ABSTRACT

Texas Hispanic Students Attending Texas Community Colleges:
Institutional Characteristics Influencing Enrollment and Graduation

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This quantitative study used the college choice nexus developed by St. John, Paulsen, and Starkey (1996) to explore how the predictor variables of average total cost of attendance (AVGCOA), average federal/state/local financial aid awarded (AVGFA), local Hispanic population (LHISPOP), and percentage of Hispanic faculty (PERHFAC) explain the two dependent variable outcomes of Hispanic students enrolling (PERHENR) and graduating (HISPGRPER) from a Texas community college. The population for this quantitative study was the 66 Texas public community colleges selected from the IPEDS Data Center online search tool. Institutions selected for this analysis were only those whose Carnegie Classification 2005 equaled Associate's—Public.

There were four specific research questions for this study. The first two asked how well the predictor variables explain the enrollment and graduation rates of Texas Hispanic students at Texas community colleges. Multiple regression was utilized to answer the first two research questions. Two linear equations were generated; one for each dependent variable.

To answer the last two research questions, commonality analysis sought to determine which predictor variable was most useful in explaining the variance in Hispanic enrollment and graduation. Commonality analysis allowed the researcher to identify the combined and unique usefulness of individual variables, or sets of variables, in explaining variance accounted for in the designated dependent variable.

This research concluded that the four predictor variables would be beneficial in explaining Hispanic enrollment but not Hispanic graduation in similar populations. It further concluded that the percent of Hispanic faculty uniquely accounts for the majority of variance in Hispanic enrollment and that the local Hispanic population percentage accounted for the majority of the variance in Hispanic graduation percentages.

This research was conducted to provide useful information to the Texas Higher Coordinating Board and the Texas Legislature that would assist in the development of strategies that would help Texas attain the goals outlined in Closing the Gaps 2015.

Texas Hispanic Students Attending Texas Community Colleges:
Institutional Characteristics Influencing Enrollment and Graduation

by

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A Dissertation

Approved by the Department of Educational Administration

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in some way that I owed this to them as much as anyone because of their investment in me.

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CHAPTER ONE

Introduction

This research discusses the challenges the state of Texas faces in educating the ever growing Hispanic population attending 66 Texas public 2-year colleges. Attention was given to the institutional characteristics that influence Hispanic students' decisions to enroll in – and eventually graduate from – those institutions. In April 1999, the Texas Higher Education Coordinating Board (THECB) appointed a committee to develop a new higher education plan. As a product of this committee, the Texas Higher Education Coordinating Board created "Closing the Gaps: 2015" (CTG) to meet the challenges related to the enrollment, retention, and graduation of the Texas population, including the exponentially increasing Hispanic population. This plan was approved by the THECB in October 2000.

Since articulating its goals, the THECB has experienced some success with regard to postsecondary participation by White and African American populations. However, the agency revised its goals in 2006, and again in 2010; partly because of its observations related to Hispanic enrollments (Texas Higher Education Coordinating Board, 2010). The percent of Texans participating in higher education increased overall from 5.0% in the fall of 2000 to 5.4% in the fall of 2008. This increase was encouraging, but the highest gains in postsecondary enrollment occurred in the White and African American populations. Given that Hispanic students are usually the most economically disadvantaged and have the highest dropout rates, the challenge to increase enrollment for Hispanic students is daunting (Texas Higher Education Coordinating Board, 2010).

The Progress Report issued in July 2010 indicated that Hispanic participation and success was well below the target in July 2009 and July 2010 (Texas Higher Education Coordinating Board, 2010). The Hispanic enrollment shortfall accounted for more than the total enrollment increase needed to reach the participation goals of Closing the Gaps (Texas Higher Education Coordinating Board, 2010). This means that in order to meet the goals of Closing the Gaps 2015, the enrollment of non-Hispanic students would need to remain stable, and the enrollment of Hispanic students would need to increase to 310,000 new students.

The Problem Statement

The problem this research explores is that the current number of Texas Hispanic students attending 66 Texas community colleges does not meet THECB established goals related to enrollment, retention, and graduation rates. If this trend continues, the state could realize devastating economic and societal consequences. It is reasonable to expect that a growing undereducated population would not only contribute to an untrained and potentially underemployed work force, but would also negatively impact the state's ability to retain current businesses and attract technologically advanced industries (Texas Higher Education Coordinating Board, 2000).

Purpose of the Study

The purpose of this study was to determine how well selected institutional characteristics explain the variance in enrollment rates for Hispanic students attending the 66 Texas community colleges. Another aim of this research was to determine how well selected institutional characteristics explain the variance in the graduation rates for

Hispanic students attending the 66 Texas community colleges. Whatever the reason influencing the decision (i.e., cultural, academic, financial), the Hispanic population in Texas is not meeting the enrollment goals outlined in Closing the Gaps. The 84.7% increase in bachelor's, associate's, and certificate degrees (BACs) earned by Hispanics between FY 2000 and FY 2009 is good progress and important; but to reach the 2015 target of 67,000 awards, Texas Hispanic students must earn 23,842 (55.2%) more BACs (Texas Higher Education Coordinating Board, 2006).

Research Questions

The population for this quantitative study was the 66 Texas public community colleges selected from the Integrated Postsecondary Education Data System (IPEDS) Data Center online search tool. Institutions selected for this analysis were only those whose Carnegie Classification 2005 equaled Associate's—Public. All of these institutions participate in federal Title IV financial aid, even though that was not a selection criterion. Institutional characteristics were selected on the basis of prior research indicating they played a role in the enrollment, retention, and graduation of Hispanic students. The predictor variables for this quantitative study and the abbreviations used throughout the study include:

- average total cost of attendance (AVGCOA)
- average federal/state/local financial aid awarded (AVGFA)
- percentage of Hispanic faculty (PERHFAC)
- local Hispanic population (LHISPOP)

The dependent variables are determined or influenced by another variable, and are related to Hispanic student retention and graduation. They were selected on the basis of prior research indicating their impact on Hispanic student enrollment and graduation.

The dependent variables included:

- Hispanic graduation percentage (HISPGRPER)
- Percentage of Hispanic enrollment (PERHENR)

The specific research questions for this study are as follows:

1. How well do the predictor variables of average total cost of attendance (AVGCOA), average federal/state/local, and institutional grants (AVGFA), local Hispanic population (LHISPOP), and percentage of Hispanic faculty (PERHFAC) explain the retention of Texas Hispanics at Texas community colleges?
2. How well do the predictor variables of average total cost of attendance (AVGCOA), average federal/state/local, and institutional grants (AVGFA), local Hispanic population (LHISPOP), and percentage of Hispanic faculty (PERHFAC) explain the graduation rates of Texas Hispanics at Texas community colleges?
3. Which predictor variable is the most useful in explaining the variance in Hispanic enrollment?
4. Which predictor variable is the most useful in explaining the variance in Hispanic graduation rates?

To answer the above research questions, multiple regression was used to determine how well the predictor variables explained the variance in each of the

dependent variables. Two linear equations were generated; one for each dependent variable. Subsequent commonality analyses were employed in order to determine each predictor variable's unique and combined usefulness in explaining effect size of each regression model.

Theoretical Framework

St. John, Paulsen, and Starkey's (1996) college choice nexus provided the theoretical framework for this study. The college choice nexus is simply stated as if a particular variable, such as financial aid, increases the likelihood of a matriculation decision, that same variable may also influence the likelihood of a persistence decision and/or how intervening factors influence this decision. This nexus construct could apply to a range of college choice-persistence interactions; the social reasons for choosing a college could influence the social integration process; the academic reasons for choosing a college could influence the way students integrate academically; the financial reasons for choosing a college could influence college affordability; and all three sets of reasons could interact in a comprehensive model (St. John, Paulsen, and Starkey, 1996).

This study used the college choice nexus to explore how the predictor variables of average total cost of attendance, average federal/state/local financial aid awarded, local Hispanic population, and percentage of Hispanic faculty explain Hispanic students enrolling and graduating from a Texas community college. The population for this quantitative study was the 66 Texas public community colleges selected from the IPEDS Data Center online search tool. Institutions selected for this analysis were only those whose Carnegie Classification 2005 equaled Associate's—Public. The data studied are at the institutional level.

Study Significance

Considering the identified strategies used by the Texas Higher Education Coordinating Board (THECB) to increase Hispanic enrollment and persistence, it is reasonable to examine their appropriateness and potential for success. Identifying the institutional characteristics that impact Hispanic student enrollment, persistence, and graduation is important, but these characteristics must be juxtaposed against the THECB solutions proposed for meeting its Hispanic enrollment goals. For instance, to increase access to community colleges in Texas for Hispanic students, the THECB is trying to create a financial framework to provide payment of the tuition and fees for all needy students (Texas Higher Education Coordinating Board, 2000). The success of CTG for the state of Texas is critical to the long-term economic health of the state. One would assume that for Texas to continue to be competitive with other states or countries that the state's population would need to have the skills necessary to fill jobs created in Texas. Otherwise, the companies will move to other states or countries that can provide an educated workforce. On its face, the availability of adequate financial assistance in the form of financial aid (AVGFA) would certainly seem to be a logical predictor of student enrollment and graduation, especially in disadvantaged populations. This would also be true if the cost of attendance (AVGCOA) for those students was affordable. Therefore, one would expect that the predictor variables of AVGFA and AVGCOA to be a good test for the college choice nexus of St. John, Paulsen, and Starkey (1996) when applied to the 66 selected community colleges in this research study. One would also expect that the THECB's desire to provide a financial framework to assist all needy students would support the college choice nexus.

Limitations

This study focused only on a limited number of financial factors affecting the enrollment and persistence of Hispanic students. The data are also specific to Texas community colleges. The ability to generalize findings to other states, except those with large Hispanic populations where attitudes and the environment toward Hispanic college attendance are similar, is limited. The data do not include private 2-year colleges that may be able to offer additional financial incentives. In order to achieve a common variable, only the cost of attendance numbers for in-district, off-campus students were used. Many Texas community colleges do not have on-campus housing so they do not develop or report those cost of attendance figures.

Another limitation would be the use of aggregated or grouped values for the predictor variables. The college choice nexus is based on the likelihood of an individual decision to enroll and persist. This research used institutional level data where all of the student's choices are aggregated into a number, usually expressed as a percentage. Robinson (1950) called them ecological correlations and states that they are often used simply because correlations between the properties of individuals are not available. Such was the case when the data for this study were collected. It is not uncommon for the interpretation of data to not be consistent with the expected outcome. Pedhazur (1997) disagrees and states that one may be interested in ecological correlations for their own sake so Robinson's claim that the interest is always in individual correlations is not supportable, although it was well stated.

Delimitations

A delimitation of this study is that its scope focused on the 66 Texas community colleges that were eligible for federal financial aid and met the Carnegie Classification 2005 for public 2-year colleges offering an associate's degree. Also excluded were the state's 4-year and private institutions whose cost of attendance would be much higher, thus making comparisons between them ill-advised.

Another delimitation of this study is that the findings will result from the regression of only four predictor institutional characteristics and two dependent variables. The exclusion of certain variables will create some bias in the outcome of this study.

Definitions of Key Terms

The following terms/words are prevalent in this research and are defined as follows:

1. *Asian:* A person having origins in any of the original peoples of the Far East, Southeast Asia, or the Indian Subcontinent; including, for example, Cambodia, China, India, Japan, Korea, Malaysia, Pakistan, the Philippine Islands, Thailand, and Vietnam (U.S. Department of Education, 2011).
2. *Average cost of attendance (AVGCOA):* The average cost to attend a Texas community college; including tuition, fees, room, board, books, personal, and miscellaneous expenses.
3. *Average federal/state/local grant aid awarded (AVGFA):* The average amount of federal, state, and local grant aid awarded to undergraduate students. Grant aid includes grant or scholarship aid received from the federal government, a state or local government, the institution, and other sources

known by the institution (IPEDS, Spring 2010, Student Financial Aid component).

4. *BAC Awards:* Bachelor's Degrees, Associate's Degrees, and Certificates
5. *Black:* A person having origins in any of the black racial groups of Africa (U.S. Department of Education, 2011).
6. *Closing the Gaps 2015:* The plan created by the Texas Higher Education Coordinating Board in 2000 to meet the four goals of: 1) closing the gaps in participation; 2) closing the gaps in success; 3) closing the gaps in excellence; and 4) closing the gaps in research.
7. *College Choice:* The decision made by a student to select a specific institution for initial or continuing enrollment.
8. *Collinearity:* Implies that two variables are near perfect linear combinations of one another. When there is a perfect linear relationship among the predictors, the estimates for a regression model cannot be uniquely computed. Tolerance and variance inflation factors are used to check for collinearity (UCLA, 2012). Pedhazur (1997) states that the larger the VIF, the larger the standard error of the regression coefficient in question. Accordingly, it has been proposed that large VIF's be used as indicators of regression coefficients adversely affected by collinearity.
9. *Commonality Analysis:* A technique that analyzes both the unique and common variance that two or more predictor variables explain in a dependent variable. Specifically, it considers the relationship that a particular

independent variable has with a specified dependent variable (Seibold & McPhee, 1979).

10. *Commonality Analysis Terms:* U equals the unique variance accounted for by variables a and b. C represents the combined variance accounted for by a and b (Si, 2001).
11. *Cook's D:* A measure of influence of an observation that is proportional to the sum of the squared differences between predictions made with all observations in the analysis and predictions made leaving out the observation in question (Lane, 2007).
12. *Correlation coefficient:* A degree of relationship which is computed using two sets of scores from a single group of participants. It provides an estimate of how related the variables are (Gay and Airasian, 2003).
13. *Ecological correlations:* Taking individual data and grouping the data to make inferences from correlations based on the aggregated data (Robinson, 1950).
14. *Effect size:* Generally thought of as the magnitude of an experimental effect. For regression designs, indicators include r^2, and R^2 (Morgan, Reichert, and Harrison, 2002).
15. *Eigenvalue:* The variances of the principal components. A low eigenvalue is an indication of problems with multi-collinearity (UCLA, 2012). Expressed as λ (lambda), the eigenvalue is the characteristic root of the matrix whose determinant is set equal to zero (Pedhazur, 1997).

16. *ENLACE:* Engaging Latino Communities for Education. ENLACE is a multi-year W.K. Kellogg Foundation initiative designed to strengthen the education pipeline and increase opportunities for Latino students to enter and complete college (National Center for Community and Education Partnerships, 2004).
17. *Expected family contribution (EFC):* The EFC is the amount of financial resources a student and/or family could reasonably be expected to provide to help pay for college expenses as determined by results of the Free Application for Federal Student Aid (FAFSA).
18. *Financial need:* The amount of eligibility for financial aid calculated by subtracting the student's expected family contribution as determined by the results of a submitted Free Application for Federal Student Aid (FAFSA) from the students' cost of attendance. (Cost − EFC = Need)
19. *Full-time enrollment:* A student enrolled for 12 or more semester credits, or 12 or more quarter credits, or 24 or more contact hours a week each term (IPEDS, Spring 2009, Student Financial Aid component).
20. *FY:* Fiscal year for Texas (September 1 through August 30).
21. *GEAR UP:* Gaining Early Awareness for Undergraduate Programs. A U.S. Department of Education program that provides 6-year grants to states and partnerships to provide services at high-poverty middle and high schools for cohorts of students beginning no later than the seventh grade and following the cohort through high school (U.S. Department of Education, 2011).

22. *Graduation Rate:* Graduation rate of first-time, full-time degree- or certificate-seeking Hispanic students – 2000 cohort (4-year institutions) and 2003 cohort (2-year institutions). The graduation rate is the rate required for disclosure and/or reporting purposes under Student Right-to-Know. This rate is calculated as the total number of completers within 150% of normal time divided by the revised cohort minus any allowable exclusions (U.S. Department of Education, 2011).
23. *Hispanic:* A person of Mexican, Puerto Rican, Cuban, Central or South American or other Spanish culture or origin, regardless of race (U.S. Department of Education, 2011).
24. *Hispanic graduation percentage (HISPGRPER):* The Hispanic graduation rate at each Texas community college.
25. *Influence:* An observation is said to be influential if removing the observation substantially changes the estimate of coefficients. Influence can be thought of as the product of leverage and outliers (UCLA, 2012).
26. *IPEDS: Integrated Postsecondary Education Data System:* The Integrated Postsecondary Education Data System (IPEDS), established as the core postsecondary education data collection program for the National Center for Education Statistics (NCES), is a system of surveys designed to collect data from all primary providers of postsecondary education. IPEDS is a single, comprehensive system designed to encompass all institutions and educational organizations whose primary purpose is to provide postsecondary education. The IPEDS system is built around a series of interrelated surveys to collect

institution-level data in such areas as enrollments, program completions, faculty, staff, finances, and academic libraries (U.S. Department of Education, 2011).

27. *Leverage:* An observation with an extreme value on a predictor variable. Leverage is a measure of how far an observation deviates from the mean of that variable. These leverage points can have an unusually large effect on the estimate of regression coefficients. Generally, a point with leverage greater than (2k+2)/n should be carefully examined where k is the number of predictors and n is the number of observations (UCLA, 2012).
28. *Multiple Regression:* Multiple regression is a flexible method of data analysis that may be appropriate whenever a quantitative variable (the dependent or criterion variable) is to be examined in relationship to any other factors (expressed as predictor or predictor variables). Relationships may be nonlinear, independent variables may be quantitative or qualitative, and one can examine the effects of a single variable or multiple variables with or without the effects of other variables taken into account (Cohen, Cohen, West, & Aiken, 2003).
29. *Multiple Regression Linear Equation:* $Y = a + b_1X_1 + b_2X_2 + \ldots + b_kX_k + e$ where Y equals the score on the dependent variable, a equals the intercept or the point where the regression line crosses the Y axis, b equals the unstandardized regression coefficient, X equals the score on the observed independent variable, and e represents the error or variance unaccounted for.

The symbol *k* equates to the number of independent variables under consideration. For the present study, $k = 4$ (Pedhazur, 1997).

30. *NCES:* National Center for Education Statistics*:* The National Center for Education Statistics (NCES) is the primary federal entity for collecting and analyzing data related to education in the U.S. and other nations. NCES is located within the U.S. Department of Education and the Institute of Education Sciences (U.S. Department of Education, 2011).
31. *National Center for Public Policy and Higher Education (NCPPHE):* An independent, nonprofit, nonpartisan organization, the National Center prepares action-oriented analyses of pressing policy issues facing the states and the nation regarding opportunity and achievement in higher education – including 2- and 4-year, public and private, for-profit and nonprofit institutions (National Center for Public Policy and Higher Education, 2006).
32. *NELS-88-2000:* National Education Longitudinal Study of 1988. A nationally representative sample of eighth-graders was first surveyed in the spring of 1988 with follow-ups in 1990, 1992, 1994, and 2000 (U.S. Department of Education, 1988).
33. *NPSAS-87:* The National Postsecondary Student Aid Survey of 1987. NPSAS is the primary source of information used by the federal government to analyze student financial aid and to inform public policy on such programs as the Pell grants and Stafford loans (U.S. Department of Education, 2011).

34. *Outliers:* Extreme values of observed variables that can distort estimates of regression coefficients. An observation whose dependent variable is unusual given its values on the predictor variables (UCLA, 2012).
35. *Pearson r correlation coefficient:* The most appropriate measure when the variables to be correlated are either interval or ratio. It takes into account each and every score in both distributions and is the most stable measure of correlation (Gay and Airasian, 2003)
36. *Percentage of Hispanic faculty (PERHFAC):* The percentage of Hispanic faculty at each Texas community college.
37. *Percentage of total enrollment that is Hispanic (PERHENR):* The percentage of Hispanic enrollment at each Texas community college. This variable is derived by dividing total Hispanic enrollment (EFALEVEL=1, EFRACE21) by the grand total enrollment (EFALEVEL=1, EFRACE24) for men and women (EFRACE24). Ratios are converted to percentages by multiplying by 100 and then rounded to whole numbers (Derived Data Feedback report – IPEDS, Winter 2006-07 and Spring 2007, Enrollment component).
38. *Quantitative Study:* Research that aims to make generalizations about objectively existing phenomena by using numbers and calculations, and following defined procedures (Creswell, 2009).
39. *Race/Ethnicity:* Categories used to describe groups to which individuals belong, identify with, or belong in the eyes of the community. The categories do not denote scientific definitions of anthropological origins. A person may be counted in only one group (U.S. Department of Education, 2011).

40. *Retention Rate:* A measure of the rate at which students persist in their educational program at an institution, expressed as a percentage. For 4-year institutions, this is the percentage of first-time bachelor's (or equivalent) degree-seeking undergraduates from the previous fall who are again enrolled in the current fall. For all other institutions this is the percentage of first-time degree/certificate-seeking students from the previous fall who either re-enrolled or successfully completed their program by the current fall (U.S. Department of Education, 2011).
41. *SPSS:* Statistical Package for the Social Sciences.
42. *Statistics:* A set of procedures for describing, synthesizing, analyzing, and interpreting quantitative data (Gay and Airasian, 2003).
43. *STEM:* Science, Technology, Engineering, and Math.
44. *Student Right-to-Know Act:* Also known as the "Student Right-to-Know and Campus Security Act" (P.L. 101-542), which was passed by Congress November 9, 1990. Title I, Section 103, requires institutions eligible for Title IV funding to calculate completion or graduation rates of certificate- or degree-seeking, full-time students entering that institution, and to disclose these rates to all students and prospective students. Further, Section 104 requires each institution that participates in any Title IV program and is attended by students receiving athletically related student aid to submit a report to the Secretary of Education annually. This report is to contain, among other things, graduation/completion rates of all students, as well as students receiving athletically related student aid by race/ethnicity and gender

and by sport, and the average completion or graduation rate for the four most recent years. These data are also required to be disclosed to parents, coaches, and potential student athletes when the institution offers athletically related student aid. The Graduation Rates component of IPEDS was developed specifically to help institutions respond to these requirements (U.S. Department of Education, 2011).

45. *Suppressor effect:* When the inclusion of a variable in a multiple regression analysis leads to a standardized regression coefficient of a predictor to be larger than it is in the absence of the suppressor variable. Introduction of the notion of suppressor variable has increased the potential for ignoring the paramount role of theory in interpreting results of multiple regression analysis (Pedhazur, 1997).
46. *TEXAS Grants:* A state grant program designed to provide access to higher education in Texas by making sure that well prepared high school graduates with financial need could go to college. TEXAS is an acronym for Toward Excellence, Access, and Success.
47. *Texas Success Initiative (TSI):* A program of assessment, advising, developmental education, and student support services that became law in 2003 and was designed to ensure that students have the skills they need to succeed in college (Texas Higher Education Coordinating Board, 2003).
48. *THECB:* The Texas Higher Education Coordinating Board.
49. *Tolerance:* An indication of the percent of variance in the predictor that cannot be accounted for by the other predictors, hence very small values

indicate that a predictor is redundant, and values that are less than .10 may merit further investigation (UCLA, 2012). A default tolerance value may be overridden if the researcher explains why it was done (Pedhazur, 1997).

50. *TRIO:* Federal outreach and student services programs designed to identify and provide services for individuals from disadvantaged backgrounds (U.S. Department of Education, 2011).
51. *Undergraduate:* A student enrolled in a 4- or 5-year bachelor's degree program, an associate's degree program, or a vocational or technical program below the baccalaureate (U.S. Department of Education, 2011).
52. *VIF:* Variance inflation factor is (1/tolerance) and as a rule of thumb, a variable whose VIF value is greater than 10 may merit further investigation (UCLA, 2012).
53. *White:* A person having origins in any of the original peoples of Europe, the Middle East, or North Africa (U.S. Department of Education, 2011).

Summary

Increasing the enrollment and persistence of Hispanic students in Texas community colleges is the only way that the state of Texas will be able to meet the goals outlined in the Texas Higher Education Coordinating Board's Closing the Gaps 2015 initiative. The success achieved with the increased enrollment of Whites and Blacks will be minimized and not recognized if the disparity remains. As the THECB revisits and adjusts its strategy, it is prudent to analyze its approach against factors that could impact its success. This study used St. John, Paulsen, and Starkey's (1996) college choice nexus as a framework to examine whether the predictor variables of average total cost of

attendance, average federal/state/local financial aid awarded, local Hispanic population, and percentage of Hispanic faculty explain students enrolling and graduating from the selected community colleges and whether the dependent variables of Hispanic enrollment and graduation percentages at Texas community colleges are explained by those variables.

CHAPTER TWO

Review of the Literature

Closing the Gaps, 2015

The Texas Higher Education Coordinating Board held a planning meeting in San Antonio in March 1999. At this meeting, the Board made a decision to develop a new plan for higher education in Texas that concentrated on the state's most critical goals. The plan was to include a date by which to achieve these goals and a means to measure progress toward the goals (Texas Higher Education Coordinating Board, 1999).

In April 1999, the Texas Higher Education Coordinating Board appointed a committee to develop this new higher education plan. The Texas Higher Education Coordinating Board Planning Committee added a broad representation from the Texas education community, including 17 representatives from the business community, community leaders, and former higher education governing board members from around the state. From this group, four task forces were created to address the specific areas of civil rights, participation and success, health profession education, and the development of the technology workforce. Before final approval of the plan, input was sought from over 1500 persons and groups within the state of Texas education community. This plan was approved by the Texas Higher Education Coordinating Board in October 2000 and was titled the Closing the Gaps Higher Education Plan (Texas Higher Education Coordinating Board, 1999).

Texas has been fortunate to have a diverse and vibrant economy, but to remain so the state had to develop a plan to educate the population to ensure a workforce that matched the needs of the state. The state recognized that participation in higher education was declining and that it had to take action to reverse the trend. To address these issues, four goals were established related to Closing the Gaps. These goals included closing the gaps in participation, success, excellence, and research (Texas Higher Education Coordinating Board, 2000). The Texas Higher Education Coordinating Board noted that large gaps existed among the racial and ethnic groups in enrollment and graduation from the state's colleges and universities. The Hispanic population was the lowest enrollment group, and they were rapidly becoming the largest population group (Texas Higher Education Coordinating Board, 2000). O'Connor, Hammack, and Scott (2010) state that although Hispanics have high expectations for graduation, only 26% of those who began their education at a community college achieved that goal. Based on NELS-88-2000 data, 60% of all Hispanic students who attended college started at a community college (O'Connor, Hammack, and Scott, 2010).

Researchers found that students in community colleges were more sensitive to college prices than students in the 4-year sector (Heller, 1997). In a study utilizing the NPSAS-87 to examine the influence of finance-related reasons for choosing a college on persistence decisions, the findings included: 1) Finance related choices have direct and indirect influences on whether students persist in college; and 2) Market-based, monetary measures of financial aid, tuition costs, housing costs, and other living costs have a substantial direct influence on persistence (St. John, Paulsen, and Starkey, 2006).

The Texas Higher Education Coordinating Board noted in 2000 that only 5% of the Texas population was taking advantage of higher education opportunities, whereas the national average was 5.4%. This difference meant thousands of students were not taking advantage of higher education opportunities. For instance, to enroll the same percentage of postsecondary students as California, Texas would have to enroll 200,000 more students immediately (Texas Higher Education Coordinating Board, 2000). Participation from Hispanics and Blacks was targeted by the THECB initially for significant increases. The enrollment percentage for Hispanics was only 3.7% (Texas Higher Education Coordinating Board, 2000). To close the gap in participation relative to Hispanics, the Texas Higher Education Coordinating Board wanted to increase their participation from 3.7% to 4.4% by 2005, to 5.1% by 2010, and to 5.7% by 2015 (Texas Higher Education Coordinating Board, 2000).

Goal 1of the Closing the Gaps 2015 initiative was to "Close the Gaps in Participation." This goal established four strategies to add 500,000 more students who participate in Texas higher education. These strategies were to: 1) make the recommended high school program the standard curriculum in Texas public high schools and make it a minimum requirement for admission to Texas public universities by 2008; 2) recruit, prepare and retain additional well-qualified educators for elementary and secondary schools; 3) ensure that all students and their parents understand the benefits of higher education and the necessary steps to prepare academically and financially for college; and 4) establish an affordability policy that ensures students are able to participate and succeed in higher education (Texas Higher Education Coordinating Board, 2000).

To accomplish strategy four, the Texas Higher Education Coordinating Board proposed increasing participation by providing grants and scholarships to cover tuition, fees, and books for every student with financial need, setting tuition and fees in a manner that closes the gaps in participation and success, and establishing incentives that increase affordability through academic and administrative efficiencies in the higher education system (Texas Higher Education Coordinating Board, 2000). With these strategies in mind, one must ask if they are sufficient and appropriate to meet the aims of the larger goal. Strategies one, two, and three, at face value, seem to be appropriate for creating an environment of student success and preparing students academically and motivationally to attend college and thus increase participation. Providing grants and scholarships to cover tuition, fees, and books for every student with financial need attending a Texas community college, regardless of their ethnicity, will require the state to invest heavily in state financial aid programs.

The College Choice Nexus

The college choice nexus states that if a particular variable, such as financial aid, increases the likelihood of a matriculation decision, that same variable may also influence the likelihood of a persistence decision and/or how intervening factors influence the decision. This nexus construct could apply to a range of college choice-persistence interactions; the social reasons for choosing a college could influence the social integration process; the academic reasons for choosing a college could influence the way students integrate academically; the financial reasons for choosing a college could influence college affordability; and all three sets of reasons could interact in a comprehensive model (St. John, Paulsen, and Starkey, 1996).

The Role of Financial Factors

In April 2010, the THECB recognized that it was necessary to accelerate its plan for achieving many of the milestones set for Closing the Gaps 2015 (Texas Higher Education Coordinating Board, 2010). Part of the Texas Higher Education Coordinating Board recommendations for finance policy included prioritizing TEXAS Grants so those with the greatest financial need who received strong high school academic preparation would receive assistance to increase persistence and graduation rates (Texas Higher Education Coordinating Board, 2010). The intent of this recommendation was to develop an affordability framework for financing postsecondary education that coordinates state appropriations, tuition policy, and student aid policy to ensure the affordability of higher education for the state as well as for students and their families (Texas Higher Education Coordinating Board, 2010).

Some of the requirements currently in place for students receiving a TEXAS Grant are that they must be a Texas resident, show financial need, have an expected family contribution (EFC) less than or equal to 4000, and register for the Selective Service or be exempt from the requirement. They must also be a graduate of an accredited high school in Texas. Academic requirements state that the student must complete at least 24 semester credit hours per year and have an overall grade point average (g.p.a.) of 2.5 on a 4.0 scale (Texas Higher Education Coordinating Board, 2010). The change to a priority model could have an adverse impact on low-income students who may not be as academically prepared.

Financial factors play an important role in even the earliest stages of the college-choice process. Stage and Hossler (1989) noted that recent studies of college-planning

behavior of ninth graders shows that socioeconomic background factors, such as family income, are significant determinants of parental saving for financing children's college education. The parents' educational aspirations for their children also have a prominent influence on the students themselves (Stage and Hossler, 1989).

In a study of college choice and socioeconomic attainment, Pascarella (1992), found that attendance at high-cost institutions directly related to significantly higher levels of educational attainment, occupational status and earnings 9 years after initial enrollment in college. They further postulate that for financial aid policies to be more effective at equalizing the socioeconomic benefits of postsecondary education, they should promote more than just policies. Such policies also must encourage students' attendance at the high-cost colleges that lead to genuine socioeconomic advancement in the future. This research is also in stark contrast to the approach of the Texas Higher Education Coordinating Board.

Hossler, Hu, and Schmit conducted a study in 1998 with the intent of identifying the predictors of student sensitivity to college tuition and financial aid in their college choice process. This was a longitudinal study of high school students in Indiana. Multiple regression was used to analyze variables such as family background, student academic characteristics, student perceptions and financial support; and student connections with institutions and awareness of financial aid programs were selected to predict student price sensitivity.

As the cost of education continues to rise, policy analysts are paying increased attention to its impact on access, matriculation decisions, and persistence. Hossler, Hu, and Schmit's study also assumed that educational decisions were based on variables such

as expected costs, the expected benefits, and the utility of educational options. These are elements of the human capital theory.

In 1995, St. John and Starkey noted that a student's responsiveness to types of subsidies is highly related to their different family backgrounds; therefore, students will respond differently to the same set of prices and subsidies in their decision making process.

Hossler, Hu, and Schmit (1998) conclude that when students have a higher expectation of parental support to their education they tend to treat financial aid as less important. The amount of research into financial aid availability and communication with the school also decreases as financial aid dependence decreases. Therefore, family background and student characteristics tend to exert significant influence on the students' college choice process. Students with more parental support have fewer barriers to their college choice. This also indicates that students are rational in their decision making process.

Paulsen and St. John (2002) noted that potential students had limited mobility, choice, and financial means and that their culture and values have a substantial influence on the methods used to determine educational choices. Paulsen and St. John studied social class and college costs as a nexus of college choice and persistence. The nexus examined two sets of parallel factors: students' perceptions of financial factors at the time of college choice and the actual cost of financial factors when making a decision to persist. They argued that if cost was important to a student when deciding to enroll, it would also be important when deciding to re-enroll.

This examination led them to conclude that social class has a role in financial decisions related to college choice and persistence. Inherent in the social class is the students' habitus, which defines their system of values, attitudes, beliefs, and actions. The students' social class consistently frames, constrains, and structures students' patterns of college choice with regard to financial factors. Paulsen and St. John divided students into four categories of class based on income: low-income, low- to middle-income, middle-income, and upper-income. Compared to other income groups, the low-income group had a higher percentage attend public and 2-year colleges, and a lower percentage lived on campus. Most (64%) chose a college because of low tuition, student aid, or both. More than half (54%) chose a college that was convenient to their work and where they could control their living costs. For them, financial factors played a major role in their decision making process. They also found that Latinos chose to attend colleges with lower costs and were more loan averse than other ethnic groups. Interestingly enough, low tuition and student aid were negatively associated with persistence for low-income students, which indicated an inadequacy of financial aid relative to tuition costs and explains the negative effect of choosing a college because of both low tuition and aid.

Notable in their findings were that cross-class comparisons about educational attainment of low-income students revealed that they are less likely than higher-income students to attend private colleges, 4-year colleges, attend full-time, or live on campus. All of these are related to the students' perception of financial factors related to college choice and persistence. The findings of their study revealed clear and substantial class-based patterns of enrollment behavior related to students' perceptions and expectations

about college costs with low-income and high-income students engaged in nearly opposite patterns of behavior.

Paulsen and St. John further stated that if appropriations to institutions from state and local governments continue to constitute a reduced portion of institutional revenues, equity would require that adequate amounts of need-based grants be made accessible to offset tuition increases for students with demonstrated need. Otherwise, postsecondary institutions will serve as an instrument of class reproduction.

In 2004, St. John indicated that the NCES had misled state policymakers by asserting that there was not a problem with financial access to higher education institutions. He stated that the failure to consider the role and influence of need-based student financial aid on preparation for – and success in – higher education may have been a costly one for states. To support his assertion, St. John summarized evaluations of two state-level programs that provide early guarantees of grants to students with financial need, Indiana and Washington State.

In 1992, Indiana created the Twenty-First Scholars Program, with high school graduates enrolling in college the next year at 50.5% or 4 percentage points below the national average. By 2000, 60% were enrolling in college – 3.3 percentage points above the national average. By targeting state funding on need-based aid rather than merit-grants, Indiana was able to expand access to its students while spending less per full-time equivalent (FTE) than most states. They also took an additional step and created a state program that guaranteed students who were eligible for free and reduced lunches a need-based grant that equaled the tuition charge for public colleges. Students in the Scholars Program had to take a pledge in the ninth grade to complete high school; remain free of

illegal drugs, alcohol, and criminal behavior; maintain at least a 2.0 grade point average; and apply on time for state and federal student aid and college admission.

Indiana concluded that students who received grant aid were substantially influenced to enroll and that adequate aid was an important aspect of a comprehensive postsecondary encouragement program. Students who took the Scholars pledge had between 4.4 and 6.7 times the odds of enrolling in colleges in Indiana compared to their peers. After controlling for other factors that could influence their college choices, St. John's findings showed a consistent pattern of improved odds of preparation, enrollment, and persistence for low-income students.

In Washington State, state appropriations per FTE had fallen from 1992 levels of $6,452 to $6,074 in 2000. Tuition revenues also fell as high school graduation rates declined from 76.1% in 1992 to 70.8% in 2000, even though this was higher than the national average. In response, Washington created the Washington State Achievers (WSA) Program that guaranteed students with incomes below $60,000 a total grant amount. The Bill & Melinda Gates Foundation provided funds capping the total grant after state grants, Pell grants, other federal grants, and institutional grants, provided they attended in-state colleges and universities. To be eligible, grant recipients had to meet certain non-cognitive criteria such as positive self-concept, realistic self-appraisal, negotiating the system, long-range goals, strong support person, leadership, community service, and nontraditional knowledge. WSA recipients did not have to maintain a minimum college grade point average.

The WSA study found a substantial positive effect of the program on preparation for college and enrollment behavior. WSA recipients were more likely to enroll in college than students in comparison schools or other students in their schools.

St. John's evaluation of these two programs led him to conclude that programs that encourage academic preparation and provide an early guarantee of student financial aid are distinctive and successful. Both the Indiana and Washington programs provided strong financial incentives for college preparation. Data indicate preparation for enrollment is influenced by early financial commitments to low-income students.

Implications for state policymakers are that states interested in improving access to higher education should consider policies that include guarantees that low-income students will receive adequate grant aid if they take the steps to prepare for college.

Hispanic Enrollment and Persistence

According to Sosa (2002), Latinos intellectually believe that education is the key to success and achievement, but familial, social, and cultural expectations become barriers and stifle their success. A study group led by Sosa determined that there were four distinct issues related to those barriers. The first was related to poverty and family. Sosa noted that Hispanics put a great value on the work ethic and unconsciously instilled in their children the need to help the family financially. A college going tradition was not established so there was a lack of commitment. There was also a belief that college is not affordable. Second, there is an issue of the unknown. A lack of highly educated role models contributed to a feeling of not fitting in. The college environment is not a comfortable place for most Hispanics. In addition, the lack of understanding of how to prepare their children for college and how to finance the education has led to a fear of

debt and the financial burden of paying for college. Third, there is the issue of low expectations. These low expectations may be from outside the family; e.g., perceived from teachers, counselors, neighbors, and others. This contributes to a predisposition to work rather than leaving home for college. The student leaving home is a fear for both students and their families. The fourth issue is an unawareness of factors like income opportunities, required educational preparedness, and scholarship opportunities or the resources available to them for information. Hispanics are often unaware of the long-term effects of under-education versus higher education, which creates a lack of drive toward the attainment of a degree. From a financial perspective, the Texas Higher Education Coordinating Board wanted to ensure that all students were able to participate in postsecondary education by providing grants and scholarships to cover the cost of tuition, fees, and books for every student with financial need. The economically disadvantaged students would be a high priority for grant and scholarship aid (Texas Higher Education Coordinating Board, 2010). Studies show that attendance in college is significantly related to determinants of educational aspiration in sociological models, such as socioeconomic background and academic ability; college costs, such as tuition, financial aid, housing, commuting, and foregone earnings; and non-financial college attributes such as selectivity and academic programs (Bishop, 1977). A benefit of the increased participation of Hispanic students would be a resulting rise in the number of students completing associate's degrees. The Texas Higher Education Coordinating Board is seeking to increase Hispanic graduations with associate's and bachelor's degrees from 18,000 in 2000 to 50,000 by 2015 (Texas Higher Education Coordinating Board, 2000).

Stratton, O'Toole, and Wetzel (2007), advanced the thought that part-time enrollment was more common for Hispanics than non-Hispanics, and also for those whose parents had less than a college degree, using the human capital theory that states that different demographic characteristics contribute to the rate of return to education. This logic seems contradictory to that of the Texas Higher Education Coordinating Board, which wants to use a grant program designed for full-time students to increase Hispanic enrollment when the Hispanic population, as a general rule, does not enroll full-time and would not be eligible. Students attending part-time would never be able to retain their TEXAS Grant eligibility simply because they would not accumulate the necessary semester hours per year (24) required. Thus, the use of the TEXAS grant as a tool to increase Hispanic participation and persistence may not be a suitable approach.

Students from low-income backgrounds who aspire to college are often overwhelmed. According to Tierney and De La Rosa (2006), the financial aid process appears to create barriers to success rather than promote access. In a 3-year research initiative called Financial Aid and College Access, the Center for Higher Education Policy (CHEPA) found that students are battered by a complex application process. The CHEPA survey had over 8,000 responses and asked students questions in four general areas. These questions asked about students' college hopes and aspirations, knowledge of the college and financial aid process, students' use of financial aid information, and factors influencing college choice. The research showed that financial aid played a critical role in the students' decision to enroll, and at which institution they ultimately chose to attend.

In 1999, the Higher Education Research Institute (HERI) at the University of California at Los Angeles (UCLA) joined with the Policy Center on the First Year of College at Brevard College to develop a national survey of first-year students. The survey was designed to measure students' curricular and co-curricular experiences. This survey was taken at the end of a student's first year. Results were then compared to the Cooperative Institutional Research Program (CIRP) Freshman Survey, which is administered to 400,000 incoming college freshmen at more than 700 colleges and universities around the country. Liu, Sharkness, and Pryor (2008) discussed the findings of the Your First College Year (YFCY) Survey. Part of the findings included a discussion of students' academic experiences, including interaction with faculty and staff in the first college year. The survey found that the majority of students "frequently" or "occasionally" received advice or guidance from their professors (70.7%) about their educational program, but fewer (53.6%) received encouragement. In contrasting the students' expectation of communication with professors in the CIRP survey (89.7%) with actual communication in the YFCY survey (60.0%), there was a negative disparity of 29.7%. A small percentage of students actually met with their professors regularly outside of class/office hours at least once a week. Other data indicated that 70.1% of students reported that they had "some" or "major" concerns about financing their college education. Related to this concern was the fact that 35.2% indicated that work frequently interfered with coursework, 26.1% worked on campus, 25.2% worked off campus, and 6.5% worked full-time while attending school. Family issues or responsibilities were reported by 32.9% of students to "frequently" or "occasionally" interfere with their schoolwork, and this balancing of familial ties was a significant challenge to their first

college year adjustment. A small percentage (13.5%) felt that they had been discriminated against based on their race or ethnicity during their first college year.

A research brief published by the HERI (2009) indicated that faculty attitudes toward race/ethnicity continue to be an important topic of discussion, with 93.6% of faculty believing that a racially/ethnically diverse student body enhances the educational experience of all students. A small percentage of faculty (10.6%) reported that there is racial tension on campus.

Tinto (2006-2007) notes that there is an economic stratification that occurs in higher-education institutions that causes students of low socioeconomic status to attend 2-year institutions. It is observed in many ways, including the number of low-income students participating in higher education who attend part-time and work while attending college. Tinto stresses the importance of the stratification and enrollment patterns of low-income students because where a student attends college impacts the likelihood of college completion. Although over 56% of high-income students complete a bachelor's degree within 6 years, only 25% of low-income students will complete their bachelor's degree within 6 years. Beginning their education at a 2-year institution often places barriers to their completion in the form of finances and proximity to a 4-year institution.

In a presentation to the Association for Institutional Research in Atlanta, Georgia, Hurtado, Arellano, Wann, Cuellar, Alvarez, and Colin (2009) outlined the conditions for student success in diverse learning environments. Hurtado et al. determined that campus climate affects student learning outcomes, including academic and social self-concept; college satisfaction; social and academic integration; students' intellectual, social, and civic development; and retention and degree completion. Students perceived that the

higher the percentage of students of color, Black, Latino, and Asian the less hostile the college climate. This also led to the students feeling less psychologically isolated. Hurtado et al. also indicated that faculty support and a sense of belonging were key to the development of an inclusive environment.

Hurtado, Ruiz, and Guillermo-Wann (2011) examined the saliency of racial identity as a contributing factor to students' general college experiences and experiences with the campus climate for diversity. Results from their study indicate that students from Latina/Latino backgrounds spend more time thinking about race than their White peers and that campus climate factors are significantly related to the outcome measures. Understanding that there are multiple social identities is a useful tool that should encourage students to understand how this identity shapes their own behavior, relationships, decisions, and opportunities.

Saenz and Ozeguera (2006) studied results from the CIRP Freshman Survey related to Latina/Latino and African American students in their first year of college. The key findings from their research revealed that Latinas/Latinos were less likely to live on campus and to choose a college that is near their home; non-Latinos had much higher reported family incomes; Latinas/Latinos reported significantly lower parental education levels; Latina/Latino students were more likely to consider a financial aid office as "important" or "very important"; and Latinas/Latinos were employed at greater rates and worked for longer periods of time while enrolled full-time in college during their first year. Taken as a whole, these findings indicate that Latinas/Latinos are more likely to spend time in efforts that are at odds with college success during the critical first year.

Gilmartin, Sax, and Hagedorn (2003) studied the role of friendship in community college students' decisions to persist, transfer, or withdraw. From their research they derived three instructive findings to be used by community colleges. The first finding suggests that community colleges might want to market themselves not only to potential community college students, but to a wider audience to capitalize on indications that how a student's friends rated an institution may impact a student's enrollment plans. Second, they suggested that faculty and staff design programs to facilitate interactions on campus that take into account the value of friendships. Third, colleges should find a way to advance students' educational goals based on the benefits of friendship as a retention strategy.

Umbach and Wawrzynski (2005) drew on Tinto's model on retention that stated students' decisions to persist or withdraw from college depend on their successful academic and social integration within the college, and asked whether faculty behaviors encourage student engagement, thus creating positive student perceptions of environment and high levels of student self-reported gains. They also sought to determine the types of campuses where these faculty behaviors were more likely to exist. Using a data set that consisted of 14,336 faculty member responses, they determined that first year students at campuses where faculty reported frequent course-related interactions positively related to a supportive campus environment, interpersonal support, and support for learning. Liberal arts campus faculty reported better results than other institutions.

Laird and Cruse (2009) studied the research of part-time enrollment status and its effects on student-faculty interaction and student gains. They noted that prior research showed that part-timers spent less time engaged in activities that were educationally

purposeful and spent more time on activities that detracted from their success – like working off-campus or caring for dependents. Although it is common to group institutions with high part-time student enrollment into categories, it is also common to assume that part-timers will lag behind their full-time counter-parts on measures of engagement. Laird and Cruse postulated that an institution with a higher percentage of part-time students may have an environment that contains barriers to engagement for all students. Their study results suggested that improving the interaction of part-time students with faculty could bring them closer to educational parity with their full-time counterparts, and called for directing institutional level resources toward that goal.

Sharkness, Eagan, Hurtado, Figueroa, and Chang (2011) concluded that providing opportunities for Black and Latino students to have more research opportunities, studying opportunities and mentorship from faculty, although important, may not be enough to eliminate racial disparities in college academic achievement. They also indicated that research has not been able to account for GPA differences between White students and their Black and Latino counterparts.

Using institutional data from the CIRP annual survey, Oseguera and Rhee (2009) evaluated the extent to which peer institutional climates and faculty perceived campus climates influenced individual 6-year retention rates. The retention climate was found to be a determining factor in students' withdrawal intentions. Faculty contact and interactions were also found to influence persistence behavior, but not necessarily their decision. This faculty contact represented significant avenues for the socialization of students.

Hagedorn (2008) used data from a longitudinal study known as TRUCCS (Transfer and Retention of Urban Community College Students, 2001-2006) to test whether Hispanic students felt marginalized when their campus environment had higher proportions of non-Hispanic students. Hagedorn's research revealed statistically significant positive trends in student success between the number of Latina/Latino students and the proportion of other Latina/Latino students and proportion of Latina/Latino faculty on campus.

The Closing the Gaps most recent Progress Report issued in July 2011 (Texas Higher Education Coordinating Board, 2011) observes that there are gains in Hispanic enrollment. Hispanics had the fastest growth of the three major racial/ethnic groups between fall 2000 and fall 2010, with an 87.5% increase in enrollment. Their college going rate of 52.2% still trailed the percent of White public high school graduates at 58.3%. The 2-year persistence rate for Hispanic students attending public community colleges in the 2009 cohort was a half percentage point below White students at 53.2%. The 1-year persistence rate for Hispanics was nearly the same as for Whites, at 66.6% and 66.7%, respectively.

The Role of Community Colleges

According to O'Toole, Stratton, and Wetzel (2003), between 1970 and 1998, growth in part-time enrollment was reflected in three main areas. The first area was an increase in enrollment by those age 25 and older, the second by students of the traditional age of 18-24, and the third major area of growth in part-time enrollment was attributable to increased enrollment by minorities. Hispanic students were disproportionately likely to enroll on a part-time basis, and rose from 4% of the market in 1980 to 9.2% in 1999

(O'Toole, Stratton, & Wetzel, 2003). One Texas Higher Education Coordinating Board strategy was to promote a college-going culture so that Hispanic and African American male students know that they have the opportunity to attend college (Texas Higher Education Coordinating Board, 2010). The Texas Higher Education Coordinating Board placed a strong emphasis on community colleges, where 60% of Hispanic students choose to enroll (Texas Higher Education Coordinating Board, 2010).

In a study to explore and compare the views and experiences that community college students face across multiple levels of parental education, Lee, Sax, Kim, and Hagedorn (2004) determined that there was no similar pattern. The majority of Latino students were most likely to be first-generation students and the greatest proportion had parents with a junior high school level of education or less.

In its 2011 Policy Alert, the National Center for Public Policy and Higher Education (NCPPHE) addressed the vital role of community colleges as the entry point for many students seeking a bachelor's degree. It noted that state financial aid and transfer policies that enable students to move from 2-year colleges to baccalaureate-granting institutions were not keeping pace with current needs. Horn and Berger (2004) describe the most underserved populations as the least able to afford the continuous escalation of tuition costs and enroll in college. If they do enroll they are the least likely to complete a degree or certificate. Once enrolled, the strategies many of these students use to pay for college include reducing course loads in order to work more hours; "stopping out" of college to earn money to return; or working excessive hours while maintaining a full-time course load. All of these scenarios significantly reduce the likelihood of completing a baccalaureate degree or any college program. According to

Baum and Ma (2010), tuition at public 2-year institutions has increased much more rapidly than the general rate of inflation for the past two decades.

The NCPPHE (2011) noted that college completion is a major problem for higher education. Community colleges account for 40% of all enrollments nationally, but account for 50% of enrollments in Texas. Community college enrollment is closely related to background characteristics of students. Among these characteristics are that community college enrollees are more likely to be low income, the first in their families to go to college, and members of an underrepresented group. Racial and ethnic groups with a history of poor college completion tend to concentrate in community colleges with a plan to transfer to earn their bachelor's degree. A particular challenge to these states is to confront college affordability. The escalation of tuition makes it more probable that those who are least likely to afford college attendance will be the least likely to complete their education. Consequently, they choose the most affordable option – community colleges. Many of their strategies to complete college have the opposite effect. They may reduce their course load to work more hours, stop out to earn funds to pay tuition later, or work excessive hours while maintaining a full-time course load.

Legislative Policy Implications

Heller (2005), in testimony provided to the Committee on House Education and the Workforce concerning reauthorization of the Higher Education Act of 1965, noted that federal and state governments play a vital role in ensuring access to college for the country's financially needy students. Heller further stated that any attempt to reduce federal and state support in favor of merit-based student aid would have a great negative impact on financially needy students.

As noted in the Closing the Gaps June 2010 Progress Report, only 4.4% of Hispanic Texans participated in higher education in the fall of 2009. The 2015 target is 5.7%, which is somewhat below the trend lines necessary to reach the Closing the Gaps targets (Texas Higher Education Coordinating Board, 2010). The Progress Report indicated that Hispanic participation and success were "well below the target in July 2009 and July 2010" (Texas Higher Education Coordinating Board, 2010). Between 2000 and 2009, Hispanics had the largest enrollment increases. Even so, the Hispanic participation rate of 4.4% is not significant enough to meet the Closing the Gaps target (Texas Higher Education Coordinating Board, 2010).

The Hispanic enrollment shortfall accounts for more than the total enrollment increase needed to reach the Closing the Gaps participation goal (Texas Higher Education Coordinating Board, 2010). Hispanic enrollment needs to grow by 310,000 students (84.3%) to meet the participation goal (Texas Higher Education Coordinating Board, 2010). Although their bachelor's, associate's, and certificate degrees awarded (BACs) increased by 9.9% from FY 2008 to FY 2009, they remained below the target trend line (Texas Higher Education Coordinating Board, 2010). A cohort of first-time, full-time Hispanic students enrolled at public universities in the fall of 2002 had a persistence rate of 63.9%, compared to 82.3% for Asians and 75.5% for Whites. At Texas public community colleges, the persistence rate for Hispanic students was 39.5% compared to 52.8% for Asians and 45.2% for Whites (Texas Higher Education Coordinating Board, 2010).

According to Callan, Finney, Kirst, Usdan, and Venezie (2006), many states have sought to raise the educational achievement of their younger population by developing

policies to advance student achievement and expand access to postsecondary education. Too often, these policies have been limited by the affordability of college and have not led to degree attainment of the younger population. The report identifies four state policy dimensions for improving college readiness opportunities for all high school students that include the alignment of coursework and assessments, state finance, statewide data systems, and accountability. When it comes to finance, the authors believe that most states perpetuate the divide between K-12 and postsecondary education.

In November 2010, the "Report to the Texas Higher Education Coordinating Board on Higher Education Cost Efficiencies to the Governor" suggested that tuition and student financial aid policies should encourage preparation and rapid progress toward completion of a program of study, while minimizing unnecessary demands on the system in the process (Texas Higher Education Coordinating Board, 2010). Although this may be good policy, one could question whether it is consistent with increasing Hispanic enrollment because of the emphasis on "rapid progress."

NCPPHE cites the need for states to assure that state financial aid policies do not discourage full-time enrollment at 2-year colleges, but should encourage completion of programs by full- and part-time students. To increase completion rates for low-income students, need-based financial aid plays a critical role. This aid should be available to students who will transfer, attend full-time, or attend part-time because of the need to work and support their families. Texas does have in place a standard general education curricula and a common numbering system for lower division courses to facilitate transcript evaluation.

Santiago (2011) encourages Texas and all states to adopt policies that will increase Latino degree completion and make college accessible and affordable for students of all economic backgrounds. Specifically related to the legislature, Santiago recommends that the state create financial incentives for low-income students that make continuous enrollment possible all the way through degree attainment. Among her recommendations are loan forgiveness, textbook waivers, or tuition discounts to students who remain continuously enrolled, and the expansion of need-based funding from the state for low-income students.

In a policy brief developed by the American Association of Hispanics in Higher Education, Rendon (2008) suggests a number of policy recommendations to enhance Latina/Latino success. Among them were support of college access programs like Gear Up, TRIO, and ENLACE beyond high school and into the first 2 years of college; development of a planning for college course for students; and adequate training for guidance counselors in schools and colleges so students receive positive and timely messages.

Heller and Rogers (2006) describe the shift of financing higher education in the United States from the government to the individual using the thesis that the ultimate value of the education is to the individual. As tuition continues to outpace the amount of aid available in the form of grants from any source, loans have become the predominant vehicle for financing a student's education. Heller points out that this has implications for the equity of distribution and college participation across the nation. In 1980, student aid was comprised of one-third loans and 63% was awarded as grants. By 2003, it had shifted to 54% loans and only 40% grants. Additionally, the percentage of aid awarded

that was not based on need rose from 9% in 1992 to 27% in 2002. Financial aid not based on need is often called merit aid.

Baird (2006) also questioned the combined effect of reductions in federal and state aid on college enrollment decisions, especially for Hispanic youth. She explained that applications for state aid may be more understandable and predictable and have a greater impact on enrollments than federal need-based aid. Baird's research concluded that enrollment rates at 2-year institutions were not related to tuition or financial aid, but more attributable to the accessibility to an institution. Overall though, the study concluded that state need-based aid plays an important role in explaining a state's public enrollment rates.

On February 23, 2011, Texas Higher Education Coordinating Board Commissioner Raymund Paredes and Board Chairman Fred Heldenfels gave a presentation to the Texas House Higher Education Committee that was an update on the progress of Closing the Gaps 2015. Part of their comments noted significant increases in participation, with 7.3% increases at public 2-year community colleges. Overall participation was on track to meet the CTG goals of 630,000 new participants by 2015. The presentation demonstrated the number of students from the 2006 community college cohort who failed to complete college level math, reading-intensive, and writing-intensive courses that did not also meet the corresponding Texas Success Initiative standards. Commissioner Paredes introduced the concept of a Priority Criteria for the awarding of TEXAS Grants that would focus funding on those students who were shown to have the greatest chance of succeeding at the college level. This concept was later adopted by the 82nd Texas Legislature as Senate Bill (SB) 28.

All higher education legislation of the 82nd Legislature was summarized by the Texas Higher Education Coordinating Board's Office of External Relations in July 2011. The official title of SB 28 was the Texas Grant College Readiness Reform Act. It was authored by the Honorable Senator Judith Zaffirini and sponsored by the Honorable Senator Branch, and is summarized below (Texas Higher Education Coordinating Board, 2011).

> SB 28 requires general academic institutions of higher education to prioritize Toward Excellence Access and Success (TEXAS) Grant awards to those who meet certain academic criteria. Beginning with the 2013-2014 academic year, general academic teaching institutions shall give highest priority for a TEXAS Grant to students with the lowest Expected Family Contribution (EFC) of $4,000 or less and achieve standards in any two of the following four categories:
>
> - Graduate with 12 hours of HB 1-mandated college credit programs (i.e. dual credit), the Distinguished Achievement Program (DAP), or the International Baccalaureate Program (IB);
> - Graduate with at least a B average (3.0 on 4.0 scale) or rank top 1/3 of high school class;
> - Complete a math course beyond Algebra II; or
> - Meet Texas Success Initiative requirements or be exempt.

Workforce Impact

The competitiveness of the U.S. workforce is projected to decline over the next decades. Economists Anthony Carnevale and Donna Desrochers (2003) estimate that by 2020 the U.S. could face a shortfall of 14 million workers who have the knowledge and skills needed to compete for middle-income jobs in a global economy.

Recent population studies (National Center for Public Policy and Higher Education, 2005) found that unless states can improve education for all students, the percentage of the U.S. workforce with a bachelor's degree will decrease over the next 15 years, with a corresponding drop in personal income per capita. Minority groups with

the lowest average levels of education will grow rapidly, whereas the baby boomers – the most highly educated generation in U.S. history – are expected to retire in record numbers. Between 1980 and 2020, the minority portion of the workforce is projected to double from 18% to 37%; and the Hispanic/Latino portion will almost triple, from 6% to 17%. During the same period, the White working-age population is projected to decline from 82% to 63%.

The average level of education in Texas' workforce and the income of its residents are projected to decline over the next two decades, unless the state can increase the number of Hispanics and African-Americans going to college and getting degrees. The National Center for Public Policy and Higher Education (2005) states that although the share of the Texas workforce made up of Whites is declining rapidly, the share made up of other racial groups is projected to reach 53% by 2020. Almost all of the growth is within the Hispanic/Latino population. Their share of the workforce is expected to jump from 18% in 1980 to 37% in 2020. The impact of these demographic changes in Texas' current educational gaps among racial/ethnic groups indicate that by 2020 the percentage of the workforce without a college degree is projected to decline, whereas the share of the workforce with less than a high school diploma is projected to increase. This would precipitate a corresponding decrease in the income of residents' personal incomes per capita from $19,663 in 2000 to $18,708 in 2020. Texas' ability to raise the level of education of all its residents, particularly its Hispanic/Latino and African-American populations, will determine its ability to compete effectively in a global economy.

Summary

As fortunate as Texas has been to have a diverse and vibrant economy, state leaders recognized that continued success depends on an educated workforce. The Texas Higher Education Coordinating Board created the Closing the Gaps 2015 initiative to address the issue. Leaders recognized early that the Hispanic population was rapidly becoming the largest population group, but Hispanics were not taking advantage of educational opportunities at a rate comparable to other ethnic groups. Sosa (2002) stated that although Latinos intellectually believe that education is the key to success, there are many barriers to postsecondary education, including the unknown. According to Stage and Hossler (1989), financial factors play an important role in the early stages of the college choice process. The college choice nexus (St. John, Paulsen, and Starkey, 1996) states that if a particular variable such as financial aid increases the likelihood of a matriculation decision, that same variable may also influence the likelihood of a persistence decision and/or how intervening factors influence the decision. As the Texas Higher Education Coordinating Board responds to the progress of its plan, its success is impacted by the legislative process. Financial aid policy in Texas is driven in large part by the balancing of the state's budgets. Changes to financial aid regulations require navigation of the legislative process, which is cumbersome at best. The passage of SB 28 by the Texas Legislature has provided the requested "Priority Model" for the awarding of TEXAS Grants. The impact of this legislation on the Hispanic population remains to be seen.

CHAPTER THREE

Research Design

This non-experimental, empirical research study employed univariate techniques to analyze institutional characteristics and participation data related to Texas Hispanic students attending the 66 selected Texas public community colleges. This design was appropriate, as the aims of this quantitative study were to identify how well selected institutional variables explain Hispanic participation and success patterns, which predictor variable(s) is most useful in predicting these outcomes, and how well data from the Texas public community colleges fit the predictive model.

Description of the Population

The Southwest Institute for the Deaf was eliminated from the population because attendance at that school is based on a specific physical disability and its characteristics were not appropriate for this study. The 66 Texas public community colleges and their Carnegie Unit ID are presented in Appendix A.

Procedures for Collection of the Data

The data analyzed in this study are public record information and are available via open access in the NCES, Integrated Postsecondary Education Database (IPEDS). The data were downloaded utilizing Microsoft® Office Excel 2003 as the result of a self-initiated query to the IPEDS Data Center website. Data for the 66 Texas community colleges were collected based on four variables selected from the IPEDS data set. The

selected variable data were used to populate the two predictor variables of AVGCOA and AVGFA, and two dependent variables of PERHENR and HISPGRPER. The downloaded data were reported to IPEDS from institutions for the 2008-2009 academic year. At the time of data collection, this was the most recent information available for download. Four institutions did not report the AVGCOA, and one institution did not report its AVGFA to IPEDS. The missing data were collected via an inquiry to the THECB Division of Grants and Special Programs.

Data to populate the LHISPOP predictor variable were collected from the U.S. Census Bureau website on the State & County QuickFacts page. This was a self-initiated search of the cities where the 66 Texas community colleges are located to find the "Persons of Hispanic or Latino origin, percent, 2010" data. The U.S. Census Bureau only reports data on those cities with a population greater than 5,000 on this website. Data for the cities of Cisco, Clarendon, Navarro, and Ranger were also collected from the U.S. Census Bureau, but from the American FactFinder page where data for smaller Texas cities reside.

Data were also collected from the Texas Higher Education Coordinating Board website to populate the remaining predictor variable of PERHFAC and were available via open access from its Data Resources and Tools Accountability System. Two selections were done to collect the data. The first selection under the Interactive Access to Data heading on the website was made for 59 public 2-year colleges. The second selection collected data for the three Lamar State College campuses and for the four Texas State Technical College campuses. These two selections were necessary because the Texas Higher Education Coordinating Board separates the 59 community colleges from the four

Texas State Technical Colleges and three 2-year Lamar State Colleges. The community colleges were not added to the system data set until early 2005 (Texas Higher Education Coordinating Board, 2010). To calculate the PERHFAC, four variables were downloaded via a self-initiated query and collected in Microsoft® Office Excel 2003. The four variables of Total Full-Time Faculty, Total Part-Time Faculty, Hispanic Full-Time Faculty, and Hispanic Part-Time Faculty from the fall of 2008 were manipulated to calculate the remaining variable of PERHFAC as Appendix B demonstrates. Total Full-Time Faculty and Total Part-Time Faculty were added to obtain the Total Faculty. Hispanic Full-Time Faculty and Hispanic Part-Time Faculty were added to obtain the Total Hispanic Faculty. The Total Hispanic Faculty was then divided by the Total Faculty to obtain the percentage of Hispanic Faculty variable of PERHFAC. The calculated variable data were used to populate the remaining dependent variable of PERHFAC used in this analysis.

Variables of Interest

One aim of this study was to identify how well selected institutional characteristics explain the variance in enrollment and graduation rates of Hispanic students attending the 66 Texas public community colleges. Based upon their face validity and prior research suggesting their importance in the college choice process, four institutional characteristics were selected as the observed predictor variables, and two institutional outcome measures were selected as the dependent variables. Table 1 presents the four predictor variables and two dependent variables, their abbreviated code as used throughout the study, and their scales of measurement.

Table 1

Predictor and Dependent Observed Variables

Predictor Variables
Average total cost of attendance (AVGCOA, in $s)
Average federal/state/local financial aid awarded (AVGFA, in $s)
Local Hispanic Population (LHISPOP, in %)
Percentage of Hispanic faculty (PERHFAC, in %)
Dependent Variables
Percentage of Hispanic enrollment (PERHENR, in %)
Hispanic graduation percentage (HISPGRPER, in %)

The average total cost of attendance (AVGCOA) used was for "In-District" students living off campus and includes an estimate of tuition, fees, books, room, board, transportation, and an allowance for personal expenses. Many 2-year colleges do not have on-campus housing facilities and are designed to serve the needs of students in their taxing district. For these reasons, only the "in-district, off-campus" category of cost of attendance was included in this study. The percentage of Hispanic faculty was calculated by totaling the full-time and part-time Hispanic faculty, and then dividing this number by the total number of part-time and full-time faculty.

The college choice nexus is simply stated that if a particular variable, such as financial aid, increases the likelihood of a matriculation decision, that same variable may also influence the likelihood of a persistence decision and/or of how intervening factors

influence this decision. This nexus construct could apply to a range of college choice-persistence interactions; the social reasons for choosing a college could influence the social integration process; the academic reasons for choosing a college could influence the way students integrate academically; the financial reasons for choosing a college could influence college affordability; and all three sets of reasons could interact in a comprehensive model (St. John, Paulsen, and Starkey, 1996). This study used the college choice nexus to explore how the predictor variables of average total cost of attendance, average federal/state/local financial aid awarded, local Hispanic population percentage, and percentage of Hispanic faculty explained the likelihood of Hispanic students enrolling and graduating from a community college.

The college choice nexus is based on the likelihood of an individual decision to enroll and persist. This research used institutional level data where all of the student's choices are aggregated into a number, usually expressed as a percentage. Robinson (1950) called them ecological correlations and states that they are often used simply because correlations between the properties of individuals are not available. It is not uncommon for the interpretation of data to not be consistent with the expected outcome. Pedhazur (1997) disagrees and states that one may be interested in ecological correlations for their own sake so Robinson's claim that the interest is always in individual correlations is not supportable, although it was well stated.

Researchers found that students in community colleges are more sensitive to college costs than students in the 4-year sector (Heller, 1997). In a study utilizing the NPSAS-87 to examine the influence of finance-related reasons for choosing a college on persistence decisions the findings included: 1) Finance related choices have direct and

indirect influences on whether students persist in college; and 2) Market-based, monetary measures of financial aid, tuition costs, housing costs, and other living costs have a substantial direct influence on persistence (St. John, Paulsen, and Starkey, 2006).

Baird (2006) questioned the combined effect of reductions in federal and state aid on college enrollment decisions, especially for Hispanic youth. Baird's research concluded that enrollment rates at 2-year institutions were not related to tuition or financial aid, but more attributable to the accessibility of an institution. Overall though, the study concluded that state need-based aid plays an important role in explaining a state's public enrollment rates.

Santiago (2011) encourages Texas and all states to adopt policies that will increase Latino students' degree completion and make college accessible and affordable for students of all economic backgrounds. Specifically related to the legislature, Santiago recommends that the state create financial incentives for low-income students that make continuous enrollment through degree attainment a possibility. Santiago's findings indicate that the new restrictions placed on eligibility for the TEXAS Grant may have an adverse impact on the Hispanic population.

Commissioner Paredes of the Texas Higher Education Coordinating Board introduced the concept of a Priority Criteria for the awarding of TEXAS Grants that would focus funding on those students that were shown to have the greatest chance of succeeding at the college level. This concept was later adopted by the 82nd Texas Legislature as SB 28.

Data Analysis

This quantitative study will employ univariate techniques to generate descriptive statistics for the data set to determine if statistically significant differences on the dependent synthetic variables exist among the 66 institutions under consideration. Multiple regression will be utilized to determine if the variance explained in the dependent variables by the predictor variables is statistically significant, and how well each predictor variable contributes to the linear equation and the creation of the synthetic dependent variable.

SPSS Statistics 19.0 (SPSS Inc., 233 S. Wacker Drive, Chicago, IL, 60606) was utilized to conduct all statistical calculations. The syntax used to obtain descriptive statistics, regression coefficients, and correlation matrices for each of the dependent variables PERHENR and HISPGRPER are provided in Appendices C and D, respectively. An Excel 2003 spreadsheet application was used to perform the calculations associated with commonality analysis.

Multiple Regression

Multiple regression (MR) is a member of the general linear model and subsumes the t-test, ANOVA, and simple univariate regression in its capability to identify the variance in a criterion variable by two or more predictor variables (Pedhazur, 1997). Additionally, not only does multiple regression potentially maximize the variance explained in the criterion variable, but subsequently reduces the error of the regression equation, or the unexplained variance (Pedhazur, 1997). Pedhazur describes the linear equation for multiple regression as follows:

$$Y = a + b_1X_1 + b_2X_2 + \ldots + b_kX_k + e$$

Where *Y* equals the score on the dependent variable, *a* equals the intercept or the point where the regression line crosses the *Y* axis, *b* equals the unstandardized regression coefficient, *X* equals the score on the observed predictor variable, and *e* represents the error or variance unaccounted for. The symbol *k* equates to the number of predictor variables under consideration. For the present study, $k = 4$.

Commonality Analysis

Although multiple regression is extremely useful in identifying how well two or more predictor variables explain the variance in a dependent variable, it does little in identifying which predictor is most useful in this process. Commonality analysis allows researchers to identify the combined and unique usefulness of individual variables, or sets of variables, in explaining variance accounted for in the designated dependent variable (Si, 2001).

Unlike stepwise regression that enters variables in a random, progressive manner until the R^2 is maximized, commonality analysis utilizes mathematical algorithms to decompose the variance into individual and combined values for the predictors. This method is superior to stepwise methods in that possible masking or suppressor effects due to shared variance among the independent variables are alleviated (Kroff, 2002). R^2 commonality analysis provides a method to determine the variance accounted for by respective predictor variable sets and helps researchers understand the contributions predictor variables make in a given regression model (Nimon, 2010). According to A.A. Beaujean (personal communication, February 29, 2012) commonality analysis is still exploratory in nature and should not take precedence over the theory being applied to the research in selecting the predictors and how they relate to the outcomes. In this research,

St. John, Paulsen, and Starkey's college choice nexus should guide the determination of which predictors should be stronger or weaker in magnitude.

The total number of commonality components is equal to 2^k-1; where k is the number of predictor variables. For heuristic purposes, Si demonstrates the mathematical formula in the case of two predictor variables as follows:

$$Ua = -R^2 + R^2y.b$$

$$Ub = R^2-R^2y.a$$

$$Cab = R^2 – Ua – Ub$$

Where U symbolizes the unique variance accounted for by variables a and b; and C represents the combined variance accounted for by a and b. Commonality analysis decomposes the R^2 of the predictor variables in an algorithm that adds or subtracts R^2 to calculate the variance unique to each variable. The complexity of commonality analysis increases as the number of variables considered increases.

For the purposes of this study the commonality analysis calculated ($2^4 – 1$) or (16-1) or 15 commonality components. The algorithms used to obtain the unique and combined calculations are presented in Appendix E. The exact calculations were performed by entering the R^2s for each of the various combinations into a Microsoft Office® Excel 2003 spreadsheet application where formulas decomposed the individual and combined usefulness of the four predictor variables in explaining the variance in each of the dependent variables.

Data Inspection and Transformation Methods

Prior to analysis, a visual inspection of the data set was conducted. This visual screening can alert researchers to missing observations and can identify severe or unreasonable abnormalities that warrant further exploration. Upon initial inspection, it was discovered that five observations of the predictor variables AVGFA and AVGCOA were missing. Four institutions did not report the AVGCOA and one institution did not report its AVGFA to IPEDS. The missing data were collected via an inquiry to the THECB Division of Grants and Special Programs. Data reported to the IPEDS and THECB are self-reported by all institutions of higher education and are not verified for accuracy by either entity. To determine the validity of the missing data items obtained from the THECB, all IPEDS data for AVGCOA were compared to the total THECB data. This visual inspection resulted in confirmation that the IPEDS data already obtained for AVGCOA generally matched the data that were self-reported to the THECB. The complete data set for this study that was used in the SPSS analysis can be found in Appendix F.

Additional visual inspections were performed on the scatter-plots of standardized predictor and standardized residual values generated by SPSS for the PERHENR and HISPGRPER dependent variables to determine if there were any spurious values. In a normal distribution, 99% of all values fall within +/-3 standard deviations from the mean. The next step is to review the SPSS output for the standardized predicted and residual values for the two dependent variables to determine the actual institutions, if any, that appear to be outliers. Data were reviewed for normality using the Normal P-P Plot of regression standardized residuals for the PERHENR and LHISPOP dependent variables.

The Cook's D values for potential outliers were reviewed to determine their actual influence on the predicted outcomes of the dependent variables. The SPSS output with Cook's D values can be found in Appendix G. The Centered Leverage Value (CLV) was also examined as another means of identifying possible outliers and is found in Appendix H. Collinearity statistics were reviewed using tolerance and VIF values provided in the output.

CHAPTER FOUR

Presentation of the Findings

The problem this research explored is that the number of Texas Hispanic students that attend 66 Texas community colleges does not meet the THECB established goals related to enrollment and graduation rates. The population for this quantitative study were the 66 Texas public community colleges identified from the Integrated Postsecondary Education Data System (IPEDS) Data Center data base. IPEDS provides an electronic filter function that allows researchers to define institutional comparison groups based on a number of criteria. Institutions selected for this research were those that met the criteria of participating in federal Title IV financial aid programs, were located in Texas, and whose Carnegie Classification 2005 equaled Associate's—Public. The results from the data analysis will be presented in the following order:

1. Outlier analysis of PERHENR data set
2. Outlier analysis of HISPGRPER data set
3. Descriptive statistics for the complete data set
4. Analysis of PERHENR data set
    a. Multiple regression
    b. Commonality analysis
    c. Summary of PERHENR regression
5. Analysis of HISPGRPER data set
    a. Multiple regression

b. Commonality analysis

c. Summary of PERHENR regression

Outlier Analysis of PERHENR Data Set

The Normal P-Plot of the expected cumulative probability and observed cumulative probability values for the dependent variable PERHENR is presented in Figure 1.

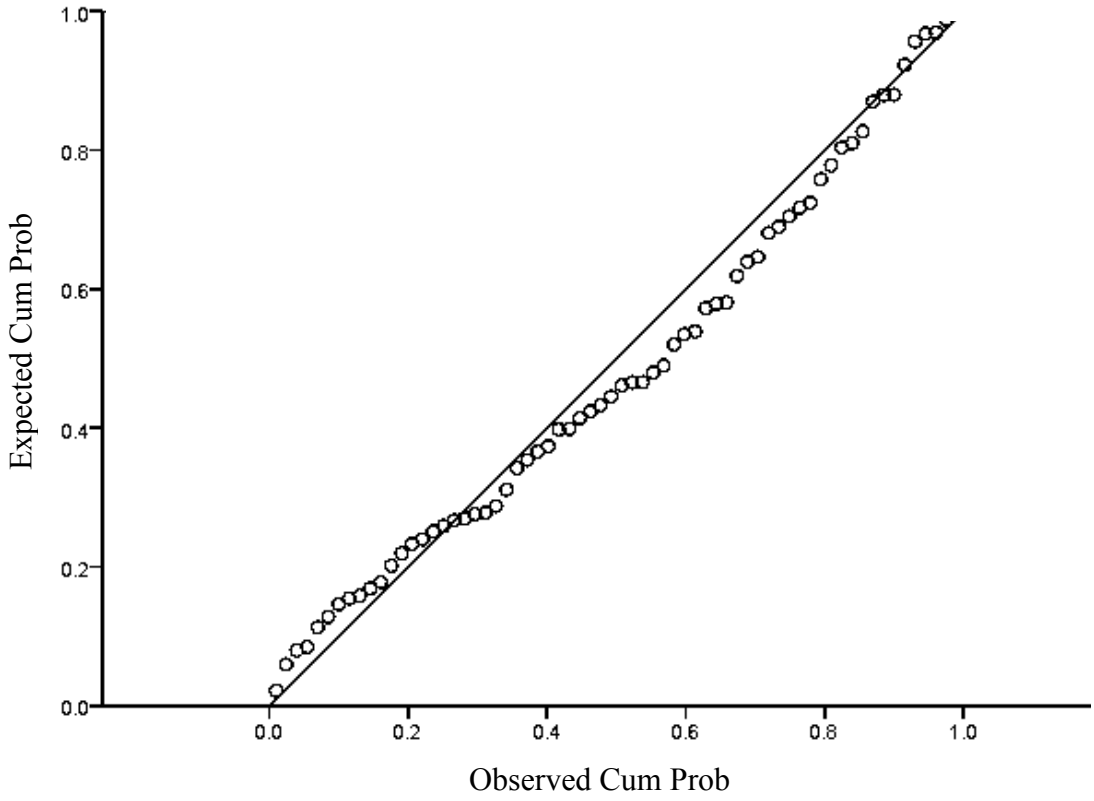

Figure 1. Normal P-Plot of the expected cumulative probability and the observed cumulative probability of the dependent variable PERHENR.

The p-plot revealed no irregularities. The scatter plot of the standardized predicted and residual values for the dependent variable PERHENR is presented in Figure 2.

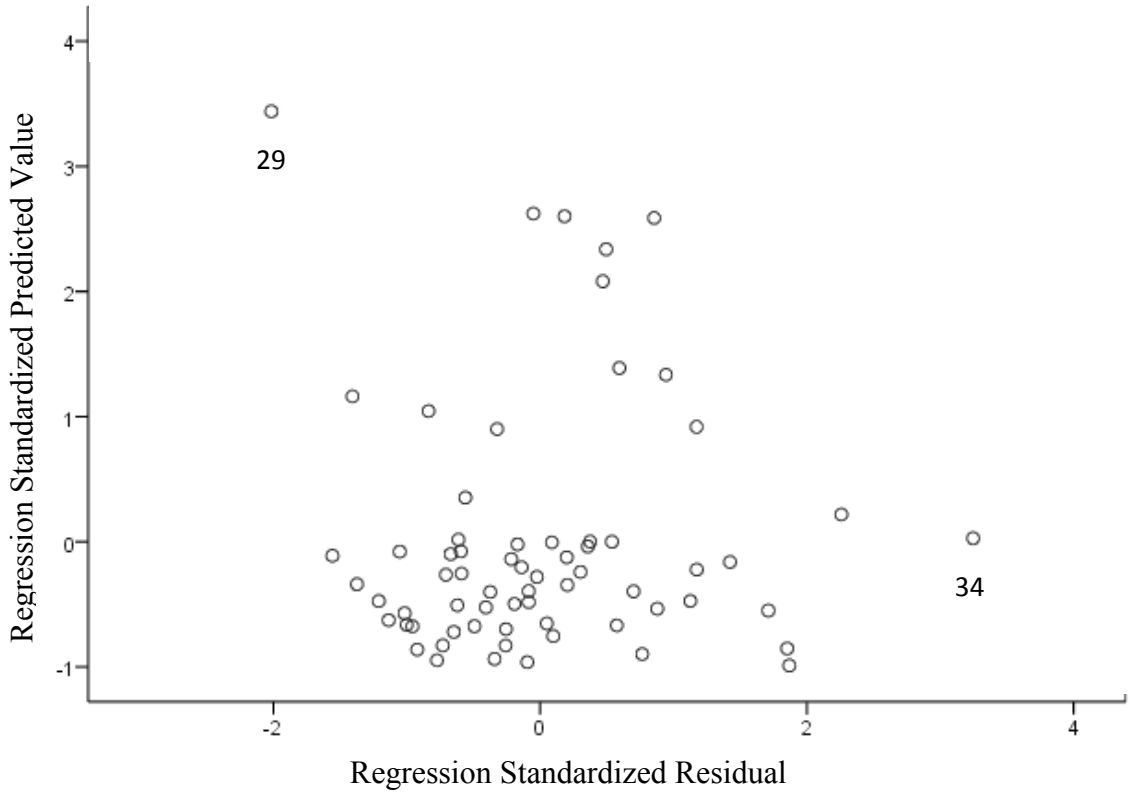

Figure 2. Plot of standardized predicted and residual values of the dependent variable PERHENR.

In the PERHENR data set there are two coordinates that are outside of the +/- 3 standard deviations. They are for observed variables #29 and #34, which are Laredo Community College and Mountain View College, respectively. Laredo College has a standardized predictor value of 3.43926 and a standardized residual value of -2.01526. According to Lane (2007), a common rule of thumb is that an

observation with a value of Cook's D over 1 has too much influence. The Cook's D value for Laredo College is .52037, which is less than 1 so it will be retained in the data set. Laredo College has a Hispanic enrollment percentage of 95%, which is consistent with the local Hispanic population percentage of 96%. Although these values are high, to exclude them from the population would not present a true picture of the Hispanic enrollment in the state of Texas. Because Laredo is isolated from any metropolitan area in the state, the options for college are not plentiful for students who do not choose to leave home to attend college. Inspection of the Cook's D value for Mountain View College reveals a value of .06115. From this we ascertain that the influence of the predictor variable on the mean is very small, so Mountain View College also will be retained in the data set.

The Centered Leverage Value (CLV) examination also revealed that Laredo Community College could be a possible outlier. Hoaglin and Welsch (as cited in Pedhazur, 1997) calculated the maximum CLV as $h_i > 2(k + 1)/n$ where h_i is the maximum value, k equals the number of predictor variables and n equals the number of observations. The maximum value would be $2(4 + 1)/66 = .151$. Five colleges had values greater than .151. They were Laredo Community College (.2922), South Texas College (.22148), Texarkana College (.17222), Texas Southmost College (.23922) and Texas State Technical College-Harlingen (.22743). Of those five, only Laredo Community College was also considered and outlier when performing the Cook's D examination. With the exception of Texarkana College, all of these institutions have the highest LHISPOP and the

highest PERHENR. According to Pedhazur, 1997, theoretical considerations should play the paramount role in attempts to explain these findings. All of these institutions were retained in the data set.

Outlier Analysis of HISPGRPER Data Set

The Normal P-Plot of the expected cumulative probability and observed cumulative probability values for the dependent variable HISPGRPER is presented in Figure 3.

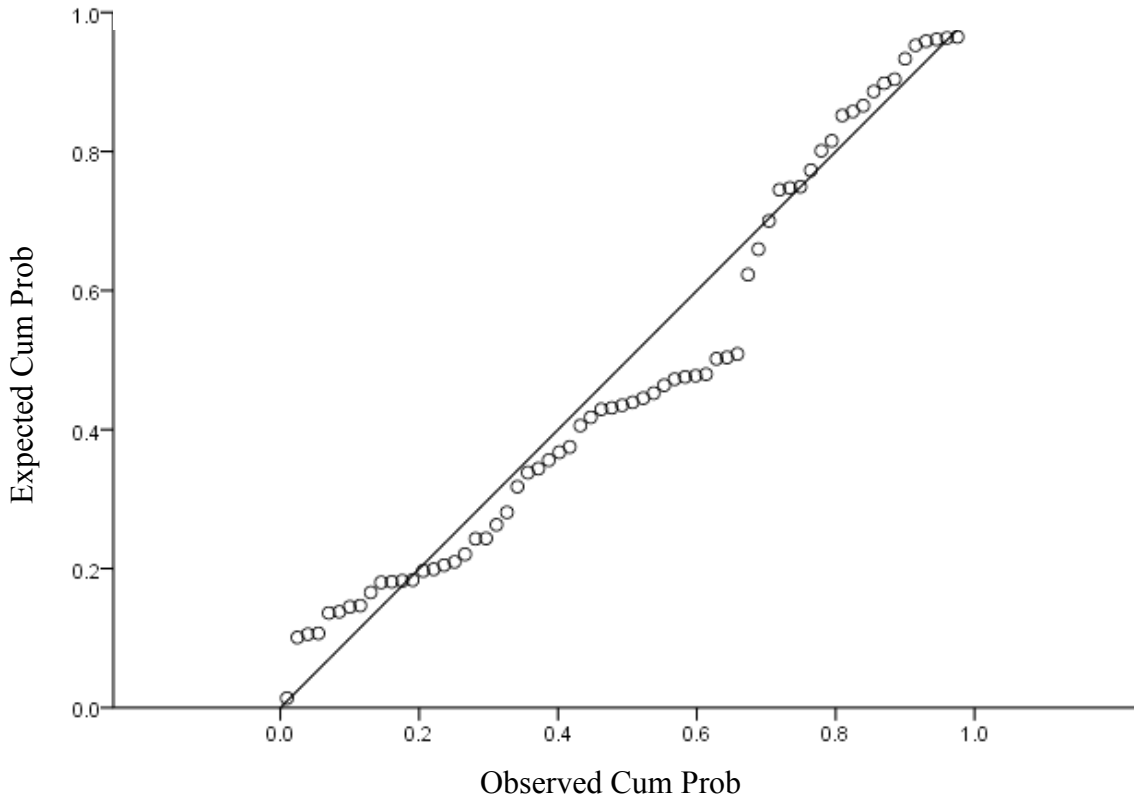

Figure 3. Normal P-Plot of the expected cumulative probability and the observed cumulative probability of the dependent variable HISPGRPER.

The data were analyzed for potential normality issues in relation to each dependent variable. The scatter plot of the standardized predicted and residual values for the dependent variable HISPGRPER is presented in Figure 4.

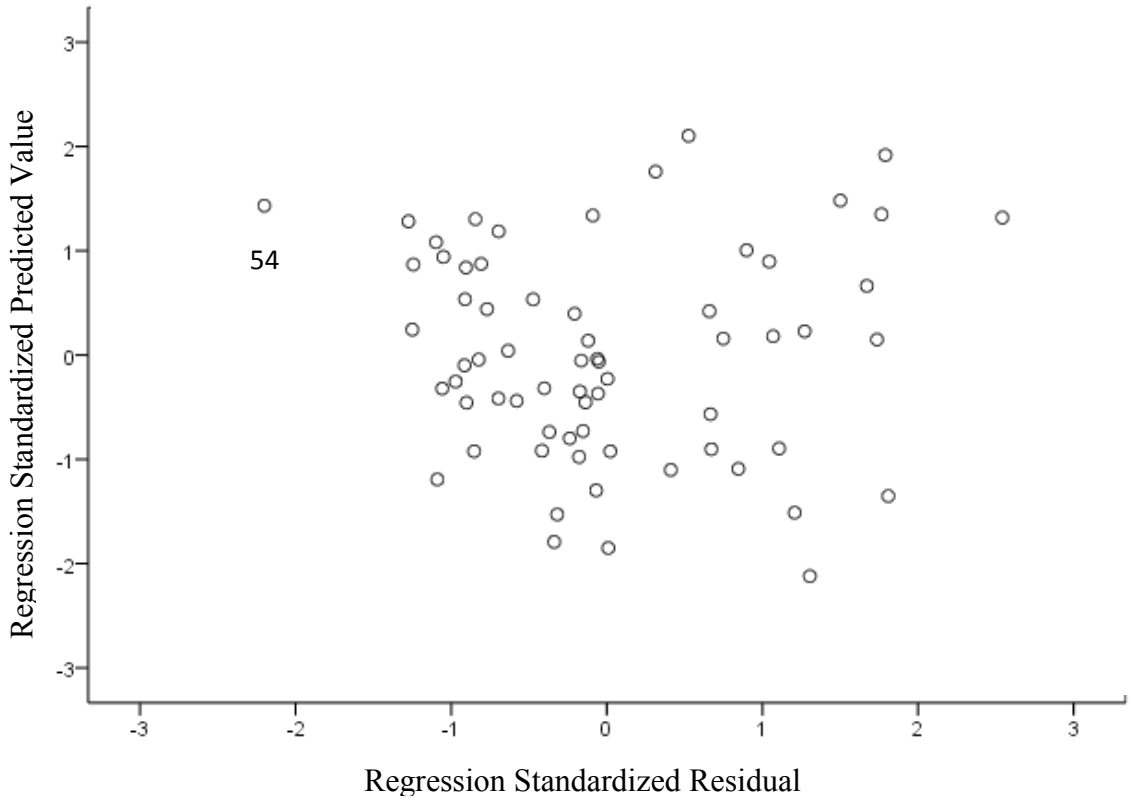

Figure 4. Plot of standardized predicted and residual values of the dependent variable HISPGRPER.

Outliers are extreme values of observed variables that can distort estimates of regression coefficients. Review of the scatterplot of the standardized predictor values and the standardized residuals in the HISPGRPER data set revealed one observed variable that appeared to be an outlier. Institution #54 had a standardized predictor value of 1.43157 and a standardized residual value of -

2.20116. Further review of the potential outlier case revealed a Cook's D value of .275. According to Lane (2007), a common rule of thumb is that an observation with a value of Cook's D over 1 has too much influence. Institution #54 is Texarkana College, which is located in Texarkana, Texas. Its reported HISPGRPER value was 0.00%, which is not far from its reported enrollment of 3% Hispanic students and lies within the +/- 3 standard deviations of the mean. Although Texarkana College does participate in federal Title IV grant programs, it does not participate in any federal loan programs. The absence of loan assistance may account for the inability of students to complete their education or a decision to transfer to another institution. Texarkana College also had a CLV of .17222 which is slightly greater than the recommended maximum value of .151. Following Pedhazur's (1997) guidance that theoretical considerations should guide evaluations this research will use St. John, Paulsen, and Starkey's (1996) college choice nexus to explain this occurrence and retain this variable in the analysis.

Descriptive Statistics of the Complete Data Set

The purpose of this study is to determine how well selected institutional characteristics explain the variance in enrollment and graduation rates of Hispanic students attending the 66 Texas community colleges. Descriptive statistics for the 66 institution sample are presented in Table 2.

Further analysis was conducted individually for each of the dependent variables. Correlation matrices were generated to determine not only the relationship of each predictor with the criterion variable, but among the predictor variables as well. Omnibus

regressions incorporating the four predictor variables were performed to obtain R and R^2 correlation coefficients for each dependent variable. Additionally, b, β, structure and squared coefficients for the individual predictors were obtained to determine how well each related to the observed and predicted values of the criterion variable. Finally, to identify the best predictor(s) of each dependent variable, the unique and combined usefulness of each predictor variable was calculated using commonality analysis.

Table 2

Descriptive Statistics of the Study Sample

	N	Mean	Std. Deviation
Predictor Variables			
AVGCOA	66	12576	1948.379
AVGFA	66	3865	748.113
PERHFAC	66	0.1152	0.16594
LHISPOP	66	0.3746	.22292
Dependent Variables			
HISPGRPER	66	0.1567	0.09385
PERHENR	66	0.2955	0.23621

Analysis of the PERHENR Data Set

Multiple Regression

The correlation matrix indicating the strength and direction of the relationships among the dependent and predictor variables is presented in Table 3.

There is a very strong and positive relationship between the predictor variable PERHFAC and the dependent variable PERHENR, r = .938. This is also true between PERHENR and LHISPOP where r = .912. PERHENR and AVGFA also have a strong and positive relationship. The relationship between PERHENR and AVGCOA is positive but weak.

Among the predictor variable AVGCOA and the other predictor variables of AVGFA, LHISPOP, and PERHFAC there is a positive but weak relationship. AVGFA and the predictor variables LHISPOP and PERHFAC exhibit a strong and positive relationship that is also significant at p<=.01. The strongest correlation between predictor variables is between LHISPOP and PERHFAC at .844, and it is significant at alpha value .01. According to Kirk (2001), a significance test does not tell the researcher how large the effect is or whether the effect is important or useful. The focus should be on what the data tell about the phenomenon under investigation.

Table 3

Correlation Matrix Among Predictor Variables and Between Dependent Variable PERHENR

VARIABLE	AVGCOA	AVGFA	LHISPOP	PERHFAC
PERHENR	.184	.514	.912	.938
AVGCOA		.030	.188	.184
AVGFA			.506	.524
LHISPOP				.844

An omnibus regression equation of the four predictor variables on the dependent variable of PERHENR generated a statistically significant model, F (4,61) = 205.174, p<.001. The Pearson R correlation and R^2 effect size coefficients for the predictors on the dependent variable of PERHENR are presented in Table 4.

Table 4

R and R^2 Coefficients for Percentage of Hispanic Enrollment

R	R^2
0.965	0.931

The *R* coefficient between PERHENR and the predictor variables is strong and positive with a value of .965. The R^2, or effect size, indicates that 93.1% of the variance in the dependent variable is accounted for by the four predictor values.

Regression coefficients in the form of unstandardized *b* and standardized β weights were obtained to determine how well each predictor contributes to the X values of the linear equation and the composition of the $\hat{Y}$ dependent variable. The size of β reflects not only the presumed effect of the variable with which it is associated but also the variances and the covariances of the variables in the model. In contrast, b remains fairly stable despite differences in the variances and the covariances of the variables in different settings or populations (Pedhazur, 1997). Additionally, structure coefficients were generated to determine how well the observed predictors correlate with the $\hat{Y}$ value for the dependent variable. The *b*, β and squared structure coefficients (effect size) for the regression model on PERHENR are presented in Table 5.

Table 5

b, β and Structure Coefficients for the Regression Model of PERHENR

Predictor	Standard Error	*b*	β	Structure Coefficients	Structure Coefficients 2
AVGCOA	.000	.000	-.002	.191	.036
AVGFA	.000	.000	-.006	.533	.284
PERHFAC	.067	.445	.420	.946	.894
LHISPOP	.092	.836	.588	.973	.946

The findings presented in Table 5 indicate that the predictor variable LHISPOP is the greatest contributor to the regression equation and the creation of $\hat{Y}$ (b = .836, p<.01; β = .588). The *b* coefficient for AVGCOA and ACGFA had a value less than .000.

The structure coefficients indicate that LHISPOP is highly correlated with the predicted value of PERHENR (r = .973, p<.001) and is capable of recreating 94.6% of the effect in the $\hat{Y}$. The predictor variable PERHFAC is also highly correlated with the predicted value of PERHENR (r = .946, p<.001). The high correlation to the dependent variable PERHENR and closeness of the structure coefficients for LHISPOP and PERHFAC in value indicates the possibility of a suppressor effect. A suppressor effect occurs when the inclusion of a variable in a multiple regression analysis leads to a standardized regression coefficient of a predictor to be larger than it is in the absence of the suppressor variable. Introduction of the notion of suppressor variable has increased the potential for ignoring the paramount role of theory in interpreting results of multiple regression analysis (Pedhazur, 1997). According to Beaujean (personal communication, February 29, 2012), a suppressor effect can be tested for by determining if

SSR(PERHFAC|LHISPOP) > SSR(PERHFAC) where SSR is the regression sum of squares. In this equation the resulting value is .972 which is grater that .946 and would validate the assumption that a suppressor effect is present. Sharpe and Roberts (1997) represent the formula as $SSR(x_2|x_1) > SSR(x_2)$.

The structure coefficient for the predictor variable AVGCOA was moderately correlated but was not significant at alpha value .001. It accounted for 3.6% of the variance in the predicted dependent value. AVGFA was strongly correlated to the value of the predicted variable and is significant at alpha value .001. It accounted for 28.4% of the variance in the predicted dependent value. The AVGCOA was not expected to be highly correlated with enrollment because this research postulated that most Texas community colleges do not provide on campus housing and elements of the cost of attendance like housing costs and personal and miscellaneous expenses would not have as great of an impact as actual tuition and fee expenses. AVGFA was expected to be strongly correlated because financial aid would be depended upon to pay the direct costs to the student of tuition, fees, and books.

Commonality Analysis

Commonality analysis was conducted to identify which of the four predictor variables was most useful, uniquely and in combination with the other predictors, in accounting for the variance in the dependent variable PERHENR, $R^2 = .931$. The unique and combined variance accounted for in the criterion variable of PERHENR by each predictor variable is presented in Table 6.

Commonality analysis decomposed the model R^2 value of .931 into the 15 unique components. This reveals that PERHFAC uniquely accounts for the majority of the

Table 6

Unique and Common Variance Accounted for in PERHENR

Grouping	AVGCOA ***a***	AVGFA ***b***	LHISPOP ***c***	PERHFAC ***d***
U ***a***	0			
U ***b***		0		
U ***c***			0.050	
U ***d***				0.095
C ***a,b***	0	0		
C ***a,c***	0.050		0.050	
C ***a,d***	0			0
C ***b,c***		0	0	
C ***b,d***		-0.047		-0.047
C ***c,d***			0.493	0.493
C ***a,b,c***	0	0	0	
C ***a,b,d***	0.001	0.001		0.001
C ***a,c,d***	0.029		0.029	0.029
C ***b,c,d***		0.256	0.256	0.256
C ***a,b,c,d***	0.004	0.004	0.004	0.004
Total Variance by Predictor	0.036	0.110	0.418	0.461
Variance Unique to Predictor	0	0	0.050	0.095
Variance in Common	0.036	0.110	0.368	0.366

variance in the dependent variable PERHENR. The PERHFAC variance unique to the predictor of 9.5% represents 10.2% of the total R^2 and indicates that PERHFAC is the best of all predictors in this population. The predictor variable LHISPOP is the second best predictor of the dependent variable PERHENR and accounts for 5.3% of the total R^2. The predictor variable PERHFAC represents 10.2% of the variance and shares 36.8% with the other predictor variables.

As previously stated, the college choice nexus is based on the likelihood of an individual decision to enroll and persist. This research used institutional level data where all of the student's choices are aggregated into a number, usually expressed as a percentage. Robinson (1950) called them ecological correlations and states that they are often used simply because correlations between the properties of individuals are not available. It is not uncommon for the interpretation of data to not be consistent with the expected outcome. This was the case with the analysis of this data. Prior research (Heller, 1997; St. John, Paulsen, and Starkey, 2006; Stage and Hossler, 1989; St. John, 2004; Texas Higher Education Coordinating Board, 2010; Bishop, 1977) indicated that financial factors such as the cost of tuition and fees were a strong predictor of a student's choice to enroll and to persist to graduation.

This unexpected outcome is due in part to the presence of collinearity between the predictor variables LHISPOP and PERHFAC. Collinearity implies that two variables are near perfect linear combinations of one another. When there is a perfect linear relationship among the predictors, the estimates for a regression model cannot be uniquely computed. The most common check for collinearity is to review the tolerance and VIF or variance inflation factors (UCLA, 2012). Pedhazur (1997) states that the

larger the VIF, the larger the standard error of the regression coefficient in question. Accordingly, it has been proposed that large VIF's be used as indicators of regression coefficients adversely affected by collinearity. While useful, VIF is not without shortcomings. Belsley (1984) pointed out that "no diagnostic threshold has yet to be systematically established for them (VIF's) – the value of 10 frequently offered is without meaningful foundation …they are unable to determine the number of coexisting near-dependencies." The review of data for this research revealed a tolerance and VIF values of .280 and 3.572 for the predictor variable LHISPOP and tolerance and VIF values of .273 and 3.659 for the predictor variable PERHFAC.

Summary of PERHENR Regression

There is a very strong and positive relationship between the predictor variable PERHFAC and the dependent variable PERHENR, r = .965, p<.01. The strongest correlation between predictor variables is between LHISPOP and PERHFAC, at .844 and it is significant at alpha value .01. The *R* coefficient between PERHENR and the predictor variables is strong and positive with a value of .965. The R^2, or effect size, indicates that 93.1% of the variance in the dependent variable is accounted for by the four predictor values. The structure coefficients indicate that LHISPOP is highly correlated with the predicted value of PERHENR (r = .973, p<.001) and is capable of recreating 94.6% of the effect in the $\hat{Y}$. Commonality analysis revealed that the PERHFAC variance unique to the predictor of 9.5% represents 10.2% of the total R^2 (.931) and indicates that PERHFAC is the best of all predictors in this population. The results of the PERHENR regression delivered results that were contrary to those expected. It was expected that AVGFA would be a much stronger predictor of a student's decision to enroll and persist

than the predictor values of LHISPOP and PERHFAC. While the presence of collinearity was not detected in the initial examination of SPSS output based on suggested values for tolerance and VIF it appears that the outcomes of the data analysis were impacted and provided unexpected results.

Analysis of HISPGRPER Data Set

Multiple Regression

The correlation matrix indicating the strength and direction of the relationships among the dependent and predictor variables is presented in Table 7. The relationship between the dependent variable HISPGRPER and the predictor variables of AVGFA, LHISPOP, and PERHFAC are all weak and negative (-.048, -.235, -.090, respectively). None of them are statistically significant at alpha .01. The relationship between HISPGRPER and the predictor variable of AVCOA is also weak but positive. None of

Table 7

Correlation Matrix Among Predictor Variables and Between Dependent Variable HISPGRPER

VARIABLE	AVGCOA	AVGFA	LHISPOP	PERHFAC
HISPGRPER	.067	-.048	-.235	-.090
AVGCOA		.030	.188	.184
AVGFA			.506	.524
LHISPOP				.844

the predictor variables have a significant relationship to the criterion variable of HISPGRPER at .01 or .05.

Among the predictor variables there is a weak but positive relationship between AVGCOA and AVGFA. The relationship between AVGCOA and LHISPOP and PERHFAC is both moderately weak and positive, but neither is statistically significant at alpha .01. AVGFA and LHISPOP exhibit a moderate and positive relationship that is significant at alpha value .01. This is also true of the relationship between AVGFA and PERHFAC. The predictor variable LHISPOP and PERHFAC exhibits a very strong and positive relationship that is statistically significant at alpha value .01. The data suggest the presence of collinearity between the predictor variables LHISPOP and PERHFAC that will have an adverse impact on the analysis of the HISPGRPER regression.

An omnibus regression equation of the four predictor variables on the dependent variable of HISPGRPER generated a statistically insignificant model, $F(4,61) = 1.881$ $p<.001$. The Pearson *R* correlation and R^2 effect size coefficients for the predictors on the dependent variable of HISPGRPER are presented in Table 8.

Table 8

R and R^2 Coefficients for Hispanic Graduation Percentage

R	R^2
0.331	0.110

The *R* coefficient between HISPGRPER and the predictor variables is moderate and positive with a value of .331. The R^2, or effect size, indicates that 11% of the variance in the dependent variable is accounted for by the four predictor values.

Regression coefficients in the form of unstandardized *b* and standardized β weights were obtained to determine how well each predictor contributes to the X values of the linear equation and the composition of the $\hat{Y}$ dependent variable. Additionally, structure coefficients were generated to determine how well the observed predictors correlate with the $\hat{Y}$ value for the dependent variable. The *b*, ß and squared structure coefficients (effect size) for the regression model on HISPGRPER are presented in Table 9.

The findings presented in Table 9 indicate that the predictor variable LHISPOP is the greatest contributor to the regression equation and the creation of $\hat{Y}$ (b = .198, p<.01; β = .350). The *b* coefficient for PERHFAC had a value less than .000 and the remaining two *b* coefficients were very small. There was no evidence of a suppressor effect or shared variance between any of the predictors in constructing the $\hat{Y}$.

The structure coefficients indicate that LHISPOP is highly correlated with the predicted value of HISPGRPER (r = -.710, p<.001) and is capable of recreating 50% of

Table 9

b, ß and Structure Coefficients for the Regression Model of HISPGRPER

Predictor	*b*	β	Structure Coefficients	Structure Coefficients 2
AVGCOA	.000	.110	.202	.040
AVGFA	.000	.059	-.146	.021
PERHFAC	-.245	-.581	-.271	.073
LHISPOP	.198	.350	-.710	.504

the effect in the $\hat{Y}$. The structure coefficients for the predictor variables of AVGCOA, AVGFA, and PERHFAC were not statistically significant and accounted for 4%, 2.1%, and 7.3% of the variance in the predicted dependent value, respectively. According to Kirk (2001), a significance test does not tell the researcher how large the effect is or whether the effect is important or useful.

Commonality Analysis

Commonality analysis was conducted to identify which of the four predictor variables was most useful, uniquely and in combination with the other predictors, in accounting for the variance in the dependent variable Hispanic Graduation Percentage, $R^2 = .110$. A review of Si's (2001) formula for the number of commonality algorithms required, 2^k-1 where ^{k} equals the number of predictor variables, indicates that a total of 15 unique and combined values will be calculated. The unique and combined variance accounted for in the criterion variable of HISPGRPER by each predictor variable is presented in Table 10.

Commonality analysis decomposed the model R^2 value of .110 into the 15 unique components. This reveals that LHISPOP uniquely accounts for the majority of the variance in the dependent variable HISPGRPER. The LHISPOP variance unique to the predictor of 9.5% represents 86.36% of the total R^2 (.110) and indicates that LHISPOP is the best of all predictors in this population. The predictor variable PERHFAC is the second best predictor of the dependent variable HISPGRPER and accounts for 30.9% of the total R^2 (.034/.110). This was not an expected outcome. The predictor variables of AVGFA and AVGCOA were expected to be much stronger predictors of the dependent variable HISPGRPER. There are two possible reasons for this unexpected finding. One

Table 10

Unique and Common Variance Accounted for in HISPGRPER

Grouping	AVGCOA ***a***	AVGFA ***b***	LHISPOP ***c***	PERHFAC ***d***
U ***a***	0.012			
U ***b***		0.003		
U ***c***			0.095	
U ***d***				0.034
C ***a,b***	-0.002	-0.002		
C ***a,c***	0.087		0.087	
C ***a,d***	0.002			0.002
C ***b,c***		-0.003	-0.003	
C ***b,d***		-0.087		-0.087
C ***c,d***			-0.026	-0.026
C ***a,b,c***	0.002	0.002	0.002	
C ***a,b,d***	0.001	0.001		0
C ***a,c,d***	-0.004		-0.004	-0.004
C ***b,c,d***		-0.002	-0.002	-0.002
C ***a,b,c,d***	-0.002	-0.002	-0.002	-0.002
Total Variance by Predictor	0.060	0.051	0.156	0.094
Variance Unique to Predictor	0.012	0.003	0.095	0.034
Variance in Common	0.048	0.048	0.061	0.060

is the issue of data aggregation. The college choice nexus examines individual student decisions to explain enrollment and persistence. This research used institutional data, or the aggregate of individual data. As Robinson (1950) discussed, it is not uncommon for the interpretation of data to not be consistent with the expected outcome. A second factor is the detected presence of collinearity between the predictor variables LHISPOP and PERHFAC. Possible remedies might include deleting the "culprit" variables, ensuring that the correct regression model is used, or collecting additional data in hopes that the collinearity would be ameliorated. Proposed remedies for collinearity do not constitute a cure (Pedhazur, 1997). A thorough understanding of the possible causes of collinearity in a given set of data is the best guide for determining which action should be taken.

Summary of HISPGRPER Regression

The predictor variables LHISPOP and PERHFAC exhibit a very strong and positive relationship that is statistically significant at alpha value .01. The findings presented in an analysis of the structure coefficients indicate that the predictor variable LHISPOP is the greatest contributor to the regression equation and the creation of $\hat{Y}$ (b = .198, $p<.01$; $\beta = .350$). The LHISPOP variance unique to the predictor of 9.5% represents 86.36% of the total R^2 and indicates that LHISPOP is the best of all predictors in this population. The results of the HISPGRPER regression delivered results that were contrary to those expected. It was expected that AVGFA would be a much stronger predictor a of student's decision to enroll and persist than the predictor values of LHISPOP and PERHFAC. While the presence of collinearity was not detected in the initial examination of SPSS output based on suggested values for tolerance and VIF it

appears that the outcomes of the data analysis were impacted and provided unexpected results.

Summary

Multiple regression and commonality analysis were used to explain the effect of the four predictor variables of AVGCOA, AVGFA, LHISPOP, and PERHFAC on the dependent variables of PERHENR and HISPGRPER. Analysis of the PERHENR data set revealed that LHISPOP is the greatest contributor to the PERHENR regression equation but commonality analysis indicated that PERHFAC uniquely accounts for the majority of the variance in the dependent variable. Analysis of the HISPGRPER revealed that none of the predictor variables have a strong relationship to the dependent variable. Commonality analysis revealed that LHISPOP accounted for 86.36% of the variance in the dependent variable HISPGRPER.

The presence of collinearity between the predictor variables PERHFAC and LHISPOP revealed unexpected results from the regression of the dependent variable HISPGRPER. Aggregation of the data may have also impacted the outcome of this study.

CHAPTER FIVE

Conclusions

Restatement of the Problem and Purpose of the Research

The problem this research explored is that Texas Hispanic students attending 66 Texas community colleges are not meeting THECB established goals related to enrollment, retention, and graduation rates. The population for this quantitative study was the 66 Texas public community colleges, as identified from the Integrated Postsecondary Education Data System (IPEDS) Data Center data base. IPEDS provides an electronic filter function that allows researchers to define institutional comparison groups based on a number of criteria. Institutions selected for this research were those that met the criteria of participating in federal Title IV financial aid programs, were located in Texas, and whose Carnegie Classification 2005 equaled Associate's—Public.

The purpose of this study was to determine how well selected institutional characteristics explain the variance in enrollment and graduation rates of Hispanic students attending the 66 Texas community colleges. The final aim was to identify which predictor variable was most useful in explaining the variance in each dependent variable.

This non-experimental, empirical research study employed univariate techniques to analyze institutional characteristics and participation data related to Texas Hispanic students attending the 66 selected Texas public community colleges. This design was

appropriate, as the aims of this quantitative study were to identify how well selected institutional variables explain Hispanic participation and success patterns, which predictor variable(s) is most useful in predicting these outcomes, and how well data from the Texas public community colleges fit the predictive model.

Research Questions Addressed

The research questions are presented and responded to individually based upon the findings from Chapter 4. The specific research questions for this study include the following.

Research Question #1: How well do the predictor variables of average total cost of attendance (AVGCOA), average federal/state/local, and institutional grants (AVGFA), local Hispanic population (LHISPOP), and percentage of Hispanic faculty (PERHFAC) explain the enrollment of Texas Hispanics at Texas community colleges?

An omnibus regression equation of the four predictor variables on the dependent variable of PERHENR generated a statistically significant model, $F(4,61) = 205.174$, $p<.001$. The Pearson R correlation and R^2 effect size coefficients for the predictors on the dependent variable of PERHENR are presented in Table 4. Based on the substantial R^2 coefficient, or effect size of 93.1%, the four predictor variables would be considered suitable predictors of $\hat{Y}$ in subsequent studies of like populations.

Tinto (2006) noted that there is an economic stratification occurring in higher-education institutions that causes students of low socioeconomic status to attend 2-year institutions. Beginning their education at a 2-year institution often places barriers to their completion in the form of finances and proximity to a 4-year institution. In this study, the

variables of AVGCOA and AVGFA are financial factors and LHISPOP would indicate proximity for the Hispanic students.

The Texas Higher Education Coordinating Board placed a strong emphasis on community colleges where 60% of Hispanic students choose to enroll (Texas Higher Education Coordinating Board, 2010). The intent was to develop an affordability framework for financing postsecondary education that coordinates state appropriations, tuition policy, and student aid policy to ensure the affordability of higher education for the state as well as for students and their families (Texas Higher Education Coordinating Board, 2010). This research study found a strong correlation between the dependent variable of PERHENR and AVGFA, with a correlation coefficient of .514. This would support the necessity for increased affordability for Texas Hispanics attending community colleges. Horn and Berger (2004) describe the most underserved populations as the least able to afford the continuous escalation of tuition costs. If they do enroll, they are the least likely to complete a degree or certificate.

Research Question #2: How well do the predictor variables of average total cost of attendance (AVGCOA), average federal/state/local, and institutional grants (AVGFA), local Hispanic population (LHISPOP), and percentage of Hispanic faculty (PERHFAC) explain the graduation rates of Texas Hispanics at Texas community colleges?

An omnibus regression equation of the four predictor variables on the dependent variable of HISPGRPER generated a statistically insignificant model, $F(4,61) = 1.881$, $p<.001$. The Pearson R correlation and R^2 effect size coefficients for the predictors on the dependent variable of HISPGRPER are presented in Table 8. Based on the R^2 value of

11%, the four predictor variables would not be considered suitable predictors of $\hat{Y}$ in future studies of like populations.

This finding is supported by Paulsen and St. John (2002), who said that low tuition and student aid were negatively associated with persistence for low-income students, which indicated an inadequacy of financial aid relative to tuition costs and explains the negative effect of choosing a college because of both low tuition and aid. This also supports the THECB's suggestion that an affordability strategy is important (Texas Higher Education Coordinating Board, 2010).

O'Connor, Hammack, and Scott (2010) state that although Hispanics have high expectations for graduation, only 26% of those who began their education at a community college achieved that goal. Researchers found that students in community colleges are more sensitive to college costs than students in the 4-year sector (Heller, 1997). In a study utilizing the NPSAS-87 to examine the influence of finance-related reasons for choosing a college on persistence decisions the findings included: 1) Finance related choices have direct and indirect influences on whether students persist in college; and 2) Market-based, monetary measures of financial aid, tuition costs, housing costs, and other living costs have a substantial direct influence on persistence (St. John, Paulsen, and Starkey, 1996).

Oseguera and Rhee (2009) found that faculty contact and interactions influence persistence behavior, but not necessarily their decision. Laird and Cruse (2009) postulated that an institution with a higher percentage of part-time students may have an environment that contains barriers to engagement for all students. Their study results suggested that improving the interaction of part-time students with faculty could bring

them closer to educational parity with their full-time counterparts, and called for directing institutional level resources toward that goal.

The Closing the Gaps most recent Progress Report issued in July 2011 (Texas Higher Education Coordinating Board, 2011) observes that there are gains in Hispanic enrollment. The 2-year persistence rate for Hispanic students attending public community colleges in the 2009 cohort was a half percentage point below White students at 53.2%. The 1-year persistence rate for Hispanics was nearly the same as for Whites, at 66.6% and 66.7%, respectively. This would indicate that the issue may not be getting Hispanic students to enroll, but to persist until graduation. This is supported by findings of the NCPPHE (2011), which note that the escalation of tuition makes it more probable that those who are least likely to afford college attendance will be the least likely to complete their education.

Research Question #3: Which predictor variable is the most useful in explaining the variance in Hispanic enrollment?

Commonality analysis decomposed the R^2 value of 93.1% into the unique and combined usefulness of the four predictor variables. This research revealed that PERHFAC uniquely accounts for the majority of the variance in the dependent variable PERHENR.

Hurtado, Ruiz, and Guillermo-Wann (2011) examined the saliency of racial identity as a contributing factor to students' general college experiences and experiences with the campus climate for diversity. Results from their study indicate that students from Latina/Latino backgrounds spend more time thinking about race than their White peers, and that campus climate factors are significantly related to the outcome measures.

Oseguera and Rhee (2009) evaluated the extent to which peer institutional climates and faculty perceived campus climates influenced individual 6-year retention rates. The retention climate was found to be a determining factor in students' withdrawal intentions. Faculty contact and interactions were also found to influence persistence behavior, but not necessarily their decision.

The findings of Hurtado, Ruiz, and Guilerrmo-Wann (2011) and Oseguera and Rhee (2009) support the findings of this research, which found that PERHFAC exhibited a very strong and positive relationship with PERHENR, $r = .965$, $p<.01$.

Research Question #4: Which predictor variable is the most useful in explaining the variance in Hispanic graduation rates?

Commonality analysis decomposed the model R^2 value of .110 into the 15 unique components. This research revealed that LHISPOP uniquely accounts for the majority of the variance in the dependent variable HISPGRPER. The LHISPOP variance unique to the predictor of 9.5% represents 86.36% of the total R^2 value of .110 and indicates that LHISPOP is the best of all predictors in this population. The predictor variable PERHFAC is the second best predictor of the dependent variable HISPGRPER, and accounts for 30.9% of the total R^2.

Baird (2006) also questioned the combined effect of reductions in federal and state aid on college enrollment decisions, especially for Hispanic youth. Baird's research concluded that enrollment rates at 2-year institutions were not related to tuition or financial aid, but more attributable to the accessibility to an institution.

Paulsen and St. John (2002) noted that potential students may have had limited mobility, choice, and financial means and that their culture and values have a substantial

influence on the methods used to determine educational choices. According to Sosa (2002), cultural factors contribute to a predisposition to work rather than leaving home for college. The student leaving home is a fear for both students and their families.

The Hispanic Graduation Percentage (HISPGRPER) was defined in this research as the percentage of Hispanics who graduated from the selected Texas community colleges. It may seem elementary to consider, but the findings of Sosa (2002) and Baird (2006) support the findings of this study, which found that the predictor variable of LHISPOP is directly related to the dependent variable of HISPGRPER because of the tendency of Hispanic students to choose not to leave home to attend college. Instead, they tend to enroll based on accessibility of the institution. Paulsen and St. John (2002) also noted students limited mobility as a factor.

Areas for Additional Research

There are many obvious areas of additional research that may be suggested. For purposes of this study, the focus will be on questions that will supplement or add to this research. If the college choice nexus of St. John, Paulsen, and Starkey (2006) is viable, then an obvious question for Texas is "What are institutions doing that is inconsistent with the desires of Hispanic students after they initially enroll that creates barriers to their graduation?" The Closing the Gaps most recent Progress Report issued in July 2011 (Texas Higher Education Coordinating Board, 2011) observes that there are gains in Hispanic enrollment. The 2-year persistence rate for Hispanic students attending public community colleges in the 2009 cohort was a half percentage point below White students at 53.2%. The 1-year persistence rate for Hispanics was nearly the same as Whites at 66.6% and 66.7%, respectively. Further research is required to determine if Texas

community colleges are facilitating the actual desired goals of Texas Hispanic students, which may not be consistent with the goals of Closing the Gaps 2015.

The definition of AVCOA for this study includes the cost of tuition, fees, room, board, books, personal, and miscellaneous expenses. This research found that the AVCOA was not a significant factor in determining Hispanic students' decision to enroll or graduate. Additional study that focuses on the cost elements of tuition and fees only might be more appropriate to determine which cost variable can explain Hispanic decisions to enroll or persist until graduation.

In this study, the PERHFAC and LHISPOP had a common variance in PERHENR that accounted for 36.8% and 36.6%, respectively. Further study is required to determine if institutions that have PERHFAC that are inconsistent with the LHISPOP could reinforce the institutions' ability to impact enrollment by ensuring that their faculty are a reflection of the local population.

Santiago (2011) encourages Texas and all states to adopt policies that will increase Latino degree completion and make college accessible and affordable for students of all economic backgrounds. Specifically related to the legislature, Santiago recommends that the state create financial incentives for low-income students that make continuous enrollment possible all the way through degree attainment. Additional study should be done to determine if the focus on full-time attendance with aid policies is a detriment to completion for Hispanic students if they are prone to part-time attendance.

Additional research is also needed to isolate the predictor variables of LHISPOP and PERHFAC to determine if they actually significantly contribute to the success of Hispanic students or if they are just a common denominator of community colleges who

serve Hispanic populations. These variables may suppress the importance that the AVCOA and AVGFA have in explaining the enrollment and graduation of Texas Hispanic students.

Haynes (2009) found the total cost of attendance to be useful in predicting the Hispanic graduation percentage among a sample of 190 public, 4-year colleges and universities in the states with the top 10 Hispanic populations for academic year 2004-2005. This is contrary to the findings of this study of Texas community colleges where the AVCOA was not a significant contributor to Hispanic students' graduation rates. Additional research to explain how the total cost of attendance influences Hispanic student graduation rates at different types of public institutions could identify areas for improvement and reduction in barriers to graduation.

Summary

Texas' ability to raise the level of education of all its residents, particularly its Hispanic/Latino and African-American populations, will determine its ability to compete effectively in a global economy. The Hispanic enrollment shortfall accounts for more than the total enrollment increase needed to reach the Closing the Gaps participation goal (Texas Higher Education Coordinating Board, 2010).

The results of this study supported earlier studies by Sosa (2002) and Baird (2006), which found that Hispanic students tend to make their college choice based largely on the accessibility of an institution. It also supported the findings of Hurtado, Ruiz, and Guilerrmo-Wann (2011) and Oseguera and Rhee (2009), which found that PERHFAC exhibited a very strong and positive relationship with PERHENR. The average cost of attendance (AVCOA) had little to do with explaining the enrollment or

graduation of Texas Hispanic students. The average state/federal financial aid (AVGFA) had a strong correlation with the PERHENR, but not with HISPGRPER. Over time, the HISPGRPER was impacted more by the LHISPOP than any other factor.

The likelihood that the predictor variables LHISPOP and PERHFAC would have the strongest impact on PERHENR and HISPGRPER was not an expected outcome of this study. The aggregation of data and the presence of collinearity between these two predictor variables is the probable cause of these unexpected findings. St. John, Paulsen, and Starkey's (1996) college choice nexus would ask if LHISPOP and PERHFAC would explain the enrollment and graduation of Texas Hispanic students. It does not seem plausible that they would explain these decisions better than the AVGFA and AVGCOA. It would seem plausible though that the LHISPOP would help to explain the PERHENR as community colleges do tend to serve their local population and that is their mission. Studies (Stratton, O'Toole, and Wetzel, 2007; Baird, 2006; Saenz and Ozeguera, 2006; Paulsen and St. John, 2002) indicate that access to a college may play an important role in a student's enrollment decision.

The efforts of the THECB to institute an affordability policy to aid in the enrollment and graduation of Texas Hispanic students is probably appropriate as one method to achieve the goals of Closing the Gaps 2015. The policy may not be congruent with the desires of the Hispanic population whose enrollment decisions are often based on cultural factors related to the needs of their nuclear family. The results of this study indicate that keeping those students in school until graduation may have more to do with the efforts of institutions to integrate Hispanic students into the culture of the institution by surrounding them with Hispanic role models and making accessibility a priority. In

this case, accessibility may be defined as the ability to attend classes on a schedule that is conducive to completion and meets their educational goals.

The problem this research explored is that the current number of Texas Hispanic students attending 66 Texas community colleges does not meet THECB established goals related to enrollment, retention, and graduation rates. If this trend continues, the state could realize devastating economic and societal consequences. It is reasonable to expect that a growing undereducated population would not only contribute to an untrained and potentially underemployed work force, but would also negatively impact the state's ability to retain current businesses and attract technologically advanced industries (Texas Higher Education Coordinating Board, 2000).

The study of Texas Hispanic student enrollment and graduation is only useful if the findings are compared to other relevant research and specific strategies are identified to support the desired outcomes. Those strategies then have to be applied as they relate to the populations served by each Texas community college.

Recommendations for the THECB and Texas Legislature

Based on the results of this study the following specific recommendations are made to the THECB and the Texas Legislature for consideration. They include:

- Develop financial aid programs that don't create barriers to persistence with stringent enrollment requirements.
- Recognize the impact of the Hispanic culture on educational choice and create learning avenues that facilitate degree completion.
- Allow flexibility to institutions to tailor financial aid programs to meet the needs of their local Hispanic populations.

- Measure degree completion for Hispanic students over a longer period of time to account for less than full-time enrollment tendencies.
- Avoid the use of loan programs as an option to increase enrollment for minority populations.

APPENDICES

APPENDIX A

Texas Public Community Colleges by Carnegie Class – Associate's—Public

Table A. 1 Texas Public Community Colleges by Carnegie Class – Associate's—Public

Carnegie Unit ID	Institution Name
222567	Alvin Community College
222576	Amarillo College
222822	Angelina College
222992	Austin Community College District
223427	Blinn College
223506	Brazosport College
223524	Brookhaven College
223773	Cedar Valley College
223816	Central Texas College
223898	Cisco College
223922	Clarendon College
223320	Coastal Bend College
226408	College of the Mainland
247834	Collin County Community College District
224350	Del Mar College
224572	Eastfield College
224615	El Centro College
224642	El Paso Community College
224891	Frank Phillips College
224961	Galveston College
225070	Grayson County College
225371	Hill College
225423	Houston Community College
225520	Howard College
226019	Kilgore College
441760	Lamar Institute of Technology
226107	Lamar State College-Orange
226116	Lamar State College-Port Arthur
226134	Laredo Community College
226204	Lee College
227182	Lone Star College System
226578	McLennan Community College
226806	Midland College
226930	Mountain View College
227146	Navarro College
224110	North Central Texas College

Table A.1. Texas Public Community Colleges by Carnegie Class – Associate's—Public (continued)

Carnegie Unit ID	Institution Name
227191	North Lake College
227225	Northeast Texas Community College
420398	Northwest Vista College
227304	Odessa College
246354	Palo Alto College
227386	Panola College
227401	Paris Junior College
227687	Ranger College
227766	Richland College
227924	San Antonio College
227979	San Jacinto Community College
228158	South Plains College
409315	South Texas College
228316	Southwest Texas Junior College
227854	St. Philips College
228547	Tarrant County College District
228608	Temple College
228699	Texarkana College
229072	Texas Southmost College
229319	Texas State Technical College-Harlingen
228680	Texas State Technical College-Waco
408394	Texas State Technical College-Marshall
229328	Texas State Technical College-West Texas
225308	Trinity Valley Community College
229355	Tyler Junior College
229504	Vernon College
229540	Victoria College
229799	Weatherford College
229832	Western Texas College
229841	Wharton County Junior College

APPENDIX B

Texas Higher Education Coordinating Board Hispanic Faculty Data Manipulated to Calculate the Percentage of Hispanic Faculty

Table B. 1 Texas Higher Education Coordinating Board Hispanic Faculty Data Manipulated to Calculate the Percentage of Hispanic Faculty

Institution	Total FT Faculty (Fall 2008)	Total FT Hispanic Faculty (Fall 2008)	Total PT Faculty (Fall 2008)	Total PT Hispanic Faculty (Fall 2008)	Total Faculty (Fall 2008)	Total Hispanic Faculty (Fall 2008)	Calculated Percent Hispanic Faculty (Fall 2008)
Alvin Community College	98	1	164	10	262	11	4.20%
Amarillo College	196	7	228	6	424	13	3.07%
Angelina College	107	3	212	2	319	5	1.57%
Austin Community College	500	53	1,242	104	1742	157	9.01%
Blinn College	274	5	325	13	599	18	3.01%
Brazosport College	89	5	72	4	161	9	5.59%
Brookhaven College (DCCCD)	110	15	421	26	531	41	7.72%
Cedar Valley College (DCCCD)	58	4	202	8	260	12	4.62%
Central Texas College	432	26	136	7	568	33	5.81%
Cisco College	87	7	98	1	185	8	4.32%
Clarendon College	35	0	48	0	83	0	0.00%
Coastal Bend College	85	27	98	30	183	57	31.15%
College of the Mainland	88	8	139	6	227	14	6.17%
Collin County Community College District	326	14	713	32	1039	46	4.43%
Del Mar College	308	76	248	62	556	138	24.82%
Eastfield College (DCCCD)	104	13	266	19	370	32	8.65%
El Centro College (DCCCD)	112	10	300	23	412	33	8.01%
El Paso Community College District	361	175	753	410	1114	585	52.51%
Frank Phillips College	20	0	62	2	82	2	2.44%

Table B.1. Texas Higher Education Coordinating Board Hispanic Faculty Data Manipulated to Calculate the Percentage of Hispanic Faculty (continued)

Institution	Total FT Faculty (Fall 2008)	Total FT Hispanic Faculty (Fall 2008)	Total PT Faculty (Fall 2008)	Total PT Hispanic Faculty (Fall 2008)	Total Faculty (Fall 2008)	Total Hispanic Faculty (Fall 2008)	Calculated Percent Hispanic Faculty (Fall 2008)
Galveston College	55	8	75	9	130	17	13.08%
Grayson County College	66	2	117	5	183	7	3.83%
Hill College	102	1	110	2	212	3	1.42%
Houston Community College System (HCCS)	574	46	1,238	95	1812	141	7.78%
Howard College (HCJCD)	81	4	92	3	173	7	4.05%
Kilgore College	125	2	142	4	267	6	2.25%
Lamar Institute of Technology	92	5	79	3	171	8	4.68%
Lamar State College-Orange	56	2	45	3	101	5	4.95%
Lamar State College-Port Arthur	70	0	45	2	115	2	1.74%
Laredo Community College	199	145	111	87	310	232	74.84%
Lee College	63	3	266	13	329	16	4.86%
Lone Star College System (LSCS)	623	38	1,806	109	2429	147	6.05%
McLennan Community College	181	8	205	11	386	19	4.92%
Midland College	137	16	153	17	290	33	11.38%
Mountain View College (DCCCD)	85	14	215	15	300	29	9.67%
Navarro College	234	9	249	2	483	11	2.28%
North Central Texas College	111	2	277	11	388	13	3.35%
North Lake College (DCCCD)	122	12	315	18	437	30	6.86%
Northeast Texas Community College	59	1	109	1	168	2	1.19%

Table B.1. Texas Higher Education Coordinating Board Hispanic Faculty Data Manipulated to Calculate the Percentage of Hispanic Faculty (continued)

Institution	Total FT Faculty (Fall 2008)	Total FT Hispanic Faculty (Fall 2008)	Total PT Faculty (Fall 2008)	Total PT Hispanic Faculty (Fall 2008)	Total Faculty (Fall 2008)	Total Hispanic Faculty (Fall 2008)	Calculated Percent Hispanic Faculty (Fall 2008)
Northwest Vista College (ACCD)	125	38	478	140	603	178	29.52%
Odessa College	121	7	109	17	230	24	10.43%
Palo Alto College (ACCD)	106	36	282	97	388	133	34.28%
Panola College	54	0	66	0	120	0	0.00%
Paris Junior College	73	2	154	0	227	2	0.88%
Ranger College	23	0	30	1	53	1	1.89%
Richland College (DCCCD)	146	15	574	34	720	49	6.81%
San Antonio College (ACCD)	316	74	735	162	1051	236	22.45%
San Jacinto College District (SJCC)	581	53	451	31	1032	84	8.14%
South Plains College	257	12	131	9	388	21	5.41%
South Texas College	528	276	253	169	781	445	56.98%
Southwest Texas Junior College	126	52	92	50	218	102	46.79%
St. Philip's College (ACCD)	158	36	505	139	663	175	26.40%
Tarrant County College District (TCCD)	584	48	914	44	1498	92	6.14%
Temple College	133	10	128	5	261	15	5.75%
Texarkana College	84	2	143	2	227	4	1.76%
Texas Southmost College District	162	97	358	178	520	275	52.88%
Texas State Technical College-Harlingen	119	73	99	60	218	133	61.01%

Table B.1. Texas Higher Education Coordinating Board Hispanic Faculty Data Manipulated to Calculate the Percentage of Hispanic Faculty (continued)

Institution	Total FT Faculty (Fall 2008)	Total FT Hispanic Faculty (Fall 2008)	Total PT Faculty (Fall 2008)	Total PT Hispanic Faculty (Fall 2008)	Total Faculty (Fall 2008)	Total Hispanic Faculty (Fall 2008)	Calculated Percent Hispanic Faculty (Fall 2008)
Texas State Technical College-Marshall	28	3	20	0	48	3	6.25%
Texas State Technical College-Waco	214	10	74	2	288	12	4.17%
Texas State Technical College-West Texas	71	4	87	5	158	9	5.70%
Trinity Valley Community College	139	2	101	2	240	4	1.67%
Tyler Junior College	292	4	179	5	471	9	1.91%
Vernon College	72	2	78	2	150	4	2.67%
Victoria College	104	5	82	6	186	11	5.91%
Weatherford College	94	2	131	1	225	3	1.33%
Western Texas College	46	2	44	0	90	2	2.22%
Wharton County Junior College	146	6	112	4	258	10	3.88%

APPENDIX C

SPSS 19.0 Syntax to Generate Descriptive Statistics, Correlations Regression Analysis, and Structure Coefficients for the Dependent Variable *PERHENR*

Table C. 1 SPSS 19.0 Syntax to Generate Descriptive Statistics for PERHENR

```
Syntax
REGRESSION
  /DESCRIPTIVES MEAN STDDEV CORR SIG N
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS CI(95) BCOV R ANOVA COLLIN TOL
CHANGE ZPP
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT PERHENR
  /METHOD=ENTER AVGTOTALCOA AVGFA LHISPOP PERHFAC
  /SCATTERPLOT=(*ZPRED ,*ZRESID)
  /RESIDUALS NORM(ZRESID)
  /CASEWISE PLOT(ZRESID) OUTLIERS(3)
  /SAVE ZPRED ZRESID LEVER COOK PRED.


CORRELATIONS
  /VARIABLES=PRE_1 AVGTOTALCOA AVGFA LHISPOP PERHFAC
  /PRINT=TWOTAIL NOSIG
  /STATISTICS XPROD
  /MISSING=PAIRWISE.
```

APPENDIX D

SPSS 19.0 Syntax to Generate Descriptive Statistics, Correlations, and Regression Analysis for the Dependent Variable *HISPGRPER*

Table D. 1 SPSS 19.0 Syntax to Generate Descriptive Statistics for HISPGRPER

Syntax
REGRESSION /DESCRIPTIVES MEAN STDDEV CORR SIG N /MISSING LISTWISE /STATISTICS COEFF OUTS CI(95) BCOV R ANOVA COLLIN TOL CHANGE ZPP /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT HISPGRPERRPER /METHOD=ENTER AVGTOTALCOA AVGFA LHISPOP PERHFAC /SCATTERPLOT=(*ZPRED ,*ZRESID) /RESIDUALS NORM(ZRESID) /CASEWISE PLOT(ZRESID) OUTLIERS(3) /SAVE ZPRED ZRESID LEVER COOK PRED. CORRELATIONS /VARIABLES=PRE_2 AVGTOTALCOA AVGFA PERHFAC LHISPOP /PRINT=TWOTAIL NOSIG /STATISTICS XPROD /MISSING=PAIRWISE.

APPENDIX E

Predictor Variables and Subsequent Commonality Analysis Algorithms

Table E. 1 Predictor Variables and Subsequent Commonality Analysis Algorithms

Legend:

U = unique variance accounted for

C = combined variance accounted for

a = Average total cost of attendance

b = Average financial aid

c = Percentage of Hispanic faculty

d = Local Hispanic Population

U a = $R^2a,b,c,d - R^2b,c,d$

U b = $R^2a,b,c,d - R^2a,c,d$

U c = $R^2a,b,c,d - R^2a,b,d$

U d = $R^2a,b,c,d - R^2a,b,c$

C a,b = $R^2a,c,d + R^2b,c,d - R^2c,d - R^2a,b,c,d$

C a,c = $R^2a,b,d + R^2b,c,d - R^2b,d - R^2a,b,c,d$

C a,d = $R^2a,b,c + R^2b,c,d - R^2b,c - R^2a,b,c,d$

C b,c = $R^2a,b,d + R^2a,c,d - R^2a,d - R^2a,b,c,d$

C b,d = $R^2a,b,c + R^2a,c,d - R^2a,c - R^2a,b,c,d$

C c,d = $R^2a,b,c + R^2a,b,d - R^2a,b - R^2a,b,c,d$

C a,b,c = $R^2a,d + R^2b,d + R^2c,d - R^2d - R^2a,b,d - R^2a,c,d - R^2b,c,d + R^2a,b,c,d$

C a,b,d = $R^2a,c + R^2b,c + R^2c,d - R^2c - R^2a,b,c - R^2a,c,d - R^2b,c,d + R^2a,b,c,d$

C a,c,d = $R^2a,b + R^2b,c + R^2b,d - R^2b - R^2a,b,c - R^2a,b,d - R^2b,c,d + R^2a,b,c,d$

C b,c,d = $R^2a,b + R^2a,c + R^2a,d - R^2a - R^2a,b,c - R^2a,b,d - R^2a,c,d + R^2a,b,c,d$

C a,b,c,d = $R^2a + R^2b + R^2c + R^2d - R^2a,b - R^2a,c - R^2a,d - R^2b,c - R^2b,d -$

$R^2c,d + R^2a,b,c + R^2a,b,d + R^2a,c,d + R^2b,c,d - R^2a,b,c,d$

APPENDIX F

Complete Data Set of All IPEDS and THECB Predictor and Dependent Variables

Table F.1 Complete Data Set of all IPEDS and THECB Predictor and Dependent Variables

INSTITUTION NAME	SPSS ID	Predictor Variables				Dependent Variables	
		AVGCOA	AVGFA	LHISPOP	PERHFAC	HISPGRPER	PERHENR
Alvin Community College	1	12,573.00	2,349.00	36.20%	4.20%	12.00%	23%
Amarillo College	2	11,180.00	3,301.00	28.80%	3.07%	15.00%	26%
Angelina College	3	12,644.00	3,831.00	24.10%	1.57%	23.00%	8%
Austin Community College District	4	14,146.00	3,662.00	35.10%	9.01%	5.00%	25%
Blinn College	5	11,350.00	5,073.00	15.30%	3.01%	8.00%	13%
Brazosport College	6	14,128.00	3,717.00	20.50%	5.59%	13.00%	28%
Brookhaven College	7	13,842.00	3,502.00	45.40%	7.72%	10.00%	26%
Cedar Valley College	8	13,842.00	3,666.00	17.00%	4.62%	19.00%	15%
Central Texas College	9	10,144.00	4,563.00	22.90%	5.81%	9.00%	17%
Cisco College	10	10,488.00	4,065.00	16.70%	4.32%	7.00%	18%
Clarendon College	11	12,360.00	3,722.00	8.40%	0.00%	34.00%	19%
Coastal Bend College	12	11,297.00	4,562.00	71.90%	31.15%	22.00%	65%
College of the Mainland	13	9,881.00	3,580.00	27.00%	6.17%	8.00%	20%
Collin County Community College District	14	12,048.00	3,164.00	14.70%	4.43%	9.00%	12%
Del Mar College	15	11,650.00	4,469.00	59.70%	24.82%	9.00%	58%
Eastfield College	16	13,842.00	4,037.00	31.60%	8.65%	13.00%	32%
El Centro College	17	13,842.00	4,184.00	42.40%	8.01%	5.00%	31%
El Paso Community College	18	13,013.00	5,042.00	80.70%	52.51%	9.00%	86%
Frank Phillips College	19	11,472.00	4,381.00	27.30%	2.44%	23.00%	23%
Galveston College	20	11,254.00	3,362.00	31.30%	3.83%	13.00%	25%
Grayson County College	21	12,056.00	2,300.00	8.80%	3.83%	12.00%	6%

Table F.1. Complete Data Set of all IPEDS and THECB Predictor and Dependent Variables (continued)

INSTITUTION NAME	SPSS ID	Predictor Variables				Dependent Variables	
		AVGCOA	AVGFA	LHISPOP	PERHFAC	HISPGRPER	PERHENR
Hill College	22	15,410.00	3,532.00	39.10%	1.42%	14.00%	13%
Houston Community College	23	16,278.00	4,090.00	43.80%	7.78%	14.00%	28%
Howard College	24	11,765.00	3,680.00	43.10%	4.05%	16.00%	35%
Kilgore College	25	8,234.00	3,459.00	19.80%	2.25%	15.00%	8%
Lamar Institute of Technology	26	16,270.00	3,168.00	13.40%	4.68%	38.00%	9%
Lamar State College-Orange	27	8,504.00	3,405.00	5.20%	4.95%	43.00%	4%
Lamar State College-Port Arthur	28	13,461.00	5,095.00	29.60%	1.74%	10.00%	15%
Laredo Community College	29	12,051.00	6,258.00	95.60%	74.84%	15.00%	95%
Lee College	30	13,493.00	3,190.00	43.40%	4.86%	23.00%	28%
Lone Star College System	31	11,800.00	3,871.00	43.80%	6.05%	11.00%	24%
McLennan Community College	32	12,867.00	4,485.00	29.60%	4.92%	15.00%	18%
Midland College	33	13,972.00	3,127.00	37.60%	11.38%	10.00%	32%
Mountain View College	34	13,842.00	3,747.00	42.40%	9.67%	11.00%	51%
Navarro College	35	14,629.00	4,356.00	9.20%	2.28%	27.00%	14%
North Central Texas College	36	10,311.00	3,571.00	28.30%	3.35%	6.00%	11%
North Lake College	37	13,842.00	3,491.00	41.10%	6.86%	6.00%	23%
Northeast Texas Community College	38	10,157.00	3,923.00	51.00%	1.19%	21.00%	17%
Northwest Vista College	39	12,974.00	3,923.00	63.20%	29.52%	11.00%	47%
Odessa College	40	9,685.00	4,140.00	50.60%	10.43%	8.00%	49%
Palo Alto College	41	12,974.00	4,255.00	63.20%	34.28%	8.00%	66%
Panola College	42	13,108.00	3,494.00	11.00%	0.00%	36.00%	6%

Table F.1. Complete Data Set of all IPEDS and THECB Predictor and Dependent Variables (continued)

INSTITUTION NAME	SPSS ID	Predictor Variables				Dependent Variables	
		AVGCOA	AVGFA	LHISPOP	PERHFAC	HISPGRPER	PERHENR
Paris Junior College	43	13,498.00	3,769.00	8.20%	0.88%	24.00%	7%
Ranger College	44	11,698.00	2,648.00	11.30%	1.89%	27.00%	22%
Richland College	45	13,842.00	3,950.00	42.40%	6.81%	13.00%	21%
San Antonio College	46	12,974.00	4,155.00	63.20%	22.45%	2.00%	48%
San Jacinto Community College	47	13,691.00	4,372.00	62.20%	8.14%	10.00%	34%
South Plains College	48	10,477.00	3,023.00	48.20%	5.41%	7.00%	30%
South Texas College	49	8,776.00	4,557.00	84.60%	56.98%	11.00%	94%
Southwest Texas Junior College	50	13,113.00	5,206.00	78.40%	46.79%	20.00%	80%
St. Philip's College	51	12,974.00	4,233.00	63.20%	26.40%	5.00%	48%
Tarrant County College District	52	12,256.00	4,006.00	34.10%	6.14%	7.00%	19%
Temple College	53	13,806.00	3,936.00	23.70%	5.75%	9.00%	18%
Texarkana College	54	13,306.00	1,709.00	6.40%	1.76%	0.00%	3%
Texas Southmost College	55	17,956.00	3,604.00	93.20%	52.88%	19.00%	90%
Texas State Technical College-Harlingen	56	17,557.00	4,744.00	79.50%	61.01%	28.00%	89%
Texas State Technical College-Waco	57	12,274.00	3,652.00	29.60%	6.25%	26.00%	23%
Texas State Technical College-Marshall	58	10,069.00	3,644.00	17.00%	4.17%	33.00%	8%
Texas State Technical College-West Texas	59	16,043.00	4,180.00	38.30%	5.70%	28.00%	24%
Trinity Valley Community College	60	12,025.00	3,954.00	26.70%	1.67%	32.00%	10%

Table F.1. Complete Data Set of all IPEDS and THECB Predictor and Dependent Variables (continued)

INSTITUTION NAME	SPSS ID	Predictor Variables				Dependent Variables	
		AVGCOA	AVGFA	LHISPOP	PERHFAC	HISPGRPER	PERHENR
Tyler Junior College	61	13,042.00	4,394.00	21.20%	1.91%	11.00%	11%
Vernon College	62	11,298.00	4,723.00	28.40%	2.67%	15.00%	14%
Victoria College	63	12,270.00	4,581.00	48.30%	5.91%	20.00%	33%
Weatherford College	64	11,976.00	2,661.00	13.60%	1.33%	10.00%	9%
Western Texas College	65	11,600.00	2,674.00	41.40%	2.22%	28.00%	20%
Wharton County Junior College	66	10,821.00	3,925.00	39.40%	3.88%	13.00%	26%

APPENDIX G

SPSS Output Containing the Cook's D Values for Dependent Variables HISPGRPER and PERHENR

Table G.1 SPSS Output Containing the Cook's D Values for Dependent Variables HISPGRPER and PERHENR

SPSS	AVGCOA	AVGFA	PERHENR	PERHFAC	HISPGRPER	LHISPOP	ZPR_1	ZRE_1	COO_1	ZPR_2	ZRE_2	COO_2
1	12573	2349	0.23	0.04	0.12	0.36	-0.28039	-0.02425	0.00001	-0.72913	-0.15307	0.00057
2	11180	3301	0.26	0.03	0.15	0.29	-0.47254	1.1263	0.00866	-0.22816	0.00469	0
3	12644	3831	0.08	0.02	0.23	0.24	-0.6257	-1.13601	0.00636	0.42162	0.65887	0.00214
4	14146	3662	0.25	0.09	0.05	0.35	-0.13844	-0.21678	0.00027	0.24432	-1.25015	0.0089
5	11350	5073	0.13	0.03	0.08	0.15	-0.75344	0.09748	0.00031	1.28228	-1.27509	0.05277
6	14128	3717	0.28	0.06	0.13	0.21	-0.54939	1.71118	0.02702	1.18543	-0.6951	0.00446
7	13842	3502	0.26	0.08	0.1	0.45	0.01701	-0.61323	0.0035	-0.73785	-0.36892	0.00127
8	13842	3666	0.15	0.05	0.19	0.17	-0.6525	0.05067	0.00003	1.33828	-0.09066	0.00008
9	10144	4563	0.17	0.06	0.09	0.23	-0.49647	-0.19195	0.00061	0.53566	-0.91165	0.01382
10	10488	4065	0.18	0.04	0.07	0.17	-0.66841	0.57494	0.00411	0.86811	-1.24358	0.01925
11	12360	3722	0.19	0	0.34	0.08	-0.98849	1.8682	0.04109	1.48251	1.50139	0.02654
12	11297	4562	0.65	0.31	0.22	0.72	1.3885	0.59421	0.00543	-1.51178	1.20731	0.02242
13	9881	3580	0.2	0.06	0.08	0.27	-0.39459	-0.08621	0.00008	-0.04353	-0.82398	0.00711
14	12048	3164	0.12	0.04	0.09	0.15	-0.69782	-0.25607	0.00071	1.08229	-1.09764	0.01299
15	11650	4469	0.58	0.25	0.09	0.6	0.91838	1.17328	0.01164	-0.91683	-0.41743	0.00147
16	13842	4037	0.32	0.09	0.13	0.32	-0.22275	1.17421	0.00803	0.53469	-0.47368	0.00131
17	13842	4184	0.31	0.08	0.05	0.42	-0.03667	0.35708	0.001	-0.32047	-1.05798	0.00879
18	13013	5042	0.86	0.53	0.09	0.81	2.33792	0.49487	0.00702	-0.43938	-0.57989	0.00964
19	11472	4381	0.23	0.02	0.23	0.27	-0.53444	0.87848	0.00715	0.15745	0.74876	0.00519
20	11254	3362	0.25	0.04	0.13	0.31	-0.39646	0.70004	0.00318	-0.34934	-0.17289	0.00019
21	12056	2300	0.06	0.04	0.12	0.09	-0.82772	-0.73	0.01674	1.30318	-0.84457	0.02241
22	15410	3532	0.13	0.01	0.14	0.39	-0.33945	-1.37354	0.03348	-0.36924	-0.05671	0.00006
23	16278	4090	0.28	0.08	0.14	0.44	-0.02013	-0.16943	0.00062	-0.05368	-0.16408	0.00058
24	11765	3680	0.35	0.04	0.16	0.43	-0.1614	1.42397	0.01908	-1.10077	0.41101	0.00159
25	8234	3459	0.08	0.02	0.15	0.2	-0.67585	-0.95782	0.02204	-0.03525	-0.06095	0.00009
26	16270	3168	0.09	0.05	0.38	0.13	-0.7195	-0.64678	0.01259	1.91894	1.79052	0.09648

Table G.1. SPSS Output Containing the Cook's D Values for Dependent Variables HISPGRPER and PERHENR (continued)

SPSS	AVGCOA	AVGFA	PERHENR	PERHFAC	HISPGRPER	LHISPOP	ZPR_1	ZRE_1	COO_1	ZPR_2	ZRE_2	COO_2
27	8504	3405	0.04	0.05	0.43	0.05	-0.86163	-0.92133	0.03313	1.31794	2.54206	0.25219
28	13461	5095	0.15	0.02	0.1	0.3	-0.52383	-0.40656	0.00461	0.44063	-0.76991	0.01653
29	12051	6258	0.95	0.75	0.15	0.96	3.43926	-2.01526	0.52037	-0.06444	-0.05101	0.00033
30	13493	3190	0.28	0.05	0.23	0.43	-0.12391	0.19933	0.00048	-0.89625	1.10728	0.01495
31	11800	3871	0.24	0.06	0.11	0.44	-0.07599	-0.5946	0.00277	-0.97707	-0.17812	0.00025
32	12867	4485	0.18	0.05	0.15	0.3	-0.4012	-0.37453	0.00131	0.39616	-0.20773	0.0004
33	13972	3127	0.32	0.11	0.1	0.38	0.00208	0.37533	0.0013	0.04097	-0.63392	0.0037
34	13842	3747	0.51	0.1	0.11	0.42	0.02795	3.24584	0.06115	-0.31932	-0.40192	0.00094
35	14629	4356	0.14	0.02	0.27	0.09	-0.89748	0.76521	0.0165	2.10167	0.52486	0.00776
36	10311	3571	0.11	0.03	0.06	0.28	-0.47318	-1.21019	0.01213	-0.2542	-0.97112	0.00781
37	13842	3491	0.23	0.07	0.06	0.41	-0.0984	-0.67092	0.0034	-0.45691	-0.90215	0.00615
38	10157	3923	0.17	0.01	0.21	0.51	-0.11214	-1.5576	0.07132	-2.11932	1.30461	0.05003
39	12974	3923	0.47	0.3	0.11	0.63	1.16209	-1.4078	0.01852	-0.79871	-0.23881	0.00053
40	9685	4140	0.49	0.1	0.08	0.51	0.21794	2.25888	0.09089	-1.52863	-0.31868	0.00181
41	12974	4255	0.66	0.34	0.08	0.63	1.33398	0.94386	0.00879	-0.41669	-0.69702	0.0048
42	13108	3494	0.06	0	0.36	0.11	-0.93678	-0.34248	0.00117	1.35063	1.76508	0.03108
43	13498	3769	0.07	0.01	0.24	0.08	-0.96196	-0.09708	0.00014	1.75884	0.31329	0.00145
44	11698	2648	0.22	0.02	0.27	0.11	-0.8526	1.85308	0.06251	1.00545	0.89785	0.01467
45	13842	3950	0.21	0.07	0.13	0.42	-0.07873	-1.05263	0.00846	-0.45269	-0.13773	0.00014
46	12974	4155	0.48	0.22	0.02	0.63	0.90066	-0.32294	0.00093	-1.19288	-1.08937	0.01064
47	13691	4372	0.34	0.08	0.1	0.62	0.3532	-0.56049	0.00908	-1.85051	0.00966	0
48	10477	3023	0.3	0.05	0.07	0.48	-0.00473	0.08768	0.00019	-1.79135	-0.33869	0.00287
49	8776	4557	0.94	0.57	0.11	0.85	2.58766	0.85481	0.05934	-1.29789	-0.06896	0.00039
50	13113	5206	0.8	0.47	0.2	0.78	2.08159	0.47021	0.0051	-0.56602	0.66669	0.01024
51	12974	4233	0.48	0.26	0.05	0.63	1.04497	-0.83571	0.00543	-0.92305	-0.85295	0.00565
52	12256	4006	0.19	0.06	0.07	0.34	-0.26376	-0.707	0.00209	-0.09854	-0.91468	0.0035

Table G.1. SPSS Output Containing the Cook's D Values for Dependent Variables HISPGRPER and PERHENR (continued)

SPSS	AVGCOA	AVGFA	PERHENR	PERHFAC	HISPGRPER	LHISPOP	ZPR_1	ZRE_1	COO_1	ZPR_2	ZRE_2	COO_2
53	13806	3936	0.18	0.06	0.09	0.24	-0.48249	-0.08572	0.00005	0.94147	-1.04973	0.00822
54	13306	1709	0.03	0.02	0	0.06	-0.94716	-0.77334	0.03394	1.43157	-2.20116	0.27494
55	17956	3604	0.9	0.53	0.19	0.93	2.60126	0.18282	0.00306	-0.90267	0.67183	0.0413
56	17557	4744	0.89	0.61	0.28	0.8	2.6231	-0.05072	0.00022	0.89661	1.04429	0.09223
57	12274	3652	0.23	0.06	0.26	0.3	-0.3446	0.2039	0.00015	0.18092	1.06899	0.00413
58	10069	3644	0.08	0.04	0.33	0.17	-0.66397	-1.00003	0.01231	0.66317	1.67076	0.03437
59	16043	4180	0.24	0.06	0.28	0.38	-0.20428	-0.13876	0.00039	0.22827	1.2717	0.03281
60	12025	3954	0.1	0.02	0.32	0.27	-0.57152	-1.0167	0.00539	0.14764	1.73677	0.01573
61	13042	4394	0.11	0.02	0.11	0.21	-0.67509	-0.49274	0.00279	0.87353	-0.80779	0.0075
62	11298	4723	0.14	0.03	0.15	0.28	-0.50719	-0.62161	0.00583	0.13768	-0.11979	0.00022
63	12270	4581	0.33	0.06	0.2	0.48	0.0001	0.53825	0.00461	-1.09044	0.84513	0.01137
64	11976	2661	0.09	0.01	0.1	0.14	-0.82872	-0.25868	0.00104	0.83927	-0.90554	0.01277
65	11600	2674	0.2	0.02	0.28	0.41	-0.25304	-0.58918	0.00793	-1.35181	1.80933	0.07483
66	10821	3925	0.26	0.04	0.13	0.39	-0.24071	0.30253	0.00086	-0.92242	0.0221	0

APPENDIX H

SPSS Output Containing the Centered Leverage Values for Dependent Variables HISPGRPER and PERHENR

Table H.1. SPSS Output Containing the Centered Leverage Values for Dependent Variables HISPGRPER and PERHENR

SPSS	AVGCOA	AVGFA	PERHENR	PERHFAC	HISPGRPER	LHISPOP	LEV_1
1	12573	2349	0.23	0.04	0.12	0.36	0.08398
2	11180	3301	0.26	0.03	0.15	0.29	0.01683
3	12644	3831	0.08	0.02	0.23	0.24	0.00836
4	14146	3662	0.25	0.09	0.05	0.35	0.01181
5	11350	5073	0.13	0.03	0.08	0.15	0.10927
6	14128	3717	0.28	0.06	0.13	0.21	0.02717
7	13842	3502	0.26	0.08	0.1	0.45	0.02755
8	13842	3666	0.15	0.05	0.19	0.17	0.03026
9	10144	4563	0.17	0.06	0.09	0.23	0.05648
10	10488	4065	0.18	0.04	0.07	0.17	0.04036
11	12360	3722	0.19	0	0.34	0.08	0.03766
12	11297	4562	0.65	0.31	0.22	0.72	0.05181
13	9881	3580	0.2	0.06	0.08	0.27	0.03234
14	12048	3164	0.12	0.04	0.09	0.15	0.03362
15	11650	4469	0.58	0.25	0.09	0.6	0.02388
16	13842	4037	0.32	0.09	0.13	0.32	0.01239
17	13842	4184	0.31	0.08	0.05	0.42	0.0213
18	13013	5042	0.86	0.53	0.09	0.81	0.09764
19	11472	4381	0.23	0.02	0.23	0.27	0.02732
20	11254	3362	0.25	0.04	0.13	0.31	0.01537
21	12056	2300	0.06	0.04	0.12	0.09	0.10613
22	15410	3532	0.13	0.01	0.14	0.39	0.06065
23	16278	4090	0.28	0.08	0.14	0.44	0.07444
24	11765	3680	0.35	0.04	0.16	0.43	0.02794

Table H.1. SPSS Output Containing the Centered Leverage Values for Dependent Variables HISPGRPER and PERHENR (continued)

SPSS	AVGCOA	AVGFA	PERHENR	PERHFAC	HISPGRPER	LHISPOP	LEV_1
25	8234	3459	0.08	0.02	0.15	0.2	0.08262
26	16270	3168	0.09	0.05	0.38	0.13	0.1021
27	8504	3405	0.04	0.05	0.43	0.05	0.12808
28	13461	5095	0.15	0.02	0.1	0.3	0.09523
29	12051	6258	0.95	0.75	0.15	0.96	0.2922
30	13493	3190	0.28	0.05	0.23	0.43	0.03936
31	11800	3871	0.24	0.06	0.11	0.44	0.02122
32	12867	4485	0.18	0.05	0.15	0.3	0.02766
33	13972	3127	0.32	0.11	0.1	0.38	0.02709
34	13842	3747	0.51	0.1	0.11	0.42	0.0123
35	14629	4356	0.14	0.02	0.27	0.09	0.09614
36	10311	3571	0.11	0.03	0.06	0.28	0.02315
37	13842	3491	0.23	0.07	0.06	0.41	0.02004
38	10157	3923	0.17	0.01	0.21	0.51	0.09994
39	12974	3923	0.47	0.3	0.11	0.63	0.02766
40	9685	4140	0.49	0.1	0.08	0.51	0.06088
41	12974	4255	0.66	0.34	0.08	0.63	0.02986
42	13108	3494	0.06	0	0.36	0.11	0.03029
43	13498	3769	0.07	0.01	0.24	0.08	0.04958
44	11698	2648	0.22	0.02	0.27	0.11	0.06231
45	13842	3950	0.21	0.07	0.13	0.42	0.02036
46	12974	4155	0.48	0.22	0.02	0.63	0.02605
47	13691	4372	0.34	0.08	0.1	0.62	0.09842
48	10477	3023	0.3	0.05	0.07	0.48	0.08606

Table H.1. SPSS Output Containing the Centered Leverage Values for Dependent Variables HISPGRPER and PERHENR (continued)

SPSS	AVGCOA	AVGFA	PERHENR	PERHFAC	HISPGRPER	LHISPOP	LEV_1
49	8776	4557	0.94	0.57	0.11	0.85	0.22148
50	13113	5206	0.8	0.47	0.2	0.78	0.07933
51	12974	4233	0.48	0.26	0.05	0.63	0.02094
52	12256	4006	0.19	0.06	0.07	0.34	0.00491
53	13806	3936	0.18	0.06	0.09	0.24	0.0196
54	13306	1709	0.03	0.02	0	0.06	0.17222
55	17956	3604	0.9	0.53	0.19	0.93	0.23922
56	17557	4744	0.89	0.61	0.28	0.8	0.22743
57	12274	3652	0.23	0.06	0.26	0.3	0.0023
58	10069	3644	0.08	0.04	0.33	0.17	0.03982
59	16043	4180	0.24	0.06	0.28	0.38	0.0698
60	12025	3954	0.1	0.02	0.32	0.27	0.00964
61	13042	4394	0.11	0.02	0.11	0.21	0.0365
62	11298	4723	0.14	0.03	0.15	0.28	0.05067
63	12270	4581	0.33	0.06	0.2	0.48	0.05383
64	11976	2661	0.09	0.01	0.1	0.14	0.05252
65	11600	2674	0.2	0.02	0.28	0.41	0.07869
66	10821	3925	0.26	0.04	0.13	0.39	0.02795

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