 2.29 percent in the poorest city campuses. This trend is important because campuses in cities served over 40 percent of the students of Texas. The wealthiest city schools had a total enrollment of 111,962 students, whereas the poorest city campuses had a total enrollment of 173,315 students, the single largest student population in Table 11.

Table 11. Dual Credit Participation Rates by Locale and Economically Disadvantaged Population Quartiles (n=dual credit student enrollment)

Economically Disadvantaged Student Population Quartiles						
Locale		1 st Quartile (<24.5%)	2 nd Quartile (24.5% - 42.0%)	3 rd Quartile (42.0% - 60.6%)	4 th Quartile (>60.6%)	Total
	City	7.66% (n=8579)	4.64% (n=5432)	3.02% (n=3562)	2.29% (n=3977)	4.14% (n=21,550)
	Suburb	5.53% (n=7014)	4.82% (n=5127)	4.57% (n=2651)	4.69% (n=2094)	5.02% (n=16,886)
	Town	8.80% (n=1721)	8.00% (n=4865)	8.16% (n=3936)	5.52% (n=773)	7.92% (n=11,295)
	Rural	7.24% (n=6587)	7.14% (n=6613)	6.82% (n=5559)	5.98% (n=2141)	6.94% (n=20,900)
	Total	6.84% (n=23,901)	5.84% (n=22,037)	5.14% (n=15,708)	3.36% (n=8985)	5.43% (n=70,631)

Source: National Center for Education Statistics, Texas Higher Education Coordinating Board

Further, the Capstone team addressed two other questions relating to participation in dual credit programs. The first question examined factors that predict whether a school has a functional dual credit program. A functional program is defined as having some level of student participation in dual credit programs. The second question asked “for those schools which have a functioning program, what factors predict the level of student participation in dual credit programs?”

To analyze the first question, a logistic regression analysis was conducted involving the 2744 Texas high school campuses identified in the NCES database for 2008. The Capstone predicted a dummy variable *Functional Program*, which was coded 1 if any students from that school participated in dual credit programs and 0 otherwise.² Slightly fewer than 40 percent of the schools had such a program; the balance did not. As can be seen in Table 12, there are substantial differences in the percentages of campuses with functional programs, by *Locale Type* (an ordinal variable corresponding to NCES categories, with twelve steps ranging in value from 1 for large cities to 11 for remote rural areas). The percentage ranges from a low of 28.4 percent in midsize cities to 56.7 percent in remote rural locations.

² Data from schools with fewer than four student participants were masked. We rounded down and coded all schools with four or fewer participants as 0.

Table 12. Number and Percentage of High School Campuses with Functional Dual Credit Programs, by Locale Type

Locale Type	Number of Campuses	Percentage of Campuses with Functional Dual Credit Programs
Large City	477	32.1%
Midsize City	197	28.4%
Small City	125	32.0%
Large Suburb	336	35.1%
Midsize Suburb	36	38.9%
Small Suburb	32	34.4%
Town, Fringe	112	33.9%
Town, Distant	230	32.6%
Town, Remote	144	41.7%
Rural, Fringe	366	41.8%
Rural, Distant	428	52.3%
Rural, Remote	261	56.7%
OVERALL	2744	39.7%

Source: National Center for Education Statistics, Texas Higher Education Coordinating Board

The predictors of *Functional Program* included six variables, which had been identified as potentially important by previous research or were of particular interest in the context of the present study. They included *Student-Teacher Ratio*, *Percentage of Black Students*, *Percent of Hispanic Students*, *Percent of Students Receiving Free Lunch*, *Locale Type*, and *Total Enrollment*.

The correlation matrix for the dependent variable and six predictor variables appears in Table 13. All cases with missing data on any variable, whether due to the failure to report, masking because of privacy concerns, or any other reason, were dropped from the analysis, leaving 2030 usable observations. As can be seen, the largest correlation coefficient (.42) is between the dummy *Functional Program* variable and *Total Enrollment*.

Table 13. Correlation Matrix for Variables Included in the Logistic Regression Analysis Predicting Whether Schools Had a Functional Dual Credit Program

(N=2030)	Functional Program	Student-Teacher Ratio	% Black Students	% Hispanic Students	% Free Lunch	Locale Type	Total Enrollment
Functional Program	1.00						
Student-Teacher Ratio	-.17	1.00					
% Black Students	-.15	-.01	1.00				
% Hispanic Students	-.14	-.02	-.25	1.00			
% Free Lunch	-.18	-.10	.25	.34	1.00		
Locale Type	.20	.02	-.33	-.31	-.12	1.00	
Total Enrollment	.42	-.18	.04	.04	-.15	-.32	1.00

Source: National Center for Education Statistics, Texas Higher Education Coordinating Board

The results of the logistic regression analysis appear in Table 14. The X^2 value is highly statistically significant and the Pseudo R^2 value equals .32. Although the analysis explains only a fraction of the variance among schools, the set of six independent variables predicts whether there is a functional dual credit program at a level that is both statistically significant and potentially practically meaningful. All six predictor variables are statistically significant. Total enrollment is the strongest significant positive predictor of whether there is a functional dual credit program at a school; participation in dual credit programs is more likely to be found in larger schools. Locale type is also a significant predictor; functional programs are more likely in less highly-urbanized areas. Further, the results suggest that, all else being equal, functional programs are less likely in schools with high student-teacher ratios, and with higher percentages of students who are black, Hispanic, or eligible for free lunches.

Table 14. Logistic Regression Analysis Predicting Whether a School Has a Functional Dual Credit Program

Number of obs = 2030
 LR chi2(6)=884.97
 Prob>chi2=0.0000
 Pseudo R2=0.3156
 Log likelihood=-.959.34669

Functional program	Coef.	Std. Err.	Z	P> z	[95% conf. Interval]
Student-teacher ratio	-9.04	1.49	-6.05	0.000	[-11.97, -6.11]
% Black Student	-.92	.40	-2.28	0.023	[-1.71, -.13]
% Hispanic Student	-.55	.25	-2.25	0.025	[-1.03, -.07]
% Free Lunch	-.61	.29	-2.08	0.038	[-1.18, -.03]
Local Type	.24	.02	12.21	0.000	[.20, .28]
Total enrollment08	.002	.000	16.01	0.000	[.002, .002]
_con	-1.04	.28	-3.71	0.000	[-1.59, -.49]

Note: 2 failures and 0 successes completely determined.

Source: National Center for Education Statistics, Texas Higher Education Coordinating Board

This first set of analyses investigated the predictors of whether schools did or did not have a functional dual credit program. The factors that predict whether a school has a functional program will not necessarily be the same factors as those that predict the level of student participation in it. The second set of analyses addresses the question of what factors best predict the level of student participation at schools that have a functional dual credit program.

We used ordinary least square regression to analyze the percentage of the student body in 2008 who participated in dual credit programs (*Percentage Participating in Dual Credit*). We used the same six predictors as in the previous analyses. For this analysis we dropped all schools with no functional dual credit program, reducing the usable number of observations to 1088 campuses.

The correlation matrix for the dependent variable and six predictor variables appears in Table 15. The correlation between *student-teacher ratio* and *total enrollment* is -.63, suggesting that larger

schools tend to have lower student-teacher ratios. The correlation between *locale type* and *total enrollment* is -.59, indicating that schools with larger enrollments tend to be located in more urbanized areas. The correlation between *student-teacher ratio* and *locale type* is .58, indicating that more rural schools typically have higher student-teacher ratios. The highest correlation of any of the predictors with the dependent variable is the correlation of -.36 between the *percentage taking dual credit* and *total enrollment*. This suggests that the percentage of students taking dual credit coursework tends to be higher in schools with lower enrollments.

Table 15. Correlation Matrix for Variables Included in the OLS Regression Analysis Predicting the Percentage of Students Participating in Dual Credit Programs

(N=1088)	% taking dual credit	Student-Teacher Ratio	% Black Students	% Hispanic Students	% Free Lunch	Locale Type	Total Enrollment
% taking dual credit	1.00						
Student-Teacher Ratio	.23	1.00					
% Black Students	-.21	-.19	1.00				
% Hispanic Students	.05	-.14	-.19	1.00			
% Free Lunch	-.01	.11	.25	.43	1.00		
Locale Type	.18	.58	-.34	-.32	-.08	1.00	
Total Enrollment	-.36	-.63	.20	.16	-.17	-.59	1.00

Source: National Center for Education Statistics, Texas Higher Education Coordinating Board

The results of the regression analysis appear in Table 16. The adjusted R^2 value is .17, indicating that although we can account for a statistically significant amount of variance, a large fraction of the variance in participation rates is not explained by the predictor variables. Of the six independent variables included in the analysis, student-teacher ratio is not statistically significant; the other five predictors are all statistically significant predictors of participation rate.

Table 16. OLS Regression Analysis Predicting the Percentage of Students Participating in Dual Credit Programs

Source	SS	df	MS	Number of obs = 1088
Model	1.9071049	6	.317850817	Prob > F = 0.0000
Residual	9.04451005	1081	.008366799	R-squared = 0.1741
Total	10.9516149	1087	.010075083	Adj R-squared = 0.1696
				Root MSE = .09147

% taking dual credit	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
Student-Teacher Ratio	.089	.165	0.54	0.591	[-.235, .412]
% Black Students	-.064	.023	-2.82	0.005	[-.109, -.020]
% Hispanic Students	.046	.013	3.44	0.001	[.020, .072]
% Free Lunch	-.063	.019	-3.37	0.001	[-.100, -.026]
Locale Type	-.002	.001	-2.24	0.025	[-.004, -.0003]
Total Enrollment08	-.000	.000	-10.83	0.000	[-.000, -.000]
_cons	.172	.018	9.35	0.000	[.136, .208]

Source: National Center for Education Statistics, Texas Higher Education Coordinating Board

Total enrollment is the strongest predictor, but in contrast to the previous analysis in which total enrollment was a positive predictor of whether a school had a functional dual credit program, there is a negative coefficient for total enrollment when predicting participation rate. All else being equal, bigger high schools are more likely to have functional dual credit programs, but the level of participation tends to be higher in smaller schools. Speculatively, this may be because schools with bigger enrollments are more likely to offer a rich array of substitutes, such as AP and IB. Higher percentages of students who are black and higher percentages of students who are eligible for free lunches are both negative predictors of participation rate. The percentage of students who are Hispanic is a positive predictor. Most surprisingly, the coefficient for locale type is negative, despite the fact that participation rates are higher in non-urban schools. This is similar to the results of the regression analyses of recent Texas data reported by Friedman et al. (2011). This result suggests that the level of participation in rural settings, although comparatively high, is nevertheless somewhat lower than would be anticipated after taking into consideration all the other characteristics of schools in those locations

Regression analyses can be instructive because they are able to estimate the effects of multiple possible causal factors considered simultaneously rather than singly. Nonetheless, results from regression analyses of Texas dual credit data should be interpreted with considerable caution. This is partly because many potential predictor variables are correlated relatively strongly with one another. Locale, ethnic composition, percentage of economically disadvantaged, size of school, and student-teacher ratio tend to co-vary to a significant degree. This means that slight changes in type of analysis or variable measurement can generate different conclusions about which predictors are or are not statistically significant. Further, it is not clear that campuses and school districts are sufficiently similar across the state so that it makes sense to try to estimate a model that accounts simultaneously for the wide variety of causal factors that operate from Texarkana to El Paso or from Brownsville to Plano.

Effectiveness of Dual Credit Programs

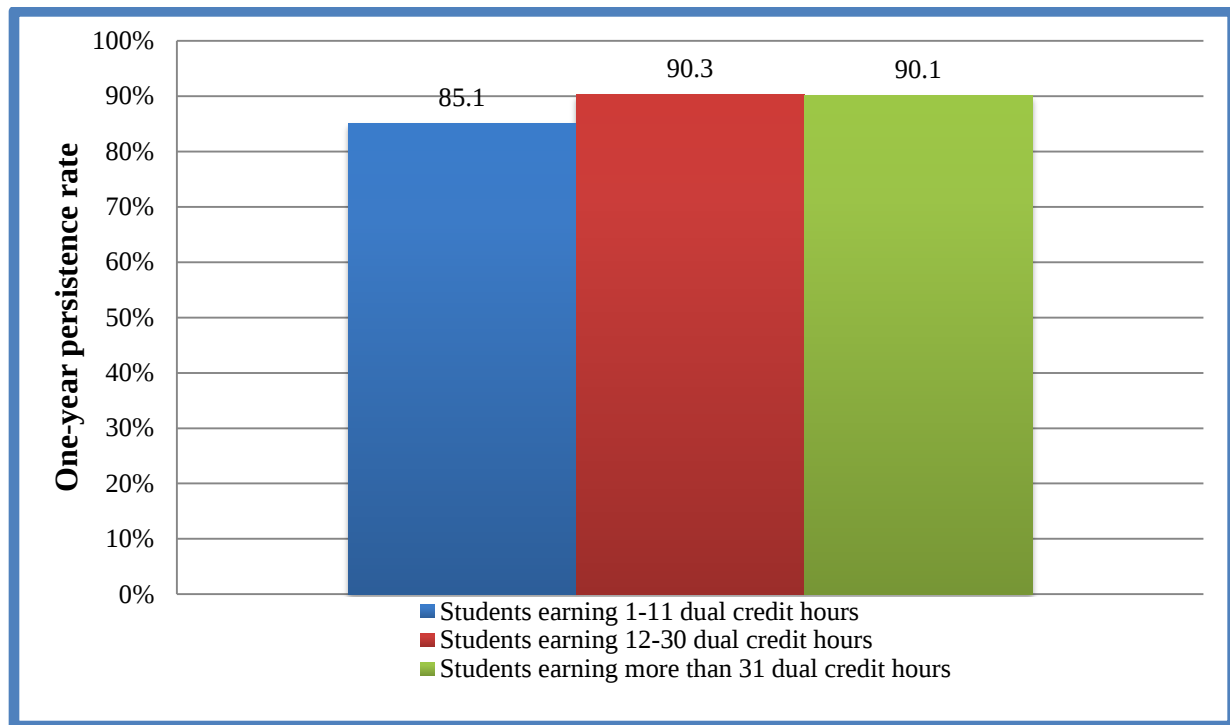
Despite the popularity of dual enrollment, little is known about its effectiveness as a strategy for increasing students' postsecondary attainment. Much of the recent research on dual credit has been qualitative, exploring state policies or program features, and thus has not substantially increased knowledge regarding effectiveness. Although these studies have identified promising program practices and indicate that dual enrollment may help students transition into college, they do not measure program effectiveness.

The analysis presented below utilizes two measures of postsecondary success to evaluate the effectiveness of dual credit programs: first year persistence rates and graduation rates. The first year persistence rate is defined as the percent of first time, degree-seeking students that are enrolled continuously from the fall of their first year to the fall of their second year of higher education. The graduation rate is the rate at which students complete their degrees within a given period of time. In this report, we examine the four and five year graduation rates of dual credit and non-dual credit students.

Question 5: How does postsecondary performance of dual credit participants compare to students who didn't participate in dual credit programs?

In Texas, as can be seen in Figure 33, our analyses show that students who earned more dual credit semester hours had a higher first year persistence rate than those who earned fewer dual credit hours. Although the difference between students who earned 12 to 30 and above 31 semester credit hours of dual credit is only 0.2 percent, the first year persistence rate of those students who only took 1 to 11 dual credit hours were about 5 percent lower compared to the other two groups in 2008 (Figure 33). The 2008 data were the most recent information available for analysis.

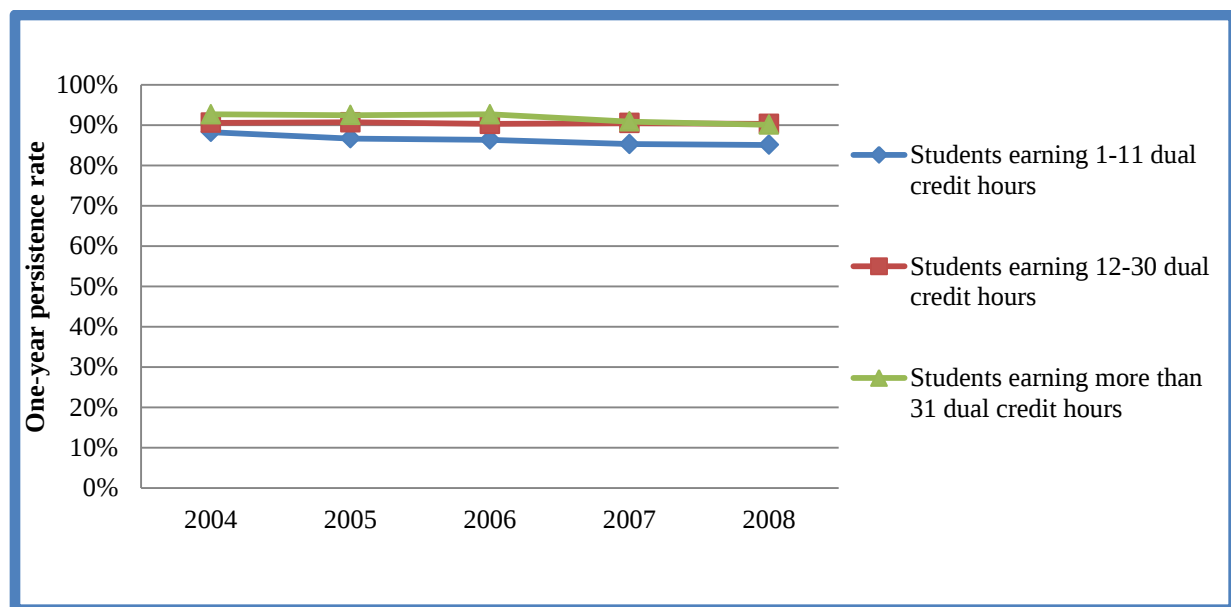
Figure 33. One-Year Persistence Rates for Dual Credit Students Enrolled in Texas Public Institutions of Higher Education in the Fall of 2008



Source: Texas Higher Education Coordinating Board

As can be seen in Figure 34, the finding of higher persistence rates for students taking 12 or more dual credit hours held true across the period from 2004 to 2008.

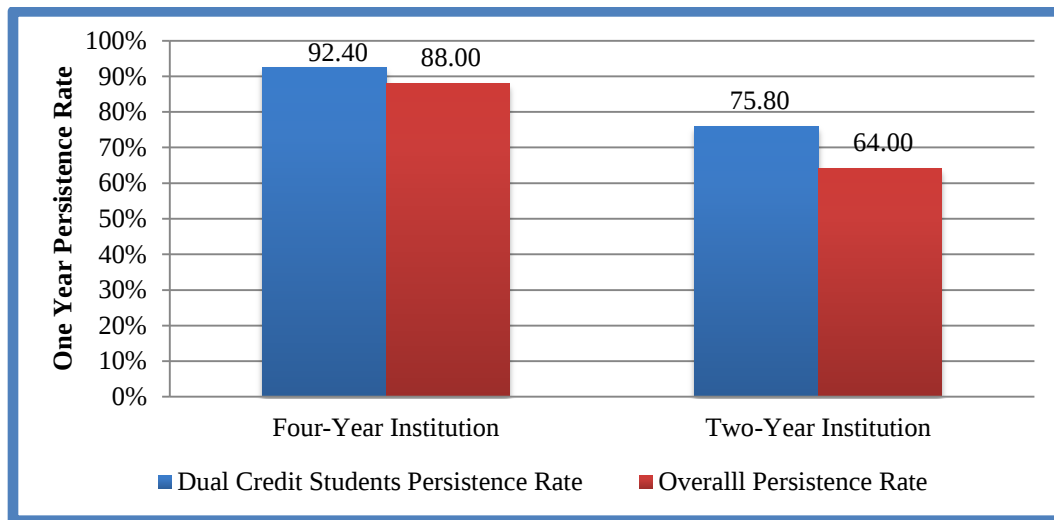
Figure 34. One-Year Persistence Rates for Dual Credit Students Enrolled in Texas Public Institutions of Higher Education from 2004-2008



Source: Texas Higher Education Coordinating Board

Furthermore, this analysis revealed that the first year persistence rate of dual credit students was higher than the overall rate for all students, both for students enrolled in two-year and those enrolled in four-year public higher education institutions (Figure 35). The comparative overall persistence rates used include dual credit students as well as non-dual credit students, as persistence rates for non-dual credit students only were unavailable. For four-year institutions, the first year persistence rate of dual credit students was 4.4 percent higher than that of all students. For two-year institution, the difference was 11.8 percent.

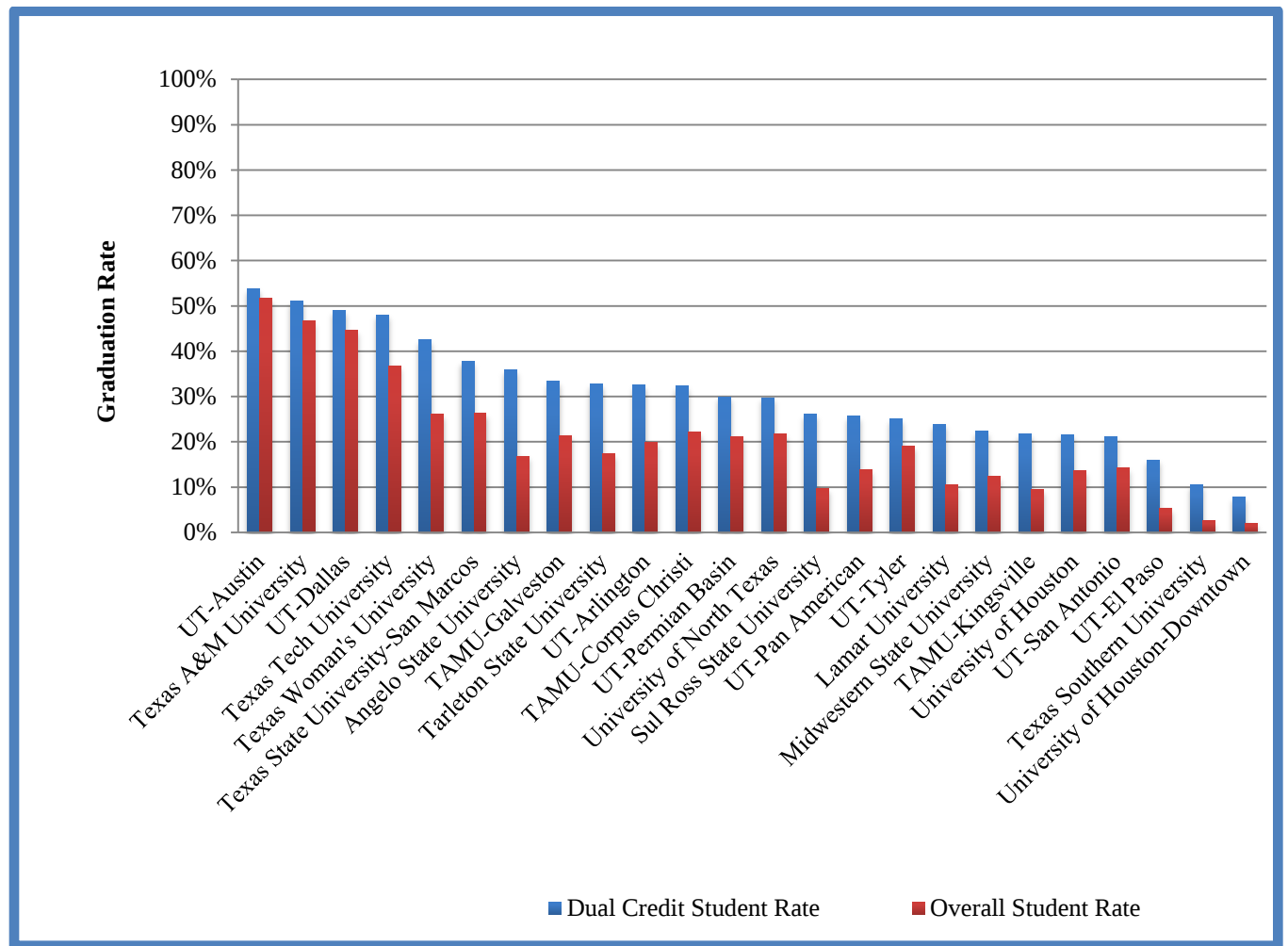
Figure 35. One-Year Persistence Rates for Texas Four-Year and Two-Year Institutions of Higher Education in the Fall of 2008



Source: Integrated Postsecondary Education Data System, Texas Higher Education Coordinating Board

College graduation rate is another important indicator of postsecondary performance. The standard measure of higher education completion is the six-year graduation rate. The earliest data included in the THECB dataset is from 2004 and the six-year graduation rate data was not available at the time of the Capstone project. Due to the aforementioned data limitation, this study examined four-year and five-year graduation rates. In 2008, the four-year graduation rates of dual credit students in every Texas public higher education institutions were higher than those for the overall student population (Figure 36). The University of Texas at Austin had the smallest gap between dual credit and overall students among all the schools. The graduation rate for dual credit students there was 5.6 percent higher than the overall graduation rate. By contrast, Angelo State University had the biggest difference. The graduation rate for dual credit students was 19.1 percent higher than that of overall students.

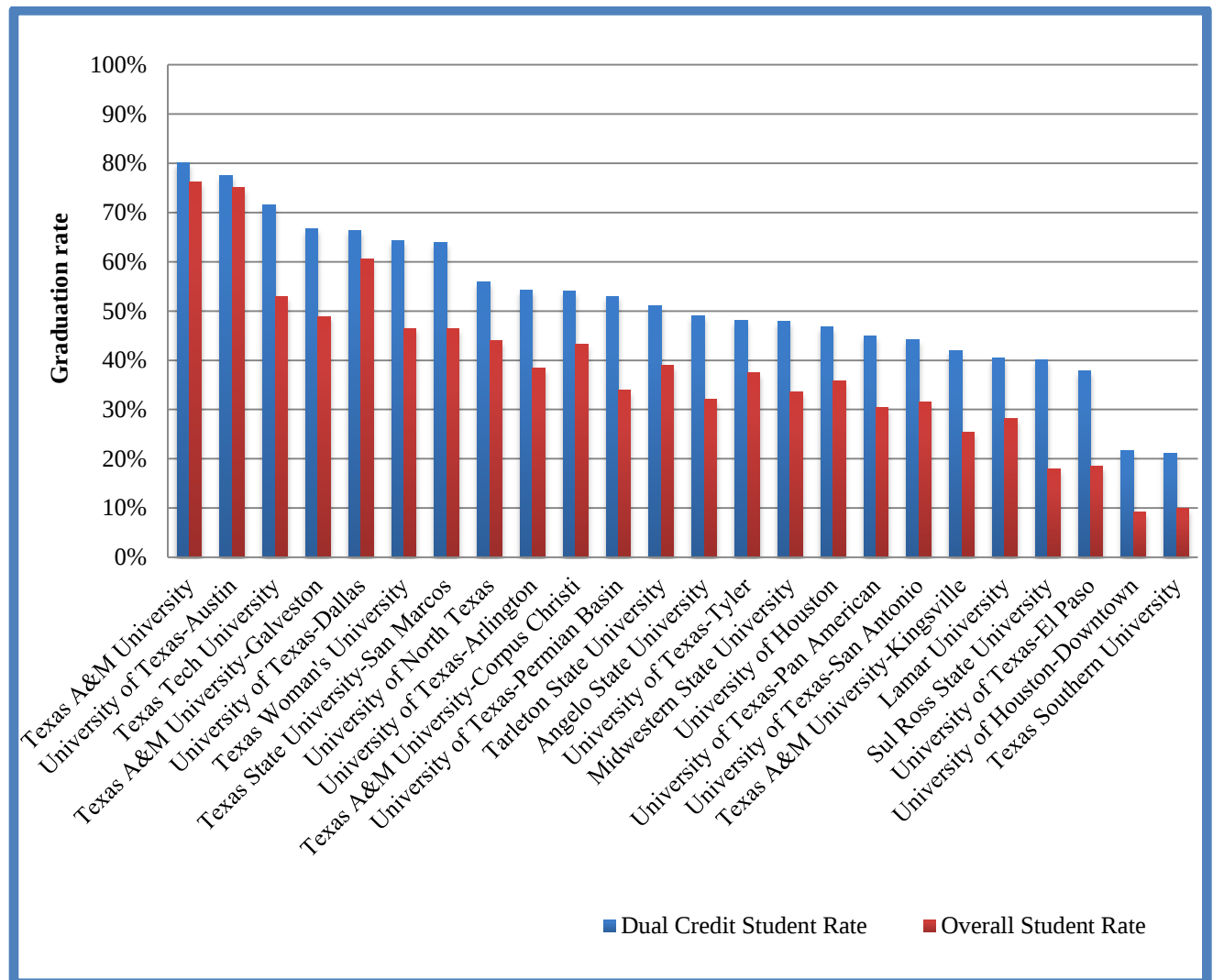
Figure 36. Four-Year Graduation Rates at Texas Public Institutions of Higher Education in 2008



Source: Texas Higher Education Coordinating Board

Similarly, the five-year graduation rates for dual credit students were higher than the overall graduation rate for all students, as seen in Figure 37. The gap between dual credit students and the overall student population for five-year graduation rate is understandably smaller than the corresponding gap for the four-year graduation rate at most institutions since the advantages of dual credit students become less obvious over time.

Figure 37. Five-Year graduation rates at Texas public institutions of higher education in 2008



Source: Texas Higher Education Coordinating Board

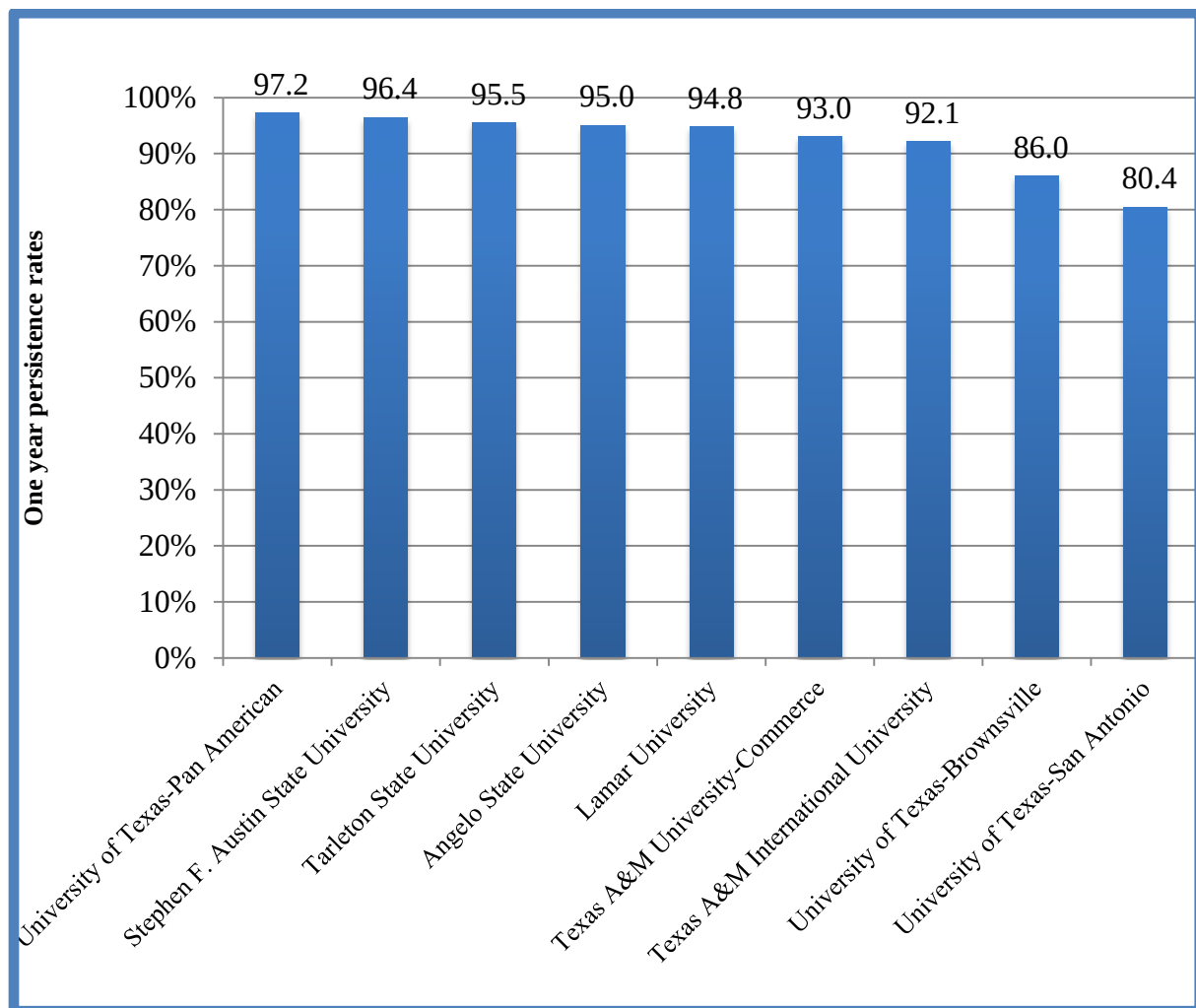
Question 6: Do certain high schools have dual credit programs with graduates who fare better than those from other programs?

Data limitations prevented the Capstone from collecting information regarding specific details of the dual credit models utilized by high schools in Texas. As a result, this analysis cannot directly address this research question. However, the data from THECB does contain the first year persistence rates and graduation rates of dual credit students according to the higher education institution where the dual credit was earned, which is presented in the section below. Further examination of models utilized by schools at which higher levels of student performance are seen may reveal more information in this regard.

Question 7: Which dual credit models have the best rates of postsecondary enrollment and graduation among their graduates?

Both four-year public institutions and two-year public institutions offer dual credits courses in Texas. The first year persistence rate of four-year public institutions where dual credit was earned ranged from 80.4 percent to 97.2 percent in 2008 (Figure 38). The total number of students taking dual credit courses in those four-year institutions was only 2,045. Universities with fewer than 20 dual credit students were dropped from the dataset.

Figure 38. One-Year Persistence Rates in Fall of 2008 of Dual Credit Students, Based on Four-Year Public Institutions Where Dual Credit was Earned



Source: Texas Higher Education Coordinating Board

For two-year public institutions, the first year persistence rate ranged from 75.1 percent to 95.2 percent (Appendix D). The total number of students who earned dual credit in those two-year institutions was 43,039. No relationship appeared to exist between the persistence rate and the

number of students enrolled in the schools. Universities with fewer than 50 students were dropped from the dataset.

Table 17 shows the top and bottom persistence rates of dual credit students, based on the two-year public institution where the student attempted dual credit. A table listing all persistence rates can be found in Appendix D. Further analysis of the models utilized by public two-year institutions could reveal why some institutions appear to be more successful than others. There could be many factors that make difference, such as the type of students, the type of courses, the quality of the courses, etc. It is also important to note that the Texas Success Initiative (TSI) requirements for dual credit participation, as set by the state, serve as a minimum standard for high school students planning to enroll in dual credit. Institutions of higher education may set their own standards at a higher level. As a result, colleges and universities accept dual credit students with varying levels of preparation and knowledge prior to participating in dual credit programs. Due to these differences, comparing the persistence rates of colleges and universities should be done with extreme caution, as the analysis presented does not control for difference in the preparation levels of students.

Table 17. Top and Bottom Five One-Year Persistence Rates for Dual Credit Students in Two-Year Institutions in 2008, Based on the Two-Year Institution where Dual Credit was Earned

Higher Education Institution	One-year Persistence Rate	Dual Credit Students
Top 5 Institutions		
LSCSD Cy-Fair College	97.7%	692
South Plains College	95.5%	399
San Jacinto Community College Central	93.9%	412
San Jacinto Community College North	93.8%	112
Alvin Community College	93.7%	237
Bottom 5 Institutions		
ACCD St. Philip's College	82.2%	516
Weatherford College	81.9%	304
Trinity Valley Community College	81.5%	590
DCCCD Cedar Valley College	80.8%	261
Texarkana College	80.6%	201

Source: Texas Higher Education Coordinating Board

Summary of Findings

Access Summary

Our data, based on locale, ethnicity, and socioeconomic status, show trends that are generally similar to those presented in comparable statewide analyses of dual credit participation (Eklund 2009; Friedman et al. 2011). We found that schools located in towns and rural locales tend to have higher rates of dual credit participation than those in cities and suburbs. This is different from the analysis reported by Friedman et al.'s (2011), in which students attending schools in rural areas were reported to be less likely to participate in dual credit courses. However, the analyses may yield different results depending on the method used. This is evidenced by the results of our regression analysis and the findings of Friedman et al. (2011).

We also found an inverse relationship between the percentage of a school's population made up of minority students and the participation rates, in that schools with higher proportions of minority students had lower rates of dual credit participation. Consistent with our findings, most dual credit studies examining race and ethnicity identified white students as the most prevalent group participating in dual credit courses. For example, the Running Start report for the state of Washington indicated that white students made up 75 percent of the student population participating in dual credit programs. This is in comparison to 25 percent for other ethnic groups taking college courses at Washington's 34 community and technical colleges and Washington State, Eastern Washington, and Central Washington universities (Washington State Board for Community and Technical Colleges 2002).

Our data also showed an inverse relationship between the percent of the student population that was economically disadvantaged and dual credit participation. As the percentage of students qualifying for free or reduced-price lunch programs increased, the average percent of students participating in dual credit decreased. This is consistent with the findings from Friedman et al. (2011), in which economically disadvantaged students tended to participate in dual credit at a much lower frequency compared to students who do not classify as economically disadvantaged.

Finally, we found that the participation rates in high-minority schools are not constant across economic levels. It ranges from the very highest observed rate of participation in the wealthiest high minority schools to the very lowest observed rate for the poorest high minority schools. A somewhat similar, but less pronounced, pattern can be seen for schools with the lowest rates of minority enrollment – participation rates are much higher than average in the wealthiest schools and much lower than average in the poorest schools. In contrast, participation rates within suburbs, towns, and rural areas vary little across both the economic and minority categories. However, participation rates in cities decrease substantially as campuses become more economically disadvantaged and have higher percentages of minority students.

Effectiveness Summary

With regard to postsecondary performance, we found a positive relationship between dual credit participation, and both the first year persistence rate and the college graduation rate. Dual credit participants were more likely to persist in college to a second year in both two year and four year public institutions in Texas. Furthermore, our findings suggest that students benefit from taking an increased number of semester credit hours. From 2004-2008, students who took more dual credit hours had higher persistence rates than those who took fewer dual credit hours. Our findings are consistent with previous research. Institutional data from Monroe Community College (MCC) in New York revealed that 93 percent of dual credit students returned to the spring semester of 2001, compared to 81 percent of non-dual credit students (Monroe Community College 2003), however, the study did not control for students' prior-academic performance. Another study by Karp et al. (2007) on dual enrollment in Florida and New York City found a multitude of impacts on participating students. Controlling for observable student and school characteristics, the researchers identified positive relationships between dual enrollment participation and all longer-term outcomes studied, including second-year and final grade point averages, persistence to the second year of college, and total postsecondary credits earned.

As for the graduation rate, dual credit participants had higher four-year and five-year graduation rates than their non-dual credit peers at each public institution in Texas. With regard to which dual credit model works best among their graduates, the first year persistence rates of four-year public institutions where dual credit was earned ranged from 80.4 percent to 97.2 percent in 2008. For two-year public institutions, the first year persistence rates ranged from 75.1 percent to 95.2 percent. These findings are consistent with the findings from Karp et al. (2007). It is worth pointing out that the students, the courses they take, and the colleges or universities that they go to all may be different for those who take courses at 4-year versus those who take courses at 2-year-institutions.

Dual Credit in Texas: Conclusions and Recommendations

Dual Credit in Texas: Conclusions and Recommendations

After studying the accessibility and effectiveness of dual credit opportunities within Texas for the last year as a Capstone project, and on behalf of the Greater Texas Foundation, we have attempted to identify any best practices or lessons learned as a result of this data. Recommendations were further based on any hindrances or hurdles that we, as a team, encountered in order to provide guidance for future research teams to avoid these problems.

Research Implications

Throughout our implementation of this Capstone research project, considerable barriers consistently impeded our ability to effectively collect the requisite data for full completion of our project as defined at the beginning of the research term. The absence of certain pieces of data severely limited the comprehensiveness of our final result. Future studies would benefit considerably from additional information primarily related to the question of effectiveness; chiefly, longitudinal data which measures GPA/GPR of students who completed dual credit during their secondary schooling, as well as 6-year graduation rates for those same students would provide invaluable information for assessing the effectiveness of dual credit as a whole. In addition, if data were available that indicated models of dual credit implementation, by campus, future researchers would be able to compare the models to comprehensively measure effectiveness. Furthermore, the availability of AP/IB courses can often serve as a confounding variable in dual credit analyses; a comprehensive data set noting AP/IB participation by jurisdiction would be incredibly useful. Lastly, an evaluation of dual credit implementation models used in high performing community college programs would serve as an excellent complement to this study. By providing thoughtful analysis of existing engagement techniques, future research may be able to provide thorough recommendations for increasing access and encouraging participation.

Case Study

One consistent issue that we encountered repeatedly was a significant delay in our approval processes to perform case studies in target areas with both dual credit participants and administrators. When our initial direct data collection efforts began to indicate that we would not be able to collect the desired information, we formulated a localized set of case studies that would provide information directly relevant to minority and low-income populations. Questions arose from performing specific quantitative analysis of data on dual credit. These questions were all intended components of our proposed case study.

This team was unable to successfully implement the proposed case studies, primarily because of a lack of timely approval through the Institutional Review Board (IRB). Had IRB approval been given earlier in the project timeline, the project team had steps outlined to travel to various counties/regional areas to perform case studies with various participant groups. The proposal specifically included case studies to be conducted in the Brownsville and El Paso areas; these are regions of high interest for the Greater Texas Foundation due to high concentrations of low-income and minority students. The failure to complete case studies in regards to dual credit

enrollment, participation and support limited any clarification we may have received from participants and administrators of dual credit in these regions.

Because of the advantages of clarifying information and opinions on dual credit that may not be explained in the data, it is our recommendation that future studies of dual credit in Texas include case studies as part of the research plan. Specifically, we recommend that two case study models should be a part of future research. One case study should target current participants of dual credit to analyze the present support, opinions and options that dual credit provides. The second case study will focus on past participants and administrators of dual credit to investigate how dual credit prepared them for postsecondary enrollment.

Implementation Practices

Perhaps one of our most important findings was that, regardless of geographic location, population density, or socioeconomic background, once a student was involved in dual credit opportunities, the level of involvement was fairly consistent across these categories. As a result, we would propose that the primary focus of education officials seeking to expand dual credit should be aimed at both increasing participation rates, and increasing the amount of credit earned by each participant.

In addition, we would like to suggest that future efforts to encourage dual credit participation should focus on urban populations over both town and rural locales. Despite anecdotal evidence of an increase in dual credit activity, our data show that urban areas are, by percentage, still trailing in participation rates. Further investment in dual credit programs in these areas could likely display profound results in both the short- and long-term.

Appendices

Appendix A: Average Semester Credit Hours Attempted and Participation Rates based on Locale, Economically Disadvantaged Populations, and Ethnic Minority Populations

Table 1. Average Semester Credit Hours Attempted, Dual Credit Participation, and Total Enrollment in the State of Texas in 2008, by Aggregated Local Code

Locale	Average Semester Credit Hours	Dual Credit Participation Rate	Total HS Enrollment	Percent of Population
City	7.36	4.14%	520,422	40.03%
Suburb	7.35	5.02%	336,066	25.85%
Town	7.93	7.92%	142,617	10.97%
Rural	7.28	6.94%	300,969	23.15%
Total	-	-	1,300,074	100.00%

Source: National Center for Education Statistics, Texas Higher Education Coordinating Board

Table 2. Average Semester Credit Hours Attempted, Dual Credit Participation, and Total Enrollment in 2008, by Expanded Local Code

Locale	Average Semester Credit Hours	Dual Credit Participation Rate	Total HS Enrollment	Percent of Population
City: Large	7.27	3.27%	325,725	25.05%
City: Mid-size	7.87	5.76%	107,049	8.23%
City: Small	6.92	5.39%	87,648	6.74%
Suburb: Large	7.40	4.55%	298,257	22.94%
Suburb: Mid-size	6.89	10.99%	17,430	1.34%
Suburb: Small	7.46	6.84%	20,379	1.57%
Town: Fringe	7.85	7.49%	46,330	3.56%
Town: Distant	7.84	8.43%	55,588	4.28%
Town: Remote	8.14	7.71%	40,699	3.13%
Rural: Fringe	6.97	6.05%	198,589	15.28%
Rural: Distant	7.64	8.04%	76,568	5.89%
Rural: Remote	7.82	10.55%	25,812	1.99%
Total	-	-	1,300,074	100.00%

Source: National Center for Education Statistics, Texas Higher Education Coordinating Board

Table 3. Average Semester Credit Hours Attempted, Dual Credit Participation, and Total Enrollment in Texas During Academic Year 2007 – 2008, by Minority Student Population Proportion

Quartiles (Minority student population percentage)	Average Semester Credit Hours	Dual Credit Participation Rate	Total HS Enrollment	Percent of Population
1 st quartile (≤30.1%)	7.21	7.14%	217,176	16.70%
2 nd quartile (30.1% - 57.8%)	7.69	6.29%	380,422	29.26%
3 rd quartile (57.8% - 88.5%)	6.91	4.22%	344,944	26.53%
4 th quartile (≥88.5%)	7.68	4.66%	357,532	27.50%
Total	-	-	1,300,074	100.00%

Source: National Center for Education Statistics, Texas Higher Education Coordinating Board

Table 4. Average Semester Credit Hours Attempted, Dual Credit Participation, and Total Enrollment in Texas During Academic Year 2007 – 2008, by Economically Disadvantaged Population Proportions

Quartiles (Economically disadvantaged population percentage)	Average Semester Credit Hours	Dual Credit Participation Rate	Total HS Enrollment	Percent of Population
1 st quartile (≤24.5%)	7.37	6.84%	349,463	26.88%
2 nd quartile (24.5% - 42.0%)	7.37	5.84%	377,027	29.00%
3 rd quartile (42.0% - 60.6%)	7.49	5.14%	305,794	23.52%
4 th quartile (≥60.6%)	7.58	3.36%	267,790	20.60%
Total	-	-	1,300,074	100.00%

Source: National Center for Education Statistics, Texas Higher Education Coordinating Board

Appendix B: Locale, Minority, Economically Disadvantaged Student Matrices

Table 1. Total Number of Campuses by Ethnic Minority Quartiles and Economically Disadvantaged Population Quartiles

		Minority Student Population Quartiles				
		1 st Quartile (<30.1%)	2 nd Quartile (30.1% - 57.8%)	3 rd Quartile (57.8% - 88.5%)	4 th Quartile (>88.5%)	Total
Economically Disadvantaged student Quartiles	1 st Quartile (<24.5%)	219	163	77	121	580
	2 nd Quartile (24.5% - 42.0%)	213	183	133	50	579
	3 rd Quartile (42.0% - 60.6%)	117	171	189	102	579
	4 th Quartile (>60.6%)	31	62	180	306	579
	Total	580	579	579	579	2,317

Source: National Center for Education Statistics

Table 2. Total High School Enrollment by Ethnic Minority Quartiles and Economically Disadvantaged Population Quartiles

		Minority Student Population Quartiles				
		1 st Quartile (<30.1%)	2 nd Quartile (30.1% - 57.8%)	3 rd Quartile (57.8% - 88.5%)	4 th Quartile (>88.5%)	Total
Economically Disadvantaged student Quartiles	1 st Quartile (<24.5%)	125,841	163,143	19,781	40,698	349,463
	2 nd Quartile (24.5% - 42.0%)	68,495	149,399	130,598	28,535	377,027
	3 rd Quartile (42.0% - 60.6%)	21,202	63,212	135,113	86,267	305,794
	4 th Quartile (>60.6%)	1,638	4,668	59,452	202,032	267,790
	Total	217,176	380,422	344,944	357,532	1,300,074

Source: National Center for Education Statistics

Table 3. Total Dual Credit Enrollment by Ethnic Minority Quartiles and Economically Disadvantaged Population Quartiles.

		Minority Student Population Quartiles				
		1 st Quartile (<30.1%)	2 nd Quartile (30.1% - 57.8%)	3 rd Quartile (57.8% - 88.5%)	4 th Quartile (>88.5%)	Total
Economically Disadvantaged student Quartiles	1 st Quartile (<24.5%)	9,410	9,177	850	4,464	23,901
	2 nd Quartile (24.5% - 42.0%)	4,548	10,411	5,195	1,883	22,037
	3 rd Quartile (42.0% - 60.6%)	1,478	4,111	6,152	3,967	15,708
	4 th Quartile (>60.6%)	65	246	2,343	6,331	8,985
	Total	15,501	23,945	14,540	16,645	70,631

Source: National Center for Education Statistics, Texas Higher Education Coordinating Board

Table 4. Total Number of Campuses by Locale and Ethnic Minority Quartiles.

		Minority Student Population Quartiles				
		1 st Quartile (<30.1%)	2 nd Quartile (30.1% - 57.8%)	3 rd Quartile (57.8% - 88.5%)	4 th Quartile (>88.5%)	Total
Locale	City	37	113	213	332	695
	Suburb	48	99	88	102	337
	Town	104	123	116	46	389
	Rural	391	244	162	99	896
	Total	580	579	579	579	2,317

Source: National Center for Education Statistics

Table 5. Total High School Enrollment by Locale and Ethnic Minority Quartiles.

Minority Student Population Quartiles						
Locale		1 st Quartile (<30.1%)	2 nd Quartile (30.1% - 57.8%)	3 rd Quartile (57.8% - 88.5%)	4 th Quartile (>88.5%)	Total
	City	17,450	115,152	153,610	234,210	520,422
	Suburb	56,428	118,885	85,715	75,038	336,066
	Town	39,834	53,996	36,310	12,477	142,617
	Rural	103,464	92,389	69,309	35,807	300,969
	Total	217,176	380,422	344,944	357,532	1,300,074

Source: National Center for Education Statistics

Table 6. Total Dual Credit Enrollment by Locale and Ethnic Minority Quartiles.

Minority Student Population Quartiles						
Locale		1 st Quartile (<30.1%)	2 nd Quartile (30.1% - 57.8%)	3 rd Quartile (57.8% - 88.5%)	4 th Quartile (>88.5%)	Total
	City	1,534	6,926	5,121	7,969	21,550
	Suburb	2,315	6,609	2,501	5,461	16,886
	Town	2,879	4,499	3,098	819	11,295
	Rural	8,773	5,911	3,820	2,396	20,900
	Total	15,501	23,945	14,540	16,645	70,631

Source: National Center for Education Statistics, Texas Higher Education Coordinating Board

Table 7. Total Number of Campuses by Locale and Economically Disadvantaged Population Quartiles.

Economically Disadvantaged Student Population Quartiles						
Locale		1 st Quartile (<24.5%)	2 nd Quartile (24.5% - 42.0%)	3 rd Quartile (42.0% - 60.6%)	4 th Quartile (>60.6%)	Total
	City	161	116	149	269	695
	Suburb	123	79	65	70	337
	Town	77	131	109	72	389
	Rural	219	253	256	168	896
	Total	580	579	579	579	2,317

Source: National Center for Education Statistics

Table 8. Total High School Enrollment by Locale and Economically Disadvantaged Population Quartiles.

Economically Disadvantaged Student Population Quartiles						
Locale		1 st Quartile (<24.5%)	2 nd Quartile (24.5% - 42.0%)	3 rd Quartile (42.0% - 60.6%)	4 th Quartile (>60.6%)	Total
	City	111,962	117,101	118,044	173,315	520,422
	Suburb	126,928	106,445	58,002	44,691	336,066
	Town	19,556	60,833	48,218	14,010	142,617
	Rural	91,017	92,648	81,530	35,774	300,969
	Total	349,463	377,027	305,794	267,790	1,300,074

Source: National Center for Education Statistics

Table 9. Total Dual Credit Enrollment by Locale and Economically Disadvantaged Population Quartiles.

		Economically Disadvantaged Student Population Quartiles				
Locale		1 st Quartile (<24.5%)	2 nd Quartile (24.5% - 42.0%)	3 rd Quartile (42.0% - 60.6%)	4 th Quartile (>60.6%)	Total
	City	8,579	5,432	3,562	3,977	21,550
	Suburb	7,014	5,127	2,651	2,094	16,886
	Town	1,721	4,865	3,936	773	11,295
	Rural	6,587	6,613	5,559	2,141	20,900
	Total	23,901	22,037	15,708	8,985	70,631

Source: National Center for Education Statistics, Texas Higher Education Coordinating Board

Appendix C: Four and Five Year Graduation Rates at Texas Institutions of Higher Education

Table 1. Four-year Graduation Rates in 2008 at Texas Institutions of Higher Education

Higher Education Institution	Dual credit students	Dual credit students (%)	Overall graduation rate (%)
Angelo State University	334	35.9	16.8
Lamar University	272	23.9	10.5
Midwestern State University	121	22.3	12.4
Sul Ross State University	50	26.0	9.7
Tarleton State University	341	32.8	17.4
Texas A&M University	2,639	51.1	46.7
Texas A&M University-Corpus Christi	291	32.3	22.1
Texas A&M University-Galveston	87	33.3	21.4
Texas A&M University-Kingsville	188	21.8	9.4
Texas Southern University	76	10.5	2.6
Texas State University-San Marcos	855	37.8	26.3
Texas Tech University	1,228	48.0	36.8
Texas Woman's University	120	42.5	26.0
University of Houston	658	21.6	13.7
University of Houston-Downtown	51	7.8	1.9
University of North Texas	617	29.7	21.7
University of Texas-Arlington	345	32.5	19.9
University of Texas-Austin	2,257	53.7	51.6
University of Texas-Dallas	223	48.9	44.5
University of Texas-El Paso	288	16.0	5.3
University of Texas-Pan American	863	25.6	13.9
University of Texas-Permian Basin	117	29.9	21.0
University of Texas-San Antonio	946	21.0	14.2
University of Texas-Tyler	108	25.0	19.1

Source: Texas Higher Education Accountability System, Texas Higher Education Coordinating Board

Table 2. Five-Year Graduation Rates in 2008 at Texas Institutions of Higher Education

Higher Education Institution	Dual credit students	Dual credit students (%)	Overall graduation rate (%)
Angelo State University	334	49.1	32.1
Lamar University	272	40.4	28.1
Midwestern State University	121	47.9	33.6
Sul Ross State University	50	40.0	17.9
Tarleton State University	341	51.0	38.9
Texas A&M University	2,639	80.1	76.2
Texas A&M University-Corpus Christi	291	54.0	43.2
Texas A&M University-Galveston	87	66.7	48.9
Texas A&M University-Kingsville	188	42.0	25.4
Texas Southern University	76	21.1	9.9
Texas State University-San Marcos	855	63.9	46.4
Texas Tech University	1,228	71.6	52.9
Texas Woman's University	120	64.2	46.5
University of Houston	658	46.8	35.8
University of Houston-Downtown	51	21.6	9.2
University of North Texas	617	55.9	44.0
University of Texas-Arlington	345	54.2	38.4
University of Texas-Austin	2,257	77.5	75.0
University of Texas-Dallas	223	66.4	60.6
University of Texas-El Paso	288	37.8	18.5
University of Texas-Pan American	863	45.0	30.4
University of Texas-Permian Basin	117	53.0	33.9
University of Texas-San Antonio	946	44.1	31.5
University of Texas-Tyler	108	48.1	37.5

Source: Texas Higher Education Accountability System, Texas Higher Education Coordinating Board

Appendix D: First-Year Persistence Rates at Texas Institutions of Higher Education

Table 1. One-Year Persistence Rates in 2008 of Dual Credit Students, Based on Two-Year Public Institutions where Dual Credit was Earned

Higher Education Institution	One-year persistence rate	Dual credit students
Texarkana C	80.6%	201
DCCCD Cedar Valley C	80.8%	261
Trinity Valley CC	81.5%	590
Weatherford C	81.9%	304
ACCD St. Philip's C	82.2%	516
Central Texas C	82.4%	290
DCCCD El Centro C	82.6%	121
Angelina C	82.9%	333
Frank Phillips C	82.9%	216
HCJCD Howard College	82.9%	286
Hill C	82.9%	375
Panola C	85.2%	155
Odessa C	86.1%	445
Coastal Bend C	86.4%	492
ACCD Palo Alto C	86.8%	614
Brazosport C	86.9%	434
South Texas C	86.9%	1,659
Western Texas C	86.9%	421
Clarendon C	87.2%	109
Midland C	87.6%	460
DCCCD North Lake C	87.7%	235
Vernon C	87.7%	155
Navarro C	87.8%	532
Lee C	87.9%	165
Paris JC	88.3%	386
Lamar SC-Orange	88.6%	149
Southwest Texas JC	88.8%	402
Amarillo C	88.9%	646
Collin County CCD	89.0%	510
LSCSD North Harris C	89.0%	482
McLennan CC	89.3%	420
C of the Mainland CCD	89.5%	275
Grayson CC	89.5%	172

Table 1 (Continued). One-Year Persistence Rates in 2008 of Dual Credit Students, Based on Two-Year Public Institutions where Dual Credit was Earned

Higher Education Institution	One-year persistence rate	Dual credit students
Texas Southmost C	89.5%	275
Galveston C	89.7%	155
DCCCD Richland C	90.4%	157
Temple C	90.5%	252
DCCCD Mountain View C	90.6%	191
Ranger C	90.6%	203
Austin CC	90.8%	1,385
ACCD NW Vista C	90.9%	693
El Paso CCD	90.9%	549
Lamar SC-Port Arthur	90.9%	77
Cisco C	91.0%	100
Del Mar C	91.0%	411
Houston CC	91.1%	1,330
DCCCD Eastfield C	91.3%	254
ACCD San Antonio C	91.8%	982
Blinn C	91.9%	445
Wharton County JC	92.4%	445
San Jac CC South	92.5%	159
LSCSD Tomball C	92.7%	491
DCCCD Brookhaven C	92.9%	113
Victoria C	93.0%	243
LSCSD Montgomery C	93.1%	393
North Central Texas C	93.6%	280
Alvin CC	93.7%	237
LSCSD Kingwood C	93.7%	505
San Jac CC North	93.8%	112
San Jac CC Central	93.9%	412
South Plains C	95.5%	399
LSCSD Cy-Fair C	97.7%	692

Source: Texas Higher Education Accountability System, Texas Higher Education Coordinating Board

Appendix E: Glossary

Average Semester Credit Hours: Calculated by dividing the total number of dual credit hours earned in one academic year and divided by the number of dual credit students in a particular category of interest.

Economically Disadvantaged: In this report, economic disadvantage is equated to qualification for free or reduced lunch.

Locale: The locale, urban-centric code categories are defined by the National Center for Education Statistics. Locale codes are divided into four main locale types (city, suburb, town, and rural) and each of the four locale types has three subtypes (large, midsize, and small for city and suburb locale types and fringe, distant, and remote for town and rural locale types). All school campuses within the state of Texas are classified as one of the following twelve locale codes.

City, Large: Territory inside an urbanized area and inside a principal city with population of 250,000 or more.

City, Midsize: Territory inside an urbanized area and inside a principal city with population less than 250,000 and greater than or equal to 100,000.

City, Small: Territory inside an urbanized area and inside a principal city with population less than 100,000.

Suburb, Large: Territory outside a principal city and inside an urbanized area with population of 250,000 or more.

Suburb, Midsize: Territory outside a principal city and inside an urbanized area with population less than 250,000 and greater than or equal to 100,000.

Suburb, Small: Territory outside a principal city and inside an urbanized area with population less than 100,000.

Town, Fringe: Territory inside an urban cluster that is less than or equal to 10 miles from an urbanized area.

Town, Distant: Territory inside an urban cluster that is more than 10 miles and less than or equal to 35 miles from an urbanized area.

Town, Remote: Territory inside an urban cluster that is more than 35 miles of an urbanized area.

Rural, Fringe: Census-defined rural territory that is less than or equal to 5 miles from an urbanized area, as well as rural territory that is less than or equal to 2.5 miles from an urban cluster.

Rural, Distant: Census-defined rural territory that is more than 5 miles but less than or equal to 25 miles from an urbanized area, as well as rural territory that is more than 2.5 miles but less than or equal to 10 miles from an urban cluster.

Rural, Remote: Census-defined rural territory that is more than 25 miles from an urbanized area and is also more than 10 miles from an urban cluster.

Persistence: One year persistence refers to the occurrence of a student remaining in school from the fall of the first semester of matriculation to the fall of the second year the student is enrolled in a higher education institution.

Appendix F: Annotated Bibliography

Ashburn, Elyse. 2007. "High-School Students Are Helped by Taking College Courses, Study Finds." *The Chronicle of Higher Education*, 17 October.

<<http://chronicle.com/article/Dual-Enrollment-Programs-Ea/102/>> (9 June 2011).

Summary:

Students who take college courses while in high school are more likely than their peers to graduate, to go on to college, and to do well in college. So says this article from the Chronicle of Higher Education. The courses appear to be especially beneficial for male students, students from low-income families, and those who struggled academically in high school, according to a report on the study.

Bailey, Thomas R., Katherine L. Hughes, and Melinda Mechur Karp. 2002. "What Role Can Dual Enrollment Programs Play in Easing the Transition Between High School and Postsecondary Education?" *The Journal for Vocational Special Needs Education* 24(3):18-29.

Summary:

This paper discusses the relationship between the coordination of high school exit and college entry standards, and Tech Prep. However, the bulk of this paper is devoted to a discussion of dual enrollment and policy implications associated with program growth.

Barnett, Elisabeth. 2010. "Research on Three College Readiness Programs." *League for Innovation in the Community College Annual Conference 2010*.

<http://ccrc.tc.columbia.edu/DefaultFiles/SendFileToPublic.asp?ft=pdf&FilePath=c:\Web\sites\ccrc_tc_columbia_edu_documents\332_768.pdf&fid=332_768&aid=47&RID=768&pf=Publication.asp?UID=768> (9 June 2011).

Summary:

This power point report discusses three ways in which to implement dual credit options (dual enrollment programs, middle-early college high schools, and career pathways). This is an important work, particularly in regards to some of the statistical information involved in the case studies (Florida, etc). Findings included the fact that "male and low-income students benefitted more from dual enrollment participation than their peers."

Bernet, Barbara. 2010. "A two-for-one program: Students can get associate degree with diploma." *Amarillo Globe News (Texas)*, 27 September.

<<http://amarillo.com/news/localnews/2010-09-27/two-one-program>> (12 April 2011).

Summary:

This news article features the dual enrollment program at Highland Park ISD and Amarillo College. Highlighted in the article is the possibility of achieving an associate degree along with a high school diploma upon graduation.

Bhatt, Monica. 2009. "Dual Credit Programs: State Definitions and Policies." *Institute of Education Sciences*. <<http://www.dpi.state.wi.us/sspw/pdf/gradsummitdualcredit.pdf>> (14 March 2011).

Summary:

This brief examines state policies around dual credit as requested by the Indiana Commission for Higher Education. The majority of state definitions accept AP and IB courses, as well as courses taught either on a high school or postsecondary campus or via virtual technology. A preliminary policy scan did not yield any states that have yet adopted a core dual credit curriculum, though further research may be needed to determine the extent to which states are employing a core dual credit curriculum in practice.

Brake, Nick, et al. 2005. "Student Participation and Performance in Dual-Credit Courses in a Reform Environment." *Community College Journal of Research and Practice* 29(3):199-213.

Summary:

A study investigated the role and impact of dual-credit programs in the reform of postsecondary education in Kentucky. Data were obtained from all Kentucky high school students enrolled in dual-credit courses in the Kentucky Community and Technical College System during the fall 2000 and fall 2001 semesters. The results reveal that more students are enrolling and succeeding in dual-credit courses and that the participation rates of students from underserved populations are also increasing. These results indicate the efficacy of Kentucky's policies on dual-credit to help institutions meet the state's reform goals for access and achievement in higher education.

Brazosport College. 2011. "Brazosport College Information Request Page." <http://longview.brazosport.edu/StuInfoRequests/#FAQ_7> (9 June 2011).

Summary:

This is an informational page from Brazosport College that includes a description of the difference between "dual credit" and "concurrent enrollment" courses.

Calderone, Shannon. 2010. "Cost Perceptions and College-Going for Low-Income Students." *Institute for Higher Education Policy*. <<http://www.docstoc.com/docs/73508423/COST-PERCEPTIONS-AND-COLLEGE-GOING-FOR-LOW-INCOME-STUDENTS>> (12 April 2011).

Summary:

This brief highlights the research on the role of "cost perceptions" on low-income students' college-going and features tangible advice from ACCESS College Foundation experts.

Career Vision. 2009. "Head Start on College: Dual Credit Saves Time and Money." <http://www.careervision.org/about/Head_Start_on_College.htm> (25 May 2011).

Summary:

This article offers a brief overview about the benefits of dual credit, including saving time and money on college.

Chronicle of Higher Education. 2006a. "Report Describes Growing Appeal of Dual Enrollment." 15 March. <<http://chronicle.com/article/Report-Describes-Growing-Ap/36705/>> (9 June 2011).

Summary:

The Education Commission of the States' High School Policy Center has published a short report, "Dual Enrollment: Policy Issues Confronting State Policymakers," that describes why and how more states are establishing dual-enrollment programs, in which high-school students take college-level courses and earn college credit. The report claims that such programs reduce remediation rates once students get to college, increase the academic rigor of high schools over all, and enhance the alignment of high-school curricula with college standards. As examples, the report cites dual-enrollment programs in Florida, Minnesota, New York, Utah, and Washington.

Chronicle of Higher Education. 2006b. "New Report Features Dual-Enrollment Programs That Help High-Schoolers Excel." 30 October. <<http://chronicle.com/article/New-Report-Features-Dual-En/37780/>> (9 May 2011).

Summary:

High-school students who take college-level courses graduate from high school and succeed in college at higher rates than classmates who do not take such courses, according to this report that profiles 22 programs, schools, and policies that foster such dual-enrollment approaches, including Advanced Placement classes, Tech Prep, and early-college high schools. The report, "The College Ladder: Linking Secondary and Postsecondary Education for Success for All Students," was released by the American Youth Policy Forum, a nonprofit, nonpartisan professional-development group in Washington, and was financed by the Lumina Foundation for Education.

Communities Foundation of Texas. 2009. "College and Career Readiness for All Texas High School Graduates." <<http://www.earlycolleges.org/Downloads/Hidalgo.pdf>> (9 May 2011).

Summary:

This is a case study of Hidalgo ISD and the steps their schools are taking, in conjunction with local colleges, to prepare their students for college and the workplace. Emphasis is put on the technical and vocational classes that are available to students not planning to enter postsecondary educational institutions, as well as on the college-emphasis curriculum of high school students. This report highlights a success story involving dual enrollment in a predominantly low-income and minority area of Texas.

Cullen, Amber. 2010. "Chapel Hill school board candidates address issues." *Daily Tribune*, 20 October. <<http://www.dailytribune.net/articles/2010/10/20/news/wednesday03.txt>> (9 May 2011).

Summary:

This news article details the stances local candidates for school board in Chapel Hill, TX. Toward the end of the article there is a detailed discussion of each candidate's stance on local dual enrollment programs – a good source for current attitudes among local education and policy professionals regarding dual enrollment programs on a local level.

Dallas Morning News. 2010. "Q&A: Which is best for you: AP or dual credit?" 4 November. <<http://www.dallasnews.com/news/education/headlines/20101104-QandA-Which-is-best-for-5806.ece>> (9 June 2011).

Summary:

This story from the Dallas Morning News discusses the benefits and downsides of Advanced Placement and dual credit options in general and within the Texas-specific context.

Del Mar College. 2011. "Where High Schools Intersect with Del Mar College." <<http://www.delmar.edu/dualcredit/purpose.html>> (9 May 2011).

Summary:

This is an explanation from Del Mar College's home page about their dual credit program for students. Of particular importance is a bullet-point explanation of why dual credit from Del Mar College is useful, including affordability for students, convenience of classes (at college, at high school, and online), as well as several other factors.

Eklund, Julie A. 2009. "Exploring Dual Credit Data Alignment, Student Populations, and Coursework Patterns in Texas Using a P-16 Framework." <<http://repositories.lib.utexas.edu/handle/2152/6869>> (24 March 2011).

Summary:

This multi-faceted study of dual credit programs in Texas used a P-16 framework, the author explored alignment issues that influence the delivery of dual credit programs and the tracking of dual credit participants in Texas. A review of dual credit partnership agreements between high schools and colleges, an analysis of dual credit course crosswalks, interviews with secondary and postsecondary dual credit coordinators, and a cross-agency analysis of state-level dual credit data provided insight into data and program alignment concerns. Longitudinal data revealed differences in dual credit course taking populations over time, including growth in the number of economically disadvantaged and underrepresented minority students who took advantage of dual credit opportunities. Study findings emphasized the value of improving dual credit data reporting and course alignment practices. Important state-level goals were identified as ensuring: students have access to rigorous, quality programs; that educators and policy-makers have access to accurate data; and that dual credit partnerships maintain the flexibility to innovate and respond to student needs while preserving program quality and equity.

Friedman, Lawrence, et al. 2011. "Research Study of Texas Dual Credit Programs and Courses." American Institutes for Research.
<<http://www.tea.state.tx.us/WorkArea/linkit.aspx?LinkIdentifier=id&ItemID=2147499085&libID=2147499082>> (9 May 2011).

Summary:

This is a report commissioned by the Texas Education Agency and released in two parts in the first months of 2011. It gives a detailed report of the current status of dual credit education in the state of Texas and provides key information and data relating to minority and low-income student status in relation to dual credit programs.

FOX News Austin. 2011. "Education Edge: Dual Credit Programs." 10 January.
<http://www.myfoxaustin.com/dpp/good_day/Education-Edge%3A-Dual-Credit-Programs-20110110-ktbcgd#> (9 May 2011).

Summary:

This is an article from FOX News in Austin describing the various pros and cons of dual credit in the state of Texas, specifically focusing on the increase in enrollment rates and other specific items related to dual credit programs.

Gardenhire-Crooks, Alissa, et al. 2010. "Terms of Engagement: Men of Color Discuss Their Experiences in Community College." *MDRC*, March.
<<http://www.mdrc.org/publications/547/full.pdf>> (9 May 2011).

Summary:

This report focuses on the experience of African-American males taking remedial classes in Community Colleges on a national scale. Though the report and analysis does not directly address dual enrollment, it does discuss the need to create environments in high schools that provide a better platform for minority students to prepare for college, of which dual credit is one option.

Giguere, Bryan. 2010. "Winnsboro in Wood County considers joining NTCC district." *The Winnsboro News (Texas)*, 22 Decemeber.
<<http://www.dailytribune.net/articles/2010/12/22/news/wednesday03.txt>> (9 May 2011).

Summary:

This is an article detailing discussions in the Mt. Pleasant area of Texas between a local community college system and the local ISD – the ISD is contemplating inclusion in the community college district. This is of particular relevance because "...benefit[s] include more dual credit offerings to high school students at WISD. Currently, students can complete up to 12 hours of college credit before graduation, compared to high school students in the NTCC district who have the opportunity to take up to 30 hours of credit at a reduced rate."

Gonzalez, Jennifer. 2010. "Helping Students Complete Degrees On Time." *The Chronicle of Higher Education*, 6 October. <http://chronicle.com/article/Helping-Students-Complete/124839/?sid=pm&utm_source=pm&utm_medium=en> (9 May 2011).

Summary:

This article outlines the increasing tendency for students to take more than the historical average of four years to complete an undergraduate degree. This is an important topic as one of the justifications for dual credit, in addition to student preparation for college, is the possibility of graduating in less than four years in order to save on financial and time costs.

Greater Texas Foundation. 2010. "Foundation Supports Texas Higher Education Coordinating Board." <<http://greatertexasfoundation.org/?p=2797>> (9 May 2011).

Summary:

Greater Texas Foundation provides a link to the Texas Higher Education Coordinating Board and their Closing the Gaps Initiative. The first goal of the initiative is to close the gaps in Participation and one way in which they plan to do so is to "make the Recommended High School Program (college preparatory courses) the standard curriculum in Texas public schools" and make it a requirement for entrance to college. The Closing the Gaps Initiative has several more goals, all with aspects of dual enrollment involved.

Hamilton, Reeve. 2010. "Students in Poor Counties Get Creative Opportunities." *The New York Times*, 23 December. <http://www.nytimes.com/2010/12/24/us/24tcking.html?_r=1> (9 May 2011).

Summary:

This New York Times article from the Fall of 2010 deals specifically with Hidalgo, TX, and other poor or minority-prominent areas, focusing on the educational opportunities available in those areas. In particular, it deals directly with dual credit opportunities and gives one example of a student from Hidalgo who has been taking dual credit courses since sophomore year of high school and is now enrolled at the University of Michigan.

Harnish, Dorothy and Richard L. Lynch. 2005. "Secondary to Postsecondary Technical Education Transitions: An Exploratory Study of Dual Enrollment in Georgia." *Career and Technical Education Research* 30(3):169-88.

Summary:

An exploratory study of credit-based transition programs was conducted to better understand the processes, outcomes, facilitators, and barriers to high school student access to and continuation in postsecondary education. This qualitative case study research examined characteristics and operations of dual enrollment programs and their link to key transition outcomes to address the question: Do credit-based-transition programs, specifically dual enrollment, facilitate college access and success for students who participate in them? Research questions focused on organization, participation, and outcomes of dual enrollment in the state of Georgia. Findings from site visits to technical colleges and high schools address emerging issues in organization, staffing, credit policies, funding, collaboration, student characteristics and motivation, programs of study, barriers to student access, benefits to student, follow-up, and program outcomes.

Help and Teach Our Children. 2011. "Straighterline And The Bridge School Partner To Offer High School Students Dual Enrollment For Online College Courses." 14 January. <<http://usteacher.biz/2011/01/straighterline-and-the-bridge-school-partner-to-offer-high-school-students-dual-enrollment-for-online-college-courses/>> (9 May 2011).

Summary:

This is an online article detailing the improvements in the dual credit plans offered between The Bridge School in Houston, TX and Straighterline, a dual-credit organization that works with high school and colleges around the country to offer accredited dual credit classes to high school students for college credit. Of particular note is a discussion of the development of dual credit programs in the Houston, TX, area.

Hoffman, Nancy and Amy Robins. 2005. "Head Start on College: Dual Enrollment Strategies In New England 2004-2005." *Jobs for the Future*, June. <<http://www.jff.org/publications/education/head-start-college-dual-enrollment-strat/247>> (9 May 2011).

Summary:

A report by Jobs For the Future provides a full, detailed review of specific dual-enrollment strategies that were undertaken in the New England area between 2004 and 2005. As the report states (2005):

This report focuses on dual enrollment programs serving young people who may not consider themselves 'college bound.' It poses questions about whether dual enrollment could—or should—be developed as an approach to increasing the number of college graduates in the region. A program guide, included in the report, profiles 19 dual enrollment partnerships, with vignettes from each New England state.

Holloway, Karel. 2010. "Not all colleges accept dual-credit hours amassed by Texas high school students." *The Dallas Morning News*, 4 November.
<<http://www.dallasnews.com/sharedcontent/dws/news/localnews/stories/110410dnmetdualcred.20d026e.html>> (9 May 2011).

Summary:

This article details how some universities and colleges aren't accepting dual credit classes as core curriculum, but instead as elective courses or some students are even encouraged to retake the class. In addition, there are inconsistencies with dual credit course acceptance outside Texas or at private institutions. Students are lured to dual credit courses by the prospect of saving money, allowing more time for classes of interest in college.

Houston Community College. 2010. "Houston Community College Dual Credit Partnership Agreement." <<http://www.hccs.edu/hccs/dual-credit-partnership-agreement--02>> (12 April 2011).

Summary:

This is a partnership agreement from Houston Community College to enroll area high school students in dual credit classes through HCC. Specific requirements are included.

Hughes, Katherine. 2010. "Dual Enrollment: Postsecondary/Secondary Partnerships to Prepare Students." *Journal of College Science Teaching* 31(6):12-13.

Summary:

This report details the successful implementation of nation-wide dual enrollment strategies. It is a short perspective paper on what national programs have been successful, such as bridging the gap between secondary and postsecondary institutions and improving student success in postsecondary education, and what can be done to continue to improve such programs on a nation-wide basis.

Hughes, Katherine L. and Melinda Karp. 2008. "Study: Dual Enrollment Can Benefit a Broad Range of Students." *Techniques: Connecting Education & Careers* 83(7):14-17.

Summary:

The article, released by the Community College Research Center (CCRC), reports on the benefit contributed by the dual enrollment programs to the broad range of students in the U.S. It notes that the programs, which allow high school students to enroll in college courses and earn college credit, offers a positive influence to the students in career and technical education. It notes that the career and technical education students involved in the program had better educational outcomes.

Hughes, Katherine and Dan Williams. 2009. "Providing College Credits and a College Pathway: Partnership Academies and Concurrent/Dual Enrollment." *California Partnership Academies (CPA) 21st Annual Conference*, 27 March. <http://ccrc.tc.columbia.edu/DefaultFiles/SendFileToPublic.asp?ft=pdf&FilePath=c:\Web\ccrc_tc_columbia_edu_documents\332_678.pdf&fid=332_678&aid=47&RID=678&pf=Publication.asp?UID=678> (9 May 2011).

Summary:

This power point format report highlights the success of dual enrollment in California schools. Several case studies are conducted and findings include such things as 97% of high school students take a CTE-dual enrollment course, the average number of course credits earned is 4, CTE-specific dual enrollment programs help students stay in school.

Institute for Higher Education Policy. 2009. "Cost Perceptions and College-Going for Low Income Students." <<http://inpathways.net/COST%20PERCEPTIONS%20AND%20COLLEGE-GOING%20FOR%20LOW-INCOME%20STUDENTS.pdf>> (9 May 2011).

Summary:

This research brief outlines the common problems associated with college for low-income students. Some of the primary points include delaying college after high school in order to pay for continued education, having to work 30+ hours per week in order to support their education, assuming much greater debt due to postsecondary education, and more.

Jackson, Kim. 2010. "Victory Center expected to be focal point for job training." *Ultimate Spring (Texas)*, 21 October. <<http://www.ultimatespringtx.com/stories/7257776-victory-center-expected-to-be-focalpoint-for-job-training>> (9 May 2010).

Summary:

This is an article on the creation of an educational facility in the Houston, TX area that focuses on preparing people for jobs and college. Of specific interest is (2010, online),

Approximately 25,000 square feet [that] will be devoted to the LSC-Carver Center's Victory Early College Program, which was created three years ago in partnership with the Aldine Independent School District. That program is housed on the second floor of the existing LSC-Carver Center, which is in an Aldine ISD-owned building, 2330 S. Victory St. Students in the program take traditional high school courses, dual credit courses and college-only courses at both LSC-Carver Center and LSC-North Harris. The Victory Early College and Carver Center classes will relocate to the new site when it opens.

Jobs for the Future. 2008a. "State Action Urged to Help Raise Graduation Rates, Better Prepare Students in Struggling Schools." 22 May. <<http://www.jff.org/media/news-releases/2009/state-action-urged-help-raise-graduation/805>> (9 May 2011).

Summary:

This article details a Jobs for the Future Report on five specific ways in which states can increase enrollment rates in colleges and graduation rates in high schools. Of note, the first suggested commitment is to,

Create a high school diploma that signifies college- and work-readiness. While a number of factors can affect whether a student completes college, completion of a high-intensity and high-quality program of study has a significant impact on the later success of low-income and minority students. State policymakers need to develop ways to monitor course content, student achievement, and course-taking patterns while also encouraging opportunities for innovation at the local level. Dual enrollment and other forms of college course-taking in high school should be considered.

Jobs for the Future. 2008b. "States Are Expanding Dual Enrollment Policies To Reach Underserved Populations, Increase College Success." 29 May. <<http://www.jff.org/media/news-releases/2008/states-are-expanding-dual-enrollment-pol/42>> (9 May 2011).

Summary:

This article discusses a report that provides educators and policy-makers a guide to creating dual enrollment programs in high schools that are not only for gifted students but also for low-income and minority students who may not have the means for a college education readily available. Something of particular interest in the article and report is that (2011, online),

The report notes that in states that offer dual enrollment programs at no cost to students, 10 to 30 percent of juniors and seniors take part and earn college credit. Not only do college courses increase a student's college readiness, but free college credits make earning a postsecondary degree or credential more affordable. Both these benefits are key for students on the bottom of the economic ladder who are far less likely to earn a postsecondary credential than students in middle- and upper-income families.

Jobs for the Future. 2010. "Largest Innovative School Network in U.S. Celebrates Success of its 210 Schools: Early College High Schools Make College a Reality for 46,000 Students Nationwide." 22 April. <<http://www.jff.org/media/news-releases/2010/largest-innovative-school-network-us-cel/1052>> (9 May 2011).

Summary:

Released by Jobs for the Future (JFF) in 2008, this report discusses the Early College High School Initiative, a coalition of 210 schools around the nation geared specifically toward providing graduating students with a head-start on their college education. The educational institutions incorporate dual-enrollment into their curriculum in order to help high school students prepare for college and, as the article states, "The average early college graduate earns 23 free college credits even before they receive a high school diploma" (2010, online).

Johnson, Todd E. and Michael Brophy. 2006. "Dual Enrollment: Measuring Factors for Rural High School Student Participation." *The Rural Educator* 28(1): 25.

Summary:

The purpose of this study was to explore why 162 rural area high school students participate in the dual enrollment program. Dual enrollment programs allow high school students to enroll in college courses for credit prior to high school graduation with local school districts covering the cost of tuition. Participants were students at local colleges from two rural agricultural counties from Washington State. Exploratory factor analysis revealed that dual enrollment participation was related to academics, financial, social, and choice reasons. Results showed no significant differences between 11th and 12th grade participants regarding financial and choice reasons to participate. However, statistically significant differences were found regarding academic and social reasons for participation. Implications for rural educators and recommendations for future research regarding dual enrollment programs are discussed.

Karp, Melinda, et al. 2007. "The Postsecondary Achievement of Participants in Dual Enrollment: An Analysis of Student Outcomes in Two States Study." National Research Center for Career and Technical Education, University of Minnesota.

Summary:

This report addresses the efficacy of dual enrollment programs and seeks to answer several questions regarding its effectiveness using arduous quantitative methods by examining the impact of dual enrollment participation for students in the State of Florida and in New York City. Postsecondary outcomes for participating CTE students were examined in both location. In Florida, there is also an examination of the outcomes of dual enrollment participation for all students. The report concludes that dual enrollment is a useful strategy for encouraging postsecondary success for all students, including those in career and technical education (CTE) programs.

Karp, Melinda M., & Jeong, D. W. 2008. "Conducting research to answer your questions about dual enrollment." *Community College Research Center*, March.
<http://ccrc.tc.columbia.edu/DefaultFiles/SendFileToPublic.asp?ft=pdf&FilePath=c:\Web\ccrc_tc_columbia_edu_documents\332_591.pdf&fid=332_591&aid=47&RID=591&pf=Publication.asp?UID=591> (23 March 2011).

Summary:

This paper introduces research on dual enrollment. Dual enrollment, in which high school students take college courses, is an increasingly popular educational program. As states and local education authorities (LEAs) devote resources to this initiative, it is important to evaluate the effectiveness of these investments. Doing so presents unique challenges, however, because the data and analytic requirements of evaluating dual enrollment require coordination among individual high schools, LEAs, postsecondary institutions, and states. These challenges can be overcome, and the effort it takes to do so is well worth the financial and human investment. This summary is intended to help decision-makers understand why research is important and how policymakers can support research activities.

Katy ISD. 2010. "Saving Money: Why AP and Dual Credit Make Financial Sense for College." <<http://www.katyisd.org/gt/Dual%20Credit%20/Why%20AP%20and%20Dual%20Credit%20Make%20Financial%20Sense.pdf>> (9 May 2011).

Summary:

This presentation lays out an argument, supported by data from Katy (TX) ISD in favor of AP and dual enrollment programs at the high school level. The point of the report is to show how college preparation in high school creates a more advantageous financial atmosphere for students able to take advantage of dual enrollment opportunities.

Kelly, Andrew, et al. 2010. "Rising to the Challenge: Hispanic Graduation Rates as a National Priority." *American Enterprise Institute*, March. <<http://www.aei.org/docLib/Rising-to-the-Challenge.pdf>> (9 May 2011).

Summary:

In an ongoing study, the American Enterprise Institute (AEI) highlights the issues involved in Hispanic graduation rates from postsecondary institutions around the country. Kelly et al. (2010, 1) found, "At the average college or university, 51 percent of Hispanics complete a bachelor's degree in six years compared to 59 percent of white students at those same schools." This report looks specifically at nation-wide minority graduation rates and the reasons for lower success numbers than non-minorities.

Keng, Leslie and Barbara Dodd. 2008. "A Comparison of College Performances of AP and Non-AP Student Groups in 10 Subject Areas." New York: The College Board.

Summary:

This report sought to compare the performance of students in the College Board Advanced Placement Program compared to non-AP students on a number of college outcome measures. In this study, ten individual AP Exams were examined of students in four entering classes (1998–2001) at the University of Texas at Austin. The four main groups of students compared included AP students who earned college credit with their AP Exam grade (AP Credit), AP students who did not earn college credit with their AP Exam grade (AP No Credit), non-AP students who were concurrently enrolled in a college-level course while they were still in high school (Concurrent), and a group of non-AP students that were matched on high school academic achievement to the AP Credit students (Non-AP). The college outcome measures included first-year credit hours and GPA, subject or subject area credit hours and GPA, overall college credit hours and GPA, and sequent course grade. Results showed that for each of the 10 individual AP Exam subjects, AP Credit students consistently outperformed non-AP students of similar academic ability in all college outcome measures. Concurrent students generally earned more college credit hours in the related subject area than the other groups of students. However, the Concurrent group's average GPAs in those related subject courses were no higher than those of the other groups. The study's results support previous research that showed that AP students performed as well if not better than non-AP students on most college outcome measures. These findings imply that the results found in these previous studies still apply, even with the rapid expansion of the AP Program.

Kerrigan, Monica R. and Doug Slater. 2010. "Collaborating to Create Change: How El Paso Community College Improved The Readiness of Incoming Students Through Achieving the Dream." *Community College Research Center and MDRC*, March.
<<http://ccrc.tc.columbia.edu/Publication.asp?UID=754>> (9 May 2011).

Summary:

This report focuses on El Paso community colleges and their relationship with local school districts in improving college readiness of high school students. This report looks at the successful interaction between postsecondary and secondary school entities in this region and the steps that they have taken to better prepare high school students for the college educational experience.

Kileen Daily Herald. 2010. "Coryell & Lampasas Counties Year in Review." 25 December.
<<http://www.kdhnews.com/news/story.aspx?s=48106>> (9 May 2011).

Summary:

This is a brief overview of two Texas counties and some of the major work being done there. Specifically, there is a comment about a local County Higher Education Center that "began classes this year with the end goal of bringing higher education within easier reach for people in Lampasas County. The center aims to offer not only dual-credit courses, but degree and technical plans through several partner institutions" (2010, online).

Kim, Johyn. 2008. "The Impact of Dual and Articulated Credit on College Readiness and Total Credit Hours in Four Selected Community Colleges: Excerpts from a Doctoral Dissertation Literature Review." 14 July.
<http://occr1.ed.uiuc.edu/Publications/papers/Dual_credit_review_JK_7_14_08.pdf> (9 May 2011).

Summary:

This paper provides a review of literature related to dual credit and the influence of dual credit on student outcomes in college. The first section reviews terms and definitions associated with dual credit, the history of dual credit policy and program implementation, and advantages and issues related to dual credit. The next section examines the relationship between dual credit and tech prep. Many similarities exist between those two programs in the definition and goal of each program. One of the primary goals of the two programs is to enhance the students' transition from secondary to postsecondary institutions. The third section reviews the literature on the background of students who participate in dual credit. The last section summarizes the literature about the influence of dual credit participation on student outcomes in college, indicated as college readiness, retention, and academic performance.

Krueger, Carl. 2006. "Dual Enrollment: Policy Issues Confronting State Policymakers."
Education Commission of the State Policy Brief.

Summary:

This policy brief includes an overview of dual enrollment around the country. In particular, the brief covers the need, the controversy, basics, growth, impact, and access of dual enrollment. Dual enrollment state examples from Florida, Minnesota, New York, Utah, and Washington are also discussed. The brief concludes with research-based policy considerations.

Kumar, Divya. 2011. "Credit Courses Provide Varying Amounts of Benefits to Students."
Coppell Student Media (Texas), 12 January.
<<http://www.coppellstudentmedia.com/2011/01/12/credit-courses-provide-varying-amounts-of-benefits-to-students/>> (9 May 2011).

Summary:

This article from a Coppell, TX, school newspaper details the benefits and costs of high school dual credit classed. Several administrators are quoted in a brief but fairly thorough explanation of the dual credit system is provided.

Lewis, Morgan V. and Laura Overman. 2008. "Dual and Concurrent Enrollment and Transition to Postsecondary Education." *Career and Technical Education Research* 33(3):189-202.

Summary:

Dual and concurrent enrollments enable students to earn postsecondary credits while still in high school. The 2006 Perkins legislation encourages such enrollments as a component of programs of study. There is evidence that students who earn dual enrollment credits have slightly (typically 4% to 5%) more positive outcomes in postsecondary education than similar students who do not. These effects, however, may be due to self-selection into dual credit courses. The modest advantages associated with dual enrollment may not be sufficient to justify the effort to develop and implement such programs.

Lowe, Adam. 2010. "Promoting Quality: State Strategies for Overseeing Dual Enrollment Programs." National Alliance for Concurrent Enrollment Partnerships, <http://nacep.org/wp-content/uploads/2010/10/NACEP_Promoting_Quality_Report_2010.pdf> (9 May 2011).

Summary:

This NACEP report gives a brief overview and discussion of quality control mechanisms utilized by 6 states in their dual enrollment programs. The report is clear in pointing out that there are several types of dual enrollment programs, including but not limited to AP courses in high schools, distance education, college courses taught in high schools, and courses taught in colleges. For their purposes, the NACEP uses the term "dual enrollment" as an umbrella under which all such programs fall.

Lubbock Avalanche-Journal. 2010. "Vroonland: We must do all we can to keep education funded." 22 December. <<http://lubbockonline.com/editorials-columnists/2010-12-19/vroonland-we-must-do-all-we-can-keep-education-funded>> (25 May 2011).

Summary:

This is an opinion piece written by the superintendent of Frenship, TX, regarding the education situation in Texas in general. He makes reference in the article to the growth of dual credit courses and opportunities that have arisen over the past few years in the state.

Mace, Lesley. 2009. "Dual Enrollment: An Instructor's Perspective." *International Review of Economics Education* 8(1): 32-47.

Summary:

This paper addresses common arguments for and against dual enrollment from an instructor's perspective. Teaching college classes in a high school setting can present challenges for both students and their instructors; the paper focuses on frequent issues that occur and proposes solutions to ease the transition process. Evidence is also presented to answer the criticism that high school students are unprepared for college work; results from several dual enrollment Economics courses confirm that these students can not only succeed at the college level while still in high school, but in many cases outperform students in the tradition

Mathews, Jay. 2011. "No Dual Enrollment on Challenge Index This Year." *The Washington Post*, 21 January. <http://voices.washingtonpost.com/class-struggle/2011/01/no_dual_enrollment_on_challeng.html> (9 May 2011).

Summary:

This article from the Washington Post describes some of the major issues concerning data collection on dual credit programs throughout the country. Differences in reporting by colleges and high schools and by area affect the overall data that is available to, in this case, rate schools on such an index.

My Harlingen News. 2010. "Gov. Perry Speaks at Texas State NAACP Annual Convention." 8 October. <<http://www.myharlingennews.com/?p=14974>> (9 May 2011).

Summary:

This news article outlines a speech by Governor Perry. It details several ways in which Texas is moving forward in ensuring affordable and accessible education. The article does not contain an in-dept analysis on dual credit, but it does touch on the Virtual School Network, which provides greater access for dual enrollment classes for Texas students.

Nichols, Paula. 2010. Hearing on Dual Credit, Texas 81st Session Interim.

Summary:

This testimony is from Paula Nichols, Executive Director of the Division of Distance Learning at Lamar University, in Beaumont, Texas. Nichols has been responsible for the dual credit programs since 1995 and the university has administered these programs for more than 20 years.

Planty, Michael and Stephen Provasnik. 2007. "High School Course Takings: Findings from the Condition of Education 2007." *National Center for Education Statistics, Department of Education*. <<http://nces.ed.gov/pubs2007/2007065.pdf>> (14 March 2011).

Summary:

The report includes 48 indicators in five main areas: (1) enrollment trends and student characteristics at all levels of the education system from early childhood education to graduate and first-professional programs; (2) student achievement and the longer term, enduring effects of education; (3) student effort and rates of progress through the educational system among different population groups; (4) the contexts of elementary and secondary education in terms of courses taken, teacher characteristics, and other factors; and (5) the contexts of postsecondary education. In addition, it includes a special analysis that examines changes in student coursetaking in high school using national transcript data from 1982 to 2000.

Ruark, Mike. 2011a. "Big Country Community Colleges Keep on Growing." *Reporter News*, 2 January. <<http://www.reporternews.com/news/2011/jan/02/big-country-community-colleges-keep-on-growing/>> (25 May 2011).

Summary:

This is an article detailing how several Texas-area community colleges have experienced significant growth in the past year or more. Of particular significance is the boost in enrollment attributed to dual credit participants: "Most of the growth was at the Big Spring and San Angelo campuses, with growing dual credit and technical education programs."

Ruark, Mike. 2011b. "Ranger College Funding, Half of State's Financial Aid, Cut from Texas' Proposed Budget." *Reporter News (Texas)*, 19 January. <<http://www.reporternews.com/news/2011/jan/19/ranger-college-funding-half-of-states-financial/>> (25 May 2011).

Summary:

This article explains the dual credit and education system in general in regards to state educational budget cuts should Ranger College not receive necessary funding. Such cuts could adversely affect the ability of the college to provide distance and dual credit opportunities to area high school students.

Rubenstein, Jayme. 2008. "Two Community Colleges Win National "Excellence Award," *Jobs for the Future*, April. <<http://www.jff.org/media/news-releases/2008/two-community-colleges-win-nationalexce/806>> (1 March 2011).

Summary:

JFF provides an article on two community colleges that received national recognition for "their ability to demonstrate determined leadership, innovative programming, and attention to outcomes." Of particular interest is the success of South Texas College, located in McAllen, TX. According to this article, South Texas College has become an effective collaborator, sponsoring annual summits on "College and Career Readiness" that bring together K-12 administrators, college representatives, and residents. It has initiated a range of effective programs to support the transition to college, including tuition-free college courses for more than 6,000 "dual enrollment" high school students. (2008, online).

Rupkalyis, David. 2010. "NCTC Reports Rapid Growth." *The Graham Leader (Texas)*, 12 November. <<http://www.grahamleader.com/index.asp?Story=20720>> (25 May 2011).

Summary:

This article discusses the increase in dual enrollment participation at North Central Texas College. Of particular note is the analysis of why there has been, at the time of publishing, such dynamic growth in dual credit enrollment both across the state and in particular at NCTC.

Scott, Laurel L. 2010. "Technology is Essential to Veribest Turnaround." *Standard Times (San Angelo, Texas)*, 18 December.

<<http://www.gosanangelo.com/news/2010/dec/18/technology-is-essential-to-veribest-turnaround/>> (12 April 2011).

Summary:

This article discusses the resurgence of a San Angelo-area high school that used technology to return itself to educational prominence in the state. Specifically, "with the technology upgrades, Veribest has been able to fully participate in distance learning. Every junior or senior is allowed to take dual-credit courses through Howard College. Fifty-two percent of the seniors and 70 percent of the juniors took courses for college credit this fall. Over two years, a student could earn up to 40 hours of credit.

Shieh, Pattie. 2011. "Perry's Education Plan May Be Too Bold." *MyFOXHouston.com*, 8 February. <<http://www.myfoxhouston.com/dpp/news/politics/110208-perrys-education-plan-may-be-too-bold>> (12 April 2011).

Summary:

This article is a synopsis of the education initiatives included in Governor Perry's State of the State address. In particular, it references Governor Perry's challenge to institutions to keep Bachelor degrees to a cost of no more than \$10,000. Further, the Governor asserts this can be done using online courses, dual credit or advanced placement classes and innovative teaching techniques.

Shulruf, B. 2009. "A Dual admission model for equity in higher education: a multi cohort longitudinal study." *World Conference on Educational Sciences – New Trends and Issues In Educational Sciences* 1(1): 2416-2420.

Summary:

This study tests a new model entitled "Dual Admission Model" which aims to enhance equity and equality in higher education while addressing many of the ethical dilemmas associated with affirmative action admission policies. Data of three consecutive national cohorts of New Zealand secondary school graduates were used to establish and test the effectiveness of a range of admission models. These datasets include achievements from secondary school assessments and data from the first year at the university. The predictability of the first year university GPA was calculated for different alternative admission models based on the NCEA features. The effect of these admission models on different groups of students was measured across three student leaving cohorts. It was found that the best models give greater weight to the quality of the assessments (i.e. higher grades) and less weight to quantity (i.e. credit accumulation) and particular combinations of subject choices. It was also found that by combining the new model with the current admission model (Dual Admission Model) provides a merit-based admissions system, which would potentially increase the number of under-represented students (e. g. lower socioeconomic communities) while maintaining their success in the university academic programs. These findings were consistent across all cohorts. It is suggested that this Dual Admission Model (DAM) will increase participation and success in degree programs for students from traditionally underrepresented groups without having to apply any affirmative action admission policy.

Smith, Diane. 2010. "Lake Worth freshmen get early start on college at Marine Creek Collegiate High School at TCC." *Star Telegram (Texas)*, 7 November. <<http://www.star-telegram.com/2010/11/07/2612210/lake-worth-freshmen-get-early.html>> (9 June 2011).

Summary:

This news article details the specifics of enrollment in an early college high school in the Lake Worth, TX area. It discusses the benefits of earning college credits before entry into a four-year institution (costs, time, learning skills) as well as possible obstacles to earning that same credit, including maturity level and availability.

Southern Education Foundation. 2010. "The Worst of Times: Children in Extreme Policy in the South and Nation." <<http://www.southerneducation.org/pdf/TWOT-Extreme%20Child%20Poverty%20Rpt-Final.pdf>> (25 May 2011).

Summary:

This report highlights the disparity in educational resources and postsecondary access and success of low-income locations and students. It highlights Texas as a state with extremely high numbers of poverty-stricken students (1 out of 10 children lives in "extreme poverty"). This resource expresses the need for educators and policy-makers to take into account the needs of low-income areas in regards to increasing postsecondary opportunities in Texas.

Southern Regional Education Board. 2009. "Fact Book on Higher Education, 2009." <http://www.sreb.org/page/1123/fact_book_on_higher_education.html> (14 March 2011).

Summary:

The Fact Book includes data on the population and economy, enrollment, degrees, student tuition and financial aid, faculty and administrators, revenue and expenditures. More than 90 tables provide detailed information on colleges and universities in SREB states, plus other regional and national data. In all but the specialized cases of data based on SREB's regional survey, figures for each of the 50 states are available online.

Straighterline. 2010. "Straighterline And The Bridge School Partner To Offer High School Students Dual Enrollment For Online College Courses." <<http://www.straighterline.com/press-releases/2010/06/straighterline-and-the-bridge-school-partner-to-offer-high-school-students-dual-enrollment-for-online-college-courses.cfm>> (9 June 2011).

Summary:

This site offers an explanation of the dual enrollment opportunities provided by StraighterLine (a course of study) and The Bridge School (an online education institution based in Houston, TX). "The Bridge School is the first high school to partner with StraighterLine to offer high school students the ability to take college courses while still in high school. This program will provide high school students with college credits and save them thousands of dollars on their college degrees. In addition to being reviewed by partner colleges, StraighterLine courses have been evaluated and recommended by the American Council on Education's (ACE) Credit Recommendation Service and have met or exceeded the Distance Education and Training Council's standards for online course quality."

Swanson, Joni. 2010. "Dual Enrollment: The Missing Link to College Readiness." *Principal Leadership* 10(7):42-46.

Summary:

Dual enrollment programs have sparked the interest of educational researchers and practitioners who want to determine whether offering college courses to high school students might positively affect their persistence in college or other postsecondary education. Current research suggests that participating in dual enrollment programs improves students' likelihood of continuing on and completing degrees in postsecondary education. By earning college credits while in high school, students are more likely to earn a benchmark level of credits before the end of the first year of college. High-quality instruction and assessment, supported by implementation standards, will help ensure that high school students receive credit for college-level courses that are taught in their high schools. Local school district personnel play a vital role in the health and vitality of dual enrollment programs. The author contends that for all participants to have confidence in the quality and viability of dual enrollment programs, rigorous quality standards--such as those promoted by National Alliance of Concurrent Enrollment Partnerships (NACEP) and endorsed by increasing numbers of state legislatures—are essential.

Swanson, Joni Lynne. 2008. "An analysis of the impact of high school dual enrollment course participation on postsecondary academic success, persistence and degree completion." <<http://nacep.org/wp-content/uploads/2010/02/Dissertation-2008-Joni-L.-Swanson.pdf>> (25 March 2011).

Summary:

The study explored several possible impacts of high school dual enrollment course participation on postsecondary persistence and degree completion. This research sought to identify dual enrollment participants' likelihood of acquiring college credits, of continuously enrolling through the second year in college, of graduating with bachelor's degrees in less than 4.56 years, and of earning postsecondary credentials. Results showed students who gained college credits through dual enrollment were more likely to enter college immediately after high school and persist to the second year in postsecondary education. Dual enrollment participants who demonstrated academic momentum (early acquisition of credit and immediate entry to college) were also more likely to complete a bachelor's degree or advanced degrees. Dual enrollment participation provided students with experiences that may have changed their outlooks on achieving a bachelor's degree.

Texas Association of Community Colleges. 2011. "Dual Credit Texas." <<http://www.dualcredittexas.org/>> (9 June 2011).

Summary:

This dual credit source is a collaboration of Texas community colleges and contains a wealth of information on dual credit options throughout the state as well as explanations of what dual credit is and how to be a part of that system.

Texas Comptroller of Public Accounts. 2011. "Demographics." <<http://www.window.state.tx.us/specialrpt/tif/population.html>> (1 March 2011).

Summary:

This website includes an overview of the demographics of Texas.

Texas Education Agency. 2008. "Advanced Placement and International Baccalaureate Examination Results in Texas 2006-2007." August.

<http://ritter.tea.state.tx.us/research/pdfs/ap-ib_2006-07.pdf> (12 April 2011).

Summary:

This report examines Advanced Placement (AP) and International Baccalaureate (IB) participation and performance in Texas during the 2006-07 school year. The percentage of Texas public school 11th and 12th grade students participating in AP and IB examinations was higher than in previous years. In 2006-07, the percentages of AP examinees and examinations with scores of 3-5 and the percentages of IB examinees and examinations with scores of 4-7 decreased from the previous year. Higher percentages of Asian/Pacific Islander and White students earned AP scores of 3-5 than African American and Hispanic students. A higher percentage of Asian/Pacific Islander students earned IB scores of 4-7 than other student groups. Participation in AP examinations by Texas public and nonpublic school students combined increased more rapidly than participation nationally between 1986-87 and 2006-07. In 2006-07, the percentages of AP examinations with scores of 3-5 in public and nonpublic schools decreased from the previous year in Texas and in the United States.

Texas Higher Education Coordinating Board. 2008. "Dual Credit Overview." 2008.

<<http://www.thecb.state.tx.us/reports/PDF/1514.PDF?CFID=547550&CFTOKEN=5875610>> (14 March 2011).

Summary:

This brief is an overview of dual credit: outcomes, participation rates, funding, courses, eligibility requirements, and evaluations/improvements.

Texas Insider. 2010. "Perry Presents Dallas Teacher Prestigious Milken Educator

Award." 20 October. <<http://www.texasinsider.org/?p=35943>> (9 June 2011).

Summary:

This news article describes an award ceremony for a Dallas-area teacher, touching on several initiatives that the Texas government is taking in regards to dual enrollment, including "Expansion of the Virtual School Network (VSN) to create the Texas Virtual High School that will provide students who have dropped out of school an opportunity to earn a high school diploma through virtual courses, while improving access to high-quality courses for all students. The VSN was created during the 2007 Legislative Session to establish a statewide network of online courses available to students across the state. These virtual courses give students access to classes their schools may not offer, additional access to dual credit opportunities, and additional flexibility to help keep students in school."

Texas P-16 Council. 2007. "Study on dual credit programs in Texas: a report to the 80th Legislature."

Summary:

Report including recommendations to public schools following the passage of House Bill 1 in the 79th Legislature. The legislation included a provision requiring each school district by the Fall 2008 semester to implement a program under which students may earn the equivalent of at least 12 semester credit hours of college credit in high school. The report recommends a series of directives to prepare schools for this implementation, containing: curriculum alignment, the inclusion of best practices on institution websites, initiating a study to address funding issues, particularly for economically-disadvantaged students, and an annual report on dual credit.

Texas State Technical College. 2011. "Letting Go Is Never Easy."
<<http://www.tstc.edu/parents/home>> (9 June 2011).

Summary:

This is from the home page of Texas State Technical College in Waco, TX. It explains to parents that students can take courses in high school that will count toward their degree from TSTC. It also provides a link to an expanded explanation of dual credit.

Texas Valley Communities Foundation. 2009. "Understanding the Perception of College Readiness in the Rio Grande Valley of Texas."

<http://www.getencore.org/docs/ENCORE_Research_Report_2009.pdf> (25 May 2011).

Summary:

This report describes the current educational awareness in the Rio Grande Valley of Texas. Of particular importance is the discussion of high school students' college readiness in the Rio Grande Valley, an area with historically low-income and minority demographics.

Tipton, Lisa. 2010. "TYC Campus in Brownwood: A New Outlook." *Brownwood News (Texas)*, 12 November.

<http://www.brownwoodnews.com/index.php?option=com_content&view=article&id=3675:tyc-campus-in-brownwood-a-new-outlook-photos&catid=36:life&Itemid=59> (25 May 2011).

Summary:

This article discusses a youth correctional facility in Brownwood, TX that offers dual credit classes for the high-school aged students at the facility, in conjunction with several local colleges. Included is a brief analysis of what constitutes dual credit and how students within a correctional facility can make use of credits.

University of New Mexico-Taos. 2011. "Frequently Asked Questions."
<<http://taos.unm.edu/dualcredit/faqs.html>> (25 May 2011).

Summary:

This is an overview of the statewide dual credit program following the passage of SB943 (2007) and SB31 (2008). The new law created a dual credit program that allows public high school students in school districts, charter schools and state-supported schools in the state to earn both high school and college credit for qualifying dual credit courses.

University of North Texas. No Date. "Dual Credit Module for Texas Career and Technical Education."

<http://www.cte.unt.edu/home/admin_corner/Dual_Credit_092208.pdf> (9 June 2011).

Summary:

This module discusses the ways in which to successfully implement dual credit programs in the state of Texas. Included in the module is a full discussion and outline of what constitutes dual credit within the state as well as a step-by-step description of how to create a dual credit program within a individual campus that will comply with state mandates and college credit transfer rules.

University of Texas, Brownsville. 2010. "Memorandum of Understanding for the Awarding of Dual Credit."

<<http://www.utb.edu/vpaa/dual/Documents/NewForms/MEMORANDUM%20OF%20UNDERSTANDING.pdf>> (25 May 2011).

Summary:

This is a standardized memorandum of understanding between the University of Texas at Brownsville and Texas Southernmost College and any participating ISD, detailing the terms of dual credit transfer and dual credit program participation with and between the academic institutions.

Waits, Tiffany, J. Carl Setzer, and Laurie Lewis. 2005. "Dual credit and exam-based courses in U.S. public high schools, 2002-03." *U.S. Dept. of Education, Institute of Education Sciences, National Center for Education Statistics, Washington, D.C.*

Summary:

This report contains information from a national survey on baseline information regarding the prevalence and characteristics of dual credit courses. The survey also collected information on two types of exam-based courses, Advanced Placement (AP) and International Baccalaureate (IB). Survey respondents were selected by the school's principal and were typically the school's director of guidance counseling. The survey findings most closely address dual credit saturation. The report includes detailed statistics on dual credit and exam-based course locations, students, and course descriptions.

Wessels, Billy. 2010. "FWISD helping students get more out of high school." *The 109 (Texas)*, 22 November. <<http://www.the109.org/fort-worth-isd/story/2010/11/4209.fwisd-helping-students-get-more-out-high-school>> (25 May 2011).

Summary:

This news story gives information about a Fort Worth ISD dual credit program that encourages students to participate in dual enrollment programs, called the "Gold Programs of Choice." The program allows for students to take college and technical level courses through partnerships with local institutions.

Williams, Jermaine F. 2010. "Early college academic performance: Studying the effects of earning college credits from advanced placement and dual enrollment." *Dissertation Abstracts International Section A: Humanities and Social Sciences* 71(2-A): 420.

Summary:

This quantitative study examined the impact of Advanced Placement (AP) and Dual Enrollment (DE) on early college academic performance by analyzing and comparing first year and sophomore year persistence rates and grade point averages (GPAs) of four student cohorts who began their education at a large urban research I university in fall 2007. These cohorts of fall 2007 first year and first time college admits comprise students who earned college credits in high school by participation in Credit Based Transition Programs (CBTPs), specifically AP and DE, and students who did not earn college credits during high school. These programs were specifically created and implemented to introduce students to the rigors of college and ease the academic and social transition from high school to college. Statistical analyses presented results showing no statistically significant difference in early college academic performance amongst the cohorts in the study.

Williams, Kim. 2010. "Superintendent Otto Prepares for Legislative Action." *Plano Star Courier (Texas)*, 13 December. <http://www.scntx.com/articles/2010/12/13/plano_star-courier/news/401.txt> (25 May 2011).

Summary:

An article from Plano, TX detailing a local superintendent's proposed fight to lessen the state-wide controls on his district's graduation requirements. The current 4x4 plan, he argues, is overly regulatory on the district. Of specific note, he suggests waiving one of the class required final exams in favor of completion of an approved dual credit course.

Work, Ann. 2010. "Senate Committee Offers Advice to Colleges." *Times Record News (Wichita Falls, Texas)*, 19 December. <<http://www.timesrecordnews.com/news/2010/dec/19/advice-to-colleges-fdgfdgdfgdf-its-a-practical-t/>> (25 May 2011).

Summary:

This is an article detailing a report from the Texas Senate Higher Education Interim Committee on various education-related fronts. Specifically, this report includes a recommendation to educators to encourage "the use of dual credit courses for high school students but stressed that whenever possible, students should be brought to the college campus and taught there."

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