

ABSTRACT

Achieving the Dream: Success of Hispanic Students in Developmental Math Courses in a Texas Community College

Homer Guevara, Jr., Ed.D.

Mentor: Albert B. Smith, Ph.D.

This investigation tracked Fall 2005 semester, first-time-to Northwest Vista College (NVC) student cohorts in order to more fully understand the success rates of students taking developmental coursework. This research specifically looked at the completion of developmental math courses by Hispanic students to see how well they succeeded in their first developmental math courses. The problem of this study was to determine whether or not there was a significant difference in success rates between Hispanic students enrolled in developmental math courses at NVC during the implementation of the *Achieving the Dream* initiative.

Three research questions were addressed related to: (1) a comparison of Hispanic male versus female success; (2) financial aid and success; and (3) the value of 17 background and personal variables in predicting success, as measured by student GPAs. A total of 1,905 students from each of the four developmental math courses were asked to participate in the study. Out of 1,905 surveys sent out for completion, 780 (40.9%) students responded, including 405 (21.3%) Hispanic students. The final sample for the

study included the following Hispanic students: (1) 27 in Math 0300; (2) 112 in Math 0301; (3) 128 in Math 0302; and (4) 138 in Math 0303.

To answer the first and second research questions, a proportion test was used to determine the success rates (a grade of C or better). In all four developmental math courses, the data analyses demonstrated that there were no significant differences between Hispanic male and female student success or in terms of the effect of financial aid on student success.

Logistic regression was the primary statistical technique used to answer research question three. Seventeen independent variables were considered in this model. The following variables were found to be significant variables in attributing to the success of Hispanic students in their respective developmental math courses: student age (Math 0301); social stimulation, peer group interaction, and faculty interaction (Math 0302); and family togetherness in (Math 0303).

This study was conducted in the hope that information could be provided as to what variables led to student success, especially in the Hispanic community. This research adds to the literature that is understudied—the motivation of Hispanic students to succeed in college.

Achieving The Dream: Success Of Hispanic Students In Developmental Math Courses
In A Texas Community College

by

Homer Guevara, Jr., B.A., M.S.

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Robert C. Cloud, Ed.D., Chairperson

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Approved by the Dissertation Committee

Albert B. Smith, Ph.D., Chairperson

Sandra B. Cooper, Ph.D.

Douglas W. Rogers, Ed.D.

C. William Thomas, Ph.D.

Trena L. Wilkerson, Ph.D.

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J. Larry Lyon, Ph.D., Dean

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CHAPTER ONE

Introduction to the Study

Introduction

The student withdrawal from colleges in United States has long been recognized as a significant social, economic, and educational problem. Therefore, improving student retention has become and continues to be, a crucial challenge for higher education. It is a challenge sparked by the increased number of students leaving colleges or universities prior to degree completion and the decreased number of college going student population in the United States. Improvements in the extent and quality of education will raise the economic prospects, well-being, and civic engagement of the Hispanic population. At the beginning of this decade, Hispanics became the most poorly educated major population group in the United States. White males averaged 13.3 years of schooling and black males averaged 12.2. Latino males lag behind with 10.6 years of schooling (Smith, 2001).

Community colleges have done an outstanding job of providing post-secondary opportunities to broad populations. Access, though, does not always lead to success for community college students. A study conducted by Bailey (2004) found that among students seeking an associate's degree or higher, only 53% earned a degree or transferred to a four-year institution within eight years of initial enrollment. Another study conducted by the National Center for Education Statistics (2003a) found that of all students that enrolled in community colleges in 1995-1996, only 35% attained a certificate or degree within six years. In this study, only 29% of the Hispanics attained a

degree or certificate within six years, compared with 38% of the Whites and 39% of the Asians.

A significant challenge facing community colleges is providing developmental education to help a growing, diverse student population. Many students are coming to the community college without the skills to do college level work (McCabe & Day, 1998). The question arises whether developmental education is worth the time, effort, and money to the student, the college, and society as a whole. A controversial aspect of developmental education is that it breeds uneven academic experiences for students of color. It also raises other points such as: (a) the appropriateness of remediation at the higher education level, (b) the real cost to college-level programs when developmental programs draw from the total college budget, and (c) the quality of instructional methodologies for the remediation and development of basic skills in students (Roueche, Ely, & Roueche, 2001). The fact is that more than 50 % of all first-time students in community colleges need remedial or developmental work in one or more basic skill areas before enrolling in college-level courses (McCabe & Day, 1998). Proponents of remediation suggest that developmental courses help under-prepared students gain the skills necessary to excel in college and may serve as a tool to integrate students into the school population, thus helping the cause of retention and persistence (Soliday, 2002).

Significance of the Study

Some measures show that greater shares of Hispanic students are enrolled in postsecondary education than non-Hispanic Whites, but many Hispanic students are pursuing paths associated with lower chances of attaining a bachelor's degree. Even though many Hispanic students are enrolled in community colleges, many attend school

part-time, and yet others delay or prolong their college education well into their 20s and beyond. Hispanic students also lag behind in the pursuit of graduate and professional degrees. Among 25 to 34 year old high school graduates, nearly 3.8 % of Whites are enrolled in graduate school, whereas only 1.9% of similarly aged Hispanic high school graduates are pursuing post-baccalaureate studies. Nearly 85% of White students 18-24 years of age, the traditional ages for college attendance, are enrolled full-time. Hispanic students' high levels of part-time enrollment and work have adverse effects on their levels of degree completion (Fry, 2002).

The Lumina Foundation has funded a multi-year initiative called “*Achieving the Dream: Community Colleges Count*”, which addresses a national imperative to increase the success of low income students and students of color. Northwest Vista College, along with each of the other colleges in the Alamo Community College District, is participating in the initiative and will develop interventions to improve student outcomes in the following areas:

- Successful completion of developmental courses and progression to college-level courses.
- Successful completion of identified college-level courses.
- Productive grades in all courses (A-C).
- Semester to semester persistence.
- Graduation.

This study will focus on the successful completion of developmental courses, specifically, the successful completion of the four developmental math courses at Northwest Vista College.

Northwest Vista College (NVC) is an institution of approximately 9,000 students located in Northwest quadrant of San Antonio, Texas. Northwest Vista College offers Associate of Arts; Associate of Science; Associate of Applied Science degrees and certificates; continuing education; and development education programs. In 2002, Northwest Vista College was the third fastest growing community college in the United States in terms of enrollment.

Developmental Mathematics Courses at Northwest Vista College

The following is a list of the developmental math courses offered at Northwest Vista College:

1. 0100-Math Lab for Cooperative Learning-This lab is required for all developmental math classes. It is designed to facilitate the learning of developmental math through assisted cooperative learning activities. Co-requisite: Math 0300, 0301, 0302, 0303.
2. 0300-Basic Mathematics-This course focuses on basic mathematical operations (addition, subtraction, multiplication, division, and square root) with signed numbers (including integers, decimals, and fractions); ratios and proportions; interpreting charts and graphs; informal geometry; and the use of these concepts in problem solving. A student who is required by the college to take this course must pass it with C (75%) or better before being allowed to take a higher-level course in the mathematics sequence.
3. 0301-Introduction to Algebra and Geometry-Prerequisite: Appropriate placement score or “C” (75%) or better in Math 0300, or equivalent. This course focuses on solution methods for linear equations and inequalities, graphs of linear functions, linear models, and the use of these concepts in problem solving. A student who is required by the college to take this course must pass it with C (75%) or better before being allowed to take a higher-level course in the mathematics sequence.
4. 0302-Elementary Algebra-Prerequisite: Appropriate placement score or “C” (75%) or better in Math 0301, or equivalent. This course focuses on factoring, arithmetic operations on polynomials and rational expressions, and the use of these concepts in problem solving. A student who is required by the college to take this course must pass it with C (75%) or better before being allowed to take a higher-level course in the mathematics sequence.

5. 0303-Intermediate Algebra-Prerequisite: Appropriate placement score or “C” (75%) or better in Math 0302, or equivalent. This course focuses on solution methods for quadratic equations and inequalities, graphs of quadratic functions, quadratic models, and the use of these concepts in problem solving. A student who is required by the college to take this course must pass it with C (75%) or better before being allowed to take a higher-level course in the mathematics sequence (Northwest Vista College Catalog, 2005-2006, p. 127).

Northwest Vista College’s Developmental Math Program

Community colleges are the port of entry into higher education for many people, including the majority of postsecondary students who are low-income and students of color. Many community college students achieve their goals, but a number of students that are low-income and students of color face challenges that impede their progress. The math department at Northwest Vista College has set up institutional structures that help ensure student retention and success. The following is the philosophy of math instructors at Northwest Vista College concerning developmental math courses:

1. Cause no more harm
 - a. Use Ips (insufficient progress) instead of “Fs” for developmental courses
 - b. Never say “you are already supposed to know that” and other abusive phrases
2. Bring students up to class level
 - a. Explore students’ work and questions for areas of deficiency or misunderstanding.
 - b. Always review and help students develop competencies for areas which are deficient
3. Teach deep, not wide
 - a. Fewer topics and more depth
 - b. Maintain a heavy emphasis on curriculum essentials
4. Be flexible, delivery may be everything
 - a. Lecture and write notes for those who learn through observation
 - b. Use group collaboration to verify that the material is understood
 - c. Individual tutoring is sometimes necessary
 - d. Practice for tests is usually needed.

The math department at Northwest Vista College has a focused analysis of student outcomes in helping it design effective responses for helping students succeed in developmental math. In order to help with the retention of developmental math students, a Drop Advising Program was established in the Fall of 2003 and has served an estimated 250 student per year. This program was established to help students wishing to drop their developmental math classes with counseling services. Students are given an advisement slip and are referred to a designated faculty member to be counseled before dropping the classes. Another service aimed at retaining students in developmental math courses is the Math, English, Reading Advocacy Center where an estimated 1,000 plus students will be served per year. Students who are at risk of dropping or failing their developmental classes are invited to use the services of the Advocacy Center. These students are assisted in areas of weakness to include study skills and organizational strategies. These services are offered in a quiet, supportive atmosphere. A third service provided to developmental math students at Northwest Vista College is the Math Laboratory. The lab is used as a center for math students to receive tutoring in collaborative groups. This collaborative effort allows for NVC to serve more students while at the same time improves the students' independence and success in their courses.

Table 1 shows a breakdown of success and enrollment in developmental math by ethnicity for the Fall 2005 and the Spring 2006 semesters at Northwest Vista College. This information includes the breakdown of enrollment by course to include the four developmental math courses offered at Northwest Vista College. The breakdown in ethnicity includes: a) American Indian/Alaskan Native, b) Asian/Pacific Islander, c) Black/Non-Hispanic, d) Hispanic, e) International, and f) White/Non-Hispanic.

According to Table 1, Hispanic students' success rates in all developmental courses are comparable to the overall success rates in each of the four developmental courses but, their success rates did fall short of expectations, percentage-wise, in comparison to White/Non-Hispanic students and some other groups. Hispanic students' success rates fell below the overall student success rates in Math 0300, 0302, and 0303 for the Spring 2006 semester. Math 0301, where all students had an overall success rate of 60%, was the only course where Hispanic students exceeded success rates with a 61% success rate. In the Fall 2005 semester, Hispanic students' success rates fell below the overall student success rates in Math 0301 and 0302. Math 0300, with an overall student success rate of 67%, was the only course where Hispanic students exceeded overall student success rates with a 69% success rate. Hispanic students matched the overall student success rate in Math 0303 with a 64% success rate.

Table 1
Success and Enrollment in Developmental Math by Ethnicity

Term	Course	Ethnicity	Enrollment	Success (C or better)
Spring 2006	Math 0300	TOTAL	2208	64%
		American Indian/Alaskan Native	197	68%
		Asian/Pacific Islander	1	100%
		Black/Non-Hispanic	0	-
		Hispanic	15	60%
		International	101	66%
		White/Non-Hispanic	1	100%
		White/Non-Hispanic	79	71%
	Math 0301	TOTAL	598	60%
		American Indian/Alaskan Native	4	100%
		Asian/Pacific Islander	9	56%

(table continues)

Table 1 . Success and Enrollment in Developmental Math by Ethnicity

Term	Course	Ethnicity	Enrollment	Success (C or better)	
Fall 2005	Math 0302	Black/Non-Hispanic	51	55%	
		Hispanic	292	61%	
		International	4	75%	
		White/Non-Hispanic	238	60%	
		TOTAL	682	65%	
		American Indian/Alaskan Native	8	75%	
		Asian/Pacific Islander	9	89%	
		Black/Non-Hispanic	39	59%	
		Hispanic	352	62%	
		International	0	-	
	Math 0303	White/Non-Hispanic	274	69%	
		TOTAL	731	66%	
		American Indian/Alaskan Native	0	-	
		Asian/Pacific Islander	19	84%	
		Black/Non-Hispanic	42	67%	
		Hispanic	323	65%	
		International	1	100%	
		White/Non-Hispanic	346	66%	
		TOTAL	2496	63%	
		Math 0300	TOTAL	308	67%
	American Indian/Alaskan Native		2	50%	
	Asian/Pacific Islander		5	100%	
	Black/Non-Hispanic		18	50%	
	Hispanic		162	69%	
	International		2	100%	
	White/Non-Hispanic		119	65%	
	Math 0301		TOTAL	711	57%
			American Indian/Alaskan Native	9	56%
			Asian/Pacific Islander	8	38%
		Black/Non-Hispanic	39	54%	
		Hispanic	377	55%	
		International	1	100%	
White/Non-Hispanic		277	61%		
Math 0302		TOTAL	736	65%	
		American Indian/Alaskan Native	3	33%	
		Asian/Pacific Islander	9	78%	
	Black/Non-Hispanic	41	66%		
	Hispanic	361	63%		
	International	2	50%		
	White/Non-Hispanic	320	67%		

(table continues)

Table 1 . Success and Enrollment in Developmental Math by Ethnicity

Term	Course	Ethnicity	Enrollment	Success (C or better)
	Math 0303	TOTAL	741	64%
		American Indian/Alaskan Native	3	67%
		Asian/Pacific Islander	16	75%
		Black/Non-Hispanic	43	63%
		Hispanic	365	64%
		International	1	100%
		White/Non-Hispanic	313	63%

Conceptual Frameworks

The research on student persistence is concentrated on persistence or departure models (Tinto 1975, 1988, and 1993; Pascarella & Terenzini, 1980). The main emphasis is the question as to what leads students to voluntarily leave institutions of higher learning. The work of Tinto (1975, 1988, 1993) is cited most often in the literature. Tinto's theory of student departure focuses on the structural conditions that lead to departure and identifies integration as key to student persistence. His theory of student departure has been consistently tested and support exists for his key theoretical constructs: academic and social integration. Tinto theorized that what motivates individuals to leave colleges and universities before graduating results from interactions between a student and his/her educational environment (see Figure 1, p. 10).

This study used parts of Tinto's model and Boshier's model of Adult Education Participation and Dropout to identify and classify 17 independent variables. Boshier's model is based on Maslow's Hierarchy of Needs and on the first major study of adult participation in education by Houle (1961). Houle's study suggested that participants in school could be categorized into three learning orientations: (1) goal-oriented students,

(2) activity-oriented students, and (3) learning-oriented students. Using Maslow's hierarchy, Boshier suggests that people are either primarily growth-oriented or deficiency-motivated. His model, therefore, is based on the assumptions that participation and persistence in adult education are determined by how people feel about themselves and the match between the self and the educational environment. Boshier (1971) developed the Educational Participation Scale, which has been revised twice in 1983 and 1991, in order to test Houle's typology. He also expanded on Houle's original three learning orientation groups into seven: (1) Communication Improvement, (2) Social Contact, (3) Educational Preparation, (4) Professional Advancement, (5) Family Togetherness, (6) Social Stimulation, and (7) Cognitive Interest.

Boshier's and Tinto's models point to the importance of students and institutions fitting well with each other, but Boshier's model (see Figure 2, p. 12) focuses more on the motivations of the student. Studies of Tinto's theory (Attinasi, 1989; Braxton, Sullivan, & Johnson, 1997) have found that a shortcoming may be that it does not include complex psychological aspects that may explain student departure. Hurtado and Carter (1997) questioned Tinto's model by saying that it is problematic in that it does not acknowledge that racially tense environments complicate integration for diverse groups of students whose responses to adversity are complex. Incorporating the motivational aspects of Boshier's Educational Participation Scale (EPS) into the background characteristics of Tinto's model may strengthen Tinto's model.

Statement of the Problem and Purposes

According to data collected, the National Study of Developmental Education showed that only 27.5% of minority students enrolled in developmental programs in community colleges and universities were retained through graduation, while 36.2% of White students at these institutions were retained through graduation (Boylan, Sutton, & Anderson, 2003). A study involving more than 130 Texas colleges and universities showed that 1-year retention rates for African-American and Hispanic students enrolled in developmental courses ranged from under 30% to over 80%, depending upon the institution (Boylan & Saxon, 1998). Some community colleges had 50% of their minority students graduate within three and a half years, whereas others had less than a 20% three and a half year graduation rate for minority students (Boylan, Sutton, & Anderson, 2003).

With societal changes that include an aging United States population, a growing demand for skilled labor, an increase in poverty, an increase in immigration, and an increase in the diversity of the population, remediation has become an issue in college education (Roueche & Roueche, 1999). Over 95% of community colleges offer remedial education courses in multiple ability levels and over 41% of entering community college students are under prepared in at least one of the basic skills which include reading and math. Over one million under-prepared students enter college and enroll in remedial programs on an annual basis. Thirty-four percent of these students are deficient in math, with 12% being Hispanic (McCabe, 2000).

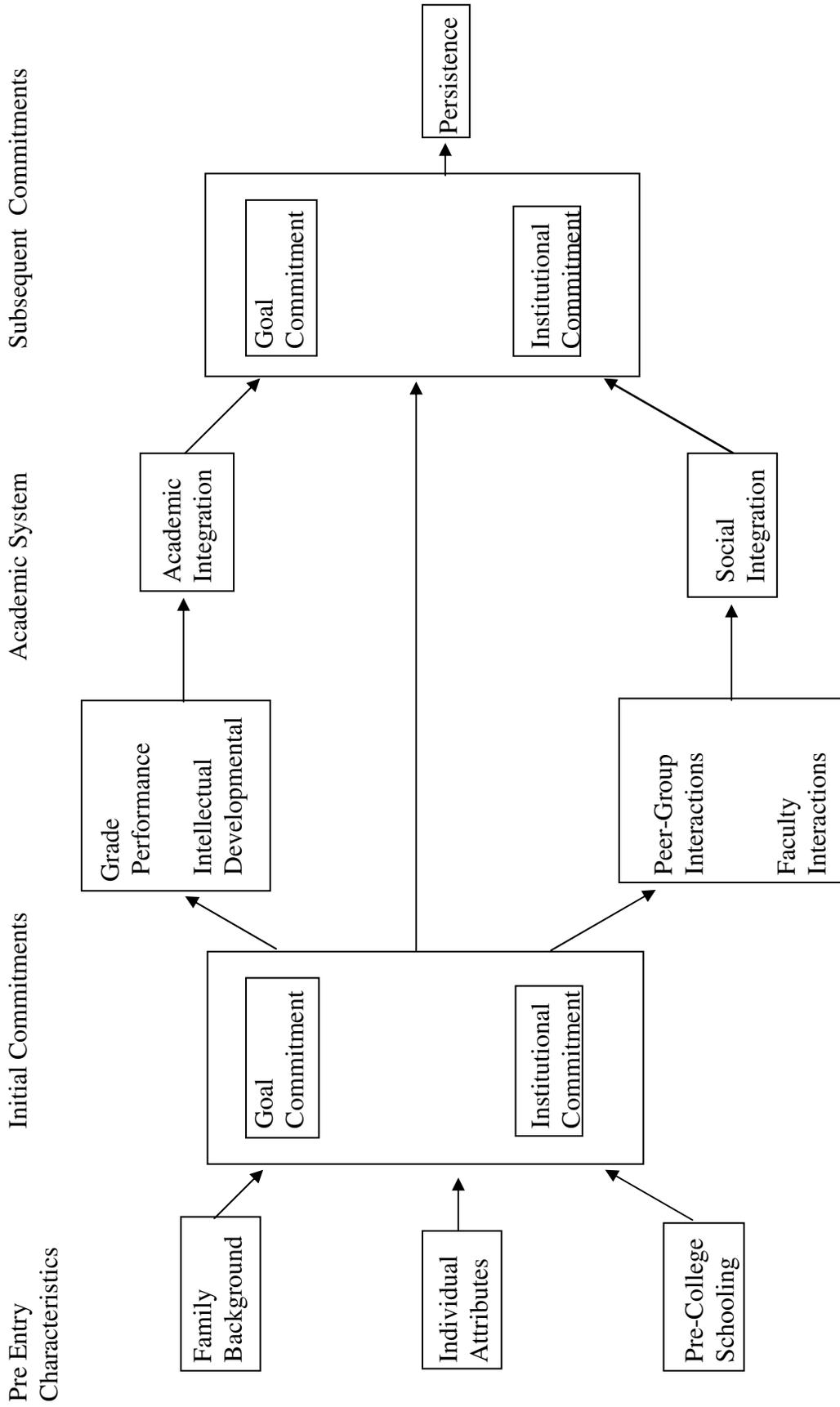


Figure 1. Tinto's Model for Student Dropout from College (Maddox, 2004)

For a national retention study, historical data for the Fall 2002 and Fall 2003 first-time-to-Northwest Vista College student cohorts were collected. Included in each cohort were students entering NVC in the Fall terms, regardless of their status as full-time/part-time, transferred, or entering as first-time degree or certificate seeking. The overall persistence rate for students at NVC during this time was 68%. For the Fall 2002 cohort, Blacks persisted at 72% from Fall 2002 to Spring 2003, while Whites persisted at a rate of 70%. The Fall to Spring persistence rate for Hispanic students in the same cohort was lower than that of the other ethnic groups as they persisted at a rate of 67%. For the Fall 2003 cohort, Fall to Spring persistence for White students was at 74%, while Fall to Spring persistence for Hispanics was at 64%.

Hispanic and Black students had the lowest success rates in developmental math in the Fall 2002 cohort. In 2002, out of 2,244 students enrolled in developmental Math courses, 65% Hispanic students successfully completed remedial Math courses as lower than that of the other ethnic groups as they persisted at a rate of 67%. For the Fall 2003 cohort, Fall to Spring persistence for White students was at 74%, while Fall to Spring persistence for Hispanics was at 64%.

Hispanic and Black students had the lowest success rates in developmental math in the Fall 2002 cohort. In 2002, out of 2,244 students enrolled in developmental Math courses, 65% Hispanic students successfully completed remedial Math courses as compared to 70% of their White peers. Out of the 2,138 students in the 2003 cohort that were enrolled in developmental Math courses, Hispanic success rates in remedial Math were at 64% as compared to 71% for their White peers.

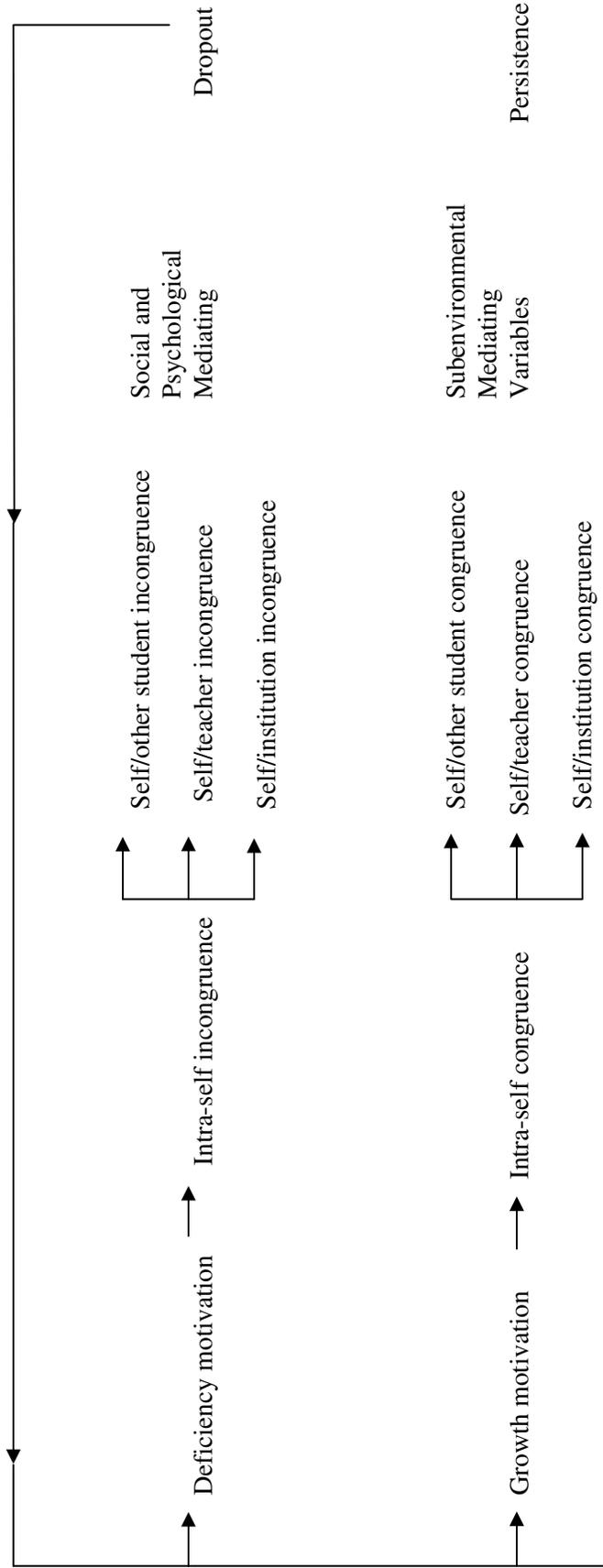


Figure 2. Boshier's Model to Explain Adult Participation and Dropout (Maddox, 2004)

The problem of this study was to determine whether or not there was a significant difference in success rates between Hispanic students enrolled in developmental math courses at Northwest Vista College during the implementation of the *Achieving the Dream* initiative in the Fall 2005 semester. There were three specific questions in this investigation. They were:

1. Is there a significant difference in the success of Hispanic male students who were enrolled in their first developmental math course in the Fall 2005 semester compared to Hispanic female students who were enrolled in their first developmental math course in the Fall 2005 semester?
2. Is there a significant difference in the success of Hispanic students who were enrolled in their first developmental math course in the Fall 2005 semester who received financial aid compared with Hispanic students who were enrolled in the same developmental math course during the Fall 2005 semester who did not receive financial aid?
3. Were background variables (socioeconomic status, gender, students' age, parents attending college, and math ability), Education Participation Scale variables (Communication Improvement, Social Contact, Educational Preparation, Professional Advancement, Family Togetherness, Social Stimulation, and Cognitive Interest), and personal variables (goal commitment, institutional commitment, intellectual development, peer group interactions, and faculty interactions) significant predictors of Hispanic student success in each of the four developmental math courses during the Fall 2005 semester?

Since 1988, practices and policies in institutions of higher education have been dramatically affected by changes in affirmative action and the diminishing emphasis on need-based financial aid, even while growing numbers of Latinos have collegiate ambitions. The fastest growing ethnic group in the nation, Latinos have become a force that higher education must consider with more overt intention. The college-going rate for Hispanics between the ages of 18 and 22 has increased to 35% and their enrollments in undergraduate education by over 200% in the last 25 years. About 10% of Latino high school graduates now attend college (Fry, 2002). Just over 10% of Hispanics in the country now have a college education—less than the national average for adults, which is over 25%, but a large increase for their educational attainment even 10 years ago (U.S. Census Bureau, 2000).

One characteristic prevalent among first-time-in-college Hispanic students is high representation in remedial courses. Those that favor developmental coursework believe that institutional efforts provide several benefits to developmental students, including the impact on persistence (Boylan, Bonham, & Bliss, 1994). Opponents of developmental coursework say that remedial coursework may not be preparing students to handle non-remedial coursework and that the attrition rates of these students remain high once the students are enrolled in college-level courses (Cronholm, 1999).

The major purposes of this study were to:

1. Use the findings of this study to propose a model for improving Hispanic student success in community college developmental math courses.
2. Make recommendations for improving practices related to retaining Hispanic students in developmental math courses.

3. To offer recommendations for future research studies related to success frameworks in community colleges.

Assumptions

Listed below are the assumptions associated with this study:

1. The students selected for this study were representative of Hispanic students at Northwest Vista College.
2. The normal populations all had equal variance.
3. That the participants in the study were representative of the growing group of Hispanic students needing to enroll in developmental math courses in community colleges.

Delimitations

The delimitations for this study were:

- This study only involved the use of Northwest Vista College student data.
- Only Hispanic students enrolled in developmental math classes at Northwest Vista College were studied.
- The study was limited to evaluating the effectiveness of *Achieving the Dream* initiatives as they related to developmental math education for Hispanic students and did not include these three student outcome indicators: (a) the successful completion of identified college-level courses, (b) productive grades in all courses (A-C), and (c) graduation.

Limitations of the Study

There were several limitations in the study:

- This study was conducted at a single, Hispanic Serving, public community college in Texas, so the results may not be generalized to other different community colleges.
- This study only looked at Hispanic student and success over one semester (Fall 2005).
- This study only used a Hispanic population of developmental math students as developmental math classes have more students enrolled in them than in developmental English and reading, according to Northwest Vista College institutional data.
- This study did not consider students who may have transferred elsewhere and completed their education at other institutions.

Definition of Terms

1. *Accuplacer*- an adaptive test used by many colleges to provide placement, advisement, and guidance information for students entering higher education. It is adaptive, meaning there is a pool of test times that are calibrated for difficulty and content.

2. *Culture*: Culture may be defined as a vigorous relationship comprised of beliefs, feelings, perceptions of experiences, and conduct in a certain situation (Bruner, 1986).

3. *Curriculum*: Curriculum is defined as an academic plan that includes the following components: purpose, content, sequence, learners, instructional process, instructional resources, evaluation, and adjustment (Stark and Lattuca, 1997).

4. *Diversity*: Diversity is traditionally defined as an assortment of individuals based on socioeconomic class, race, gender, and ethnicity (Alicea, 1995).

5. *Developmental Math* – Developmental math first focuses on basic mathematical operations (addition, subtraction, multiplication, division, and square root) with signed numbers (including integers, decimals, and fractions); ratios and proportions; interpreting charts and graphs; informal geometry; and the use of these concepts in problem solving. Developmental math students progress through solution methods for linear equations and inequalities, graphs of linear functions, linear models, and the use of these concepts in problem solving. Next, the agenda includes factoring, arithmetic operations on polynomials and rational expressions, and the use of these concepts in problem solving. Finally, the focus falls on solution methods for quadratic equations and inequalities, graphs of quadratic functions, quadratic models, and the use of these concepts in problem solving.

6. *Ethnicity* – Ethnicity encompasses the shared feelings, ways of thinking, and actions that comprise a culture based on a common ancestry. However, this definition is too expansive and does not include issues of the group's power in society. Also, ethnicity may be a matter of choice for individuals as they may have roots in various ethnic backgrounds (LeCompte, 1999).

7. *Financial Aid* – Financial aid in this study was specifically referred to as the Pell Grant.

8. *Hispanic student* – a term that referred to any student who self-identified, on college information data as “of Hispanic origin” or who had a Hispanic surname (Brown, 2003).

9. *Latino/a*: Used interchangeably with the term “Hispanic”. Also refers to a group of Americans who share a language and common cultural origins but who come from diverse nations and backgrounds with distinctive histories and socio-economic and political experiences (Brown, 2003).

10. *Minority*: A term “minority” concerns the power position of a racial or ethnic group that is the object of discrimination and prejudice. A minority group includes the four characteristics of identifiability such as language or gender; differential power based on the group’s degree of difference; differential and pejorative treatment and the resulting loss of power; and increased group awareness (LeCompte, 1999).

11. *Recruitment*: The process of adding new individuals to a population. In this case, seeking to enroll Hispanic or Latino students (Fry, 2003).

12. *Retention* – A preservation of experience. Recognized variables related to student retention include: various student characteristics and student-institutional interaction; academic aptitude and performance; level of aspiration and motivation; institutional type, image, student services offered; and student involvement-plus the development of a sense of belonging or degree of fit that results from student and institution interactions (Bean, F., Capps, R. & Tyler, M, 2001).

13. *Success* – Success in this study referred to students achieving grades between an A and a C.

Organization of the Study

Chapter Two contains a review of literature as it related to research on retention of Hispanic students in institutions of higher education; retention and success of Hispanic students and other ethnic student populations; institutional significance; the need for developmental math; and societal implications.

Chapter Three contains a description of the methodology used to analyze data collected relative to Northwest Vista College's participation in the *Achieving the Dream* initiative. Chapter Four contains a report of the results of the analysis of the data.

Chapter Five includes a summary, major findings, discussion, and recommendations for future practice and research.

CHAPTER TWO

Review of Related Literature

Introduction

The following literature provided information on the enrollment and retention of Latino students in higher education. This chapter addresses Latinos in higher education today and focuses on how many Latinos attend college today and addresses the advocacy for Latino educational achievement in higher education. There is a need to enhance public understanding of the challenges Latinos face in accessing higher education. This can be accomplished by supporting public policies that help Latino educational achievement and targeting resources toward the effort. This chapter also deals with institutional leadership. In order to improve a student's educational achievement, it is required that thoughtful leadership determines student success, regardless of ethnicity. Another area covered in this chapter details the backgrounds of Latino college students. The patterns in college enrollment among Latino populations are closely linked with their socioeconomic profile. Mexican-origin Latinos have the lowest average household income among the native born. Among Hispanics, as with the U.S. population, the children from higher income families are more successful in obtaining a college education. Developmental education is addressed as there is a need for continued remediation for Hispanic students entering college today.

Latinos in Higher Education Today

Many Latinos are first-generation college students, are low-income, have less academic high school education than their peers, and enroll in community colleges.

Latinos are concentrated geographically in a small number of states and institutions of higher education. Between 50 and 55% of Latinos enrolled in higher education were in two states: California and Texas (National Center for Educational Statistics, 2001).

Additionally, over 40% of Latino students were enrolled in the approximately 220 institutions identified as Hispanic Serving Institutions (HSIs) (National Center for Education Statistics, 2000a).

A large number of Latinos are enrolled in postsecondary education. Some measures showed that greater shares of Latinos were enrolled in postsecondary education than non-Hispanic whites. Studies showed that many Latinos are pursuing paths associated with lower chances of attaining a bachelor's degree. Many Latinos are enrolled in community colleges, many attend school part-time, and yet others delay or prolong their college education well into their 20s and beyond. Many Latino students are also caring for a family. The aforementioned characteristics influence the decisions Latino students make in participating in and completing higher education. Latinos also lag behind in the pursuit of graduate and professional degrees. Among 25 to 34 year old high school graduates, nearly 3.8% of Whites were enrolled in graduate school, whereas only 1.9% of similarly aged Latino high school graduates were pursuing post-baccalaureate studies. Nearly 85% of white students 18 to 24 years of age, the traditional ages for college attendance, were enrolled full-time. By comparison, only 75% of Latino traditional college-age students attended full-time. Latinos' high levels of part-time

enrollment had adverse effects on their levels of degree completion (Fry, 2002).

According to the U.S. Department of Education, part-time college enrollment was associated with a greater risk of accumulating college credits with no degree to show for the effort.

Economics and an attachment to family and community are factors in Latinos' high rate of enrollment in two-year colleges. Among 18 to 24 year olds, 44% of Hispanic undergraduates attended a two-year school, as opposed to about 30% of both white and black undergraduates. Latino students over the age of 24 years old were more likely than their peers of any other ethnic/racial group to be enrolled at two-year institutions. As Latinos get older, there was a greater share that attended two-year colleges. An extraordinary percentage of Latino undergraduate students over the age of 35 years old attended two-year colleges.

Community colleges and other two-year institutions typically feature a number of characteristics that appeal to Latino students. Tuition is lower at community colleges compared to four-year institutions. Degree programs are designed to accommodate part-time students and classes are scheduled in the evenings to accommodate students with full-time jobs. Many two-year colleges offer courses that aim more at improving job skills rather than at advancing a student towards a degree. Community colleges are usually located near residential areas and rarely feature dormitories. One characteristic shared by most Latinos regardless of national origin or income is an emphasis on close family ties. Many community colleges also welcome students with low levels of academic achievement or aptitude, with many offering classes in English as a second language. Also, many community colleges have transfer agreements with baccalaureate

institutions so that credits earned at a two-year school can be applied towards a four-year degree. This provides an inexpensive and accessible way for a student to complete a bachelor's degree. Degree completion lagged for students who began at two-year colleges. More than half of students that initially enrolled at two-year colleges never completed a postsecondary degree. In comparison, almost six in ten four-year college entrants completed at least a bachelor's degree (Kane and Rouse, 1995a). A recent study was conducted that followed college students for three years after their initial enrollment. Among Latino students, 39% of those who began at other than four-year colleges had no degree and were no longer enrolled after three years. In comparison, only 18% of those who began at four-year schools had no degree and were no longer enrolled in school (National Center on Education Statistics, 2000a).

Even though many Latino high school graduates may be furthering their education and skills at college campuses nation-wide, few are gaining a bachelor's degree and then moving on to the highest levels of the United States higher education system. Latinos are trailing in the pursuit of graduate and professional education. In the 25 to 34 year-old age bracket, which is the typical age for graduate school attendance, 3.8% of White and 3.0% of African-American high school graduates are enrolled in graduate school. Only 1.9% of similarly aged Latino high school students were pursuing a graduate degree. Latinos have the lowest rate of graduate school enrollment of any major racial/ethnic group. Graduate school enrollment mirrors a number of factors. First is the relatively low number of Latino students gaining a bachelor's degree, which is obviously a necessary prerequisite for graduate studies. Lacking advanced degrees, Latinos have

been underrepresented in the nation's most prestigious job opportunities that would undoubtedly hurt our economy in the future (Kane and Rouse, 1995b).

Even though Latino enrollment in college is extensive, it is low at the traditional college-going age. Studies have shown that college is most advantageous for students who are 18 to 24 years old, the traditional age for college attendance. Among high school graduates 18 to 24 years old, 35% of Hispanics were enrolled in college compared to 46% of Whites and 40% of Blacks. College students in the traditional age range were more persistent in pursuing their education. These students were more likely to earn a bachelor's degree and go on to attain valuable advanced degrees (National Center for Education Statistics, 2001). From a strictly economic standpoint, the wage gains from completing a college education diminished as the student aged. Individuals who earned their degrees at a younger age earned more earning power than older graduates. The earnings are not only bigger, but a person had more time to reap those benefits by completing their postsecondary training earlier in their lives. College enrollment at a later age was also more costly. Older students usually earned more money and they wound up deferring more income than a younger student if they chose to pursue an education than work. Significant numbers of Latinos attended college at ages that did not provide them with maximum benefits (Monks, 1997).

Advocacy for Latino Educational Achievement

There are a significant number of first-generation Latino students who are unfamiliar with our educational system and they look to their families for guidance. Many Latino parents, though, are limited in their ability to help them with higher education decisions. Latino students navigating the system alone feel the absence of

family and community members who have already gone through the process. As first-generation college students, many Latino students relied on formal sources of information to tell them how to prepare for and participate in higher education. College information that is available through high school counselors or through college fairs typically did not target parents. It was up to the student to gather the necessary information and then have the parents help in some manner. Advocates of Latino education needed to understand how Latino parents and first-generation college students viewed the education system and then inform them about the choices they needed to make and the consequences of those choices. One important concern that Latino parents had was the cost of college (Lowell & Suro, 2002).

Many Latino families did not research the cost of college or the sources of financial aid. Because of this, they deemed college to be too expensive for their children. Many Latino families did not have an understanding of the different aspects of financing a college education. This has led Latinos to either not consider college or limit themselves to choices that meet a particular sticker price. The financial concern moved students to enroll in community colleges because it was both affordable and closer to home.

The admissions process was another hurdle that many first-year Latino students faced. Latino students may not have known the process needed to register for entrance exams, such as the SAT, nor have applied for financial aid before applying for college. Research showed that if students took the SAT, applied for college, and then applied for financial aid, their chances of going to college were deemed to be high regardless of what

they scored on their SAT or the amount of financial aid offered (National Center for Education Statistics, 2000b).

There was a national strategy aimed at addressing any informational gaps in promoting a college education to Latino families called College is Possible. The American Council on Education offered this and it focused on getting the word out early and often to students and their parents that a college education was both affordable and possible. An application of this strategy was part of the Kellogg funded ENLACE (Engaging Latino Communities for Education) initiative that involved 13 communities throughout the country in a linked effort to support students ranging from the seventh grade to college entrance (American Council for Education, 2002).

Education policy had always had an impact on the access and retention of students from different backgrounds. Only since the mid-1990s, had there been broader federal and state policies that focused explicitly on Latinos in higher education. Because of the rollback of affirmative action practices, California, Texas, and Florida adopted a plan in which a given percentage from the top of the graduating class of each high school in the state would be given automatic admission to the states' universities. In 1997, Texas adopted a plan that mandated that all 35 public universities must have offered automatic enrollment to students who graduated in the top ten percent of their high school class. Unfortunately, research showed that many Latino youth were segregated in schools with poor academic and physical resources. While more Latinos might have been eligible for automatic admission, they may not have been academically prepared to take advantage of this benefit. This automatic admission did not address students' financial or support needs. Many universities in Texas found that they still needed to

combine need and merit-based financial aid and academic and social support to successfully recruit and retain Latinos in higher education (Brown, 2003).

The most important piece of federal higher education legislation affecting Latino access and success in college was the Higher Education Act. This piece of legislation authorized student outreach and support programs such as TRIO (Upward Bound, UB Math/Science, SSS, Talent Search, and McNair) and GEAR Up that were run by the U.S. Department of Education. These programs have helped facilitate increased access to higher education for Latinos and other historically underserved populations while at the same time, also promoting institutional and community alliances. Title V's Developing Hispanic-Serving Institutions (HSIs) program provided support on a competitive basis to HSIs. HSIs are accredited, nonprofit institutions of higher education that enroll a quarter or more Hispanic undergraduate full-time (FTE) students as long as the institutions have low educational and general expenditures and enroll a large number of needy students. Identifying a specific set of institutions to receive state or federal resources was one way to facilitate success for Latinos in higher education. Not all Hispanics attended HSIs, though, so aid to HSIs could not be the answer to satisfy the needs of Latino students. Focusing on the policies and practices of institutions that graduated larger numbers of Latino students was another way to help ensure Latino educational achievement (Brown, 2003).

There are over 200 HSIs in the United States. Of these, 66 institutions were in California, which served almost 130,000 undergraduate FTE Latino students. Estimates revealed that three-quarters are two-year institutions with most being public. HSIs were not created explicitly to serve Latinos, but they were located in communities that had

high concentrations of Latino students. HSIs were there to create an opportunity to aim services, resources, and information about opportunities for higher education at large numbers of Latino students throughout the K-16 educational mode (Brown, 2003).

Institutional Leadership

Campus leaders can shape the climate by articulating institutional goals and holding faculty and staff accountable for meeting expectations with respect to student success. For policy implementation to be effective, it required a commitment from all sectors of the campus to eliminate barriers that were high for first-generation Latino students. A commitment that began at the top could filter on down to the faculty, whose composition should mirror the student body. It could also be evident in the hiring of new colleagues who valued the student population. Administration had to make sure that efforts to retain students should not be isolated but systemic. The institutional culture must have created a successful environment for Latino students that were understood as a learning experience. A committed college would welcome Latino students as assets and should have viewed their arrival as a part of achieving its mission. An example of such a college is Northeastern Illinois University. The school had adopted a student/learner-centered goal that defined specific actions the entire community took in improving achievement. Among these was an early intervention program for students on probation after one semester. The school had been successful in reducing the percentage of students on probation by almost half. A Faculty Teaching and Learning Center was established with external funding that offered workshops on pedagogy. Advising first-year students became a big component of the program. At the end of the first five years

of the program, retention of first-year students increased by seven percent. Latino students were retained at the same rate as white students (Brown, 2003).

Backgrounds of Latino College Students

Native-born Latino high school graduates were more successful in pursuing college studies than their immigrant peers. About 42.4% of second-generation 18 to 24 year old Latino high school graduates were attending college (Vernez & Abrahamse, 1996). This was near the white rate of 45.8%. The performance of the Latino second generation in attending college was widespread across all origin groups. Among the 18 to 24 year old high school graduates, nearly 55% of second generation Central and South American youth attended college. About half of Cuban and 42.7% of Mexican generation high school graduates attended college (National Center on Education Statistics, 2000b).

In regard to income, Cubans as well as Central and South Americans tended to be among the better-off Latino households with average household incomes above \$40,000. Mexican origin and Puerto Rican households tended to be less well off, with average household incomes below \$37,000, which was below the average household level of African-Americans (Bean, 2001). As stated earlier, Native-born Latino households tended to be richer than foreign-born households. Mexican-origin Latinos had the lowest average household income among the native-born at \$42,000. This was well above the African-American average household income. The more one was wealthy meant that they would become more successful in obtaining a college education (Vernez & Mizell, 2001).

Studies on Latino Retention in Colleges and Universities

Amaury Nora developed his Model of Student Engagement that incorporated theoretical perspectives from sources such as Tinto. The model held major components such as pre-college/pull factors, sense of purpose and institutional allegiance, academic and social experiences, cognitive and non-cognitive outcomes, goal determination/institutional allegiance, and persistence. Studies conducted by Nora, Castaneda, and Cabrera (1992) and Cabrera, Nora, and Castaneda (1993) established that the educational dedication of Hispanic college students was a prominent component in affecting the intentions of this group of students to have returned for their second year in college. Research indicated that Hispanic college students possessed the desire to earn an undergraduate degree that they brought with them upon entering college. The high expectations Hispanics had were formed as early as elementary school (Rendon & Nora, 1997) and remained high even though research indicated that most of them would enroll in community colleges.

Other studies (Cabrera & Stampen, 1988; Cabrera, Stampen & Hansen, 1990; Cabrera, Nora, & Castaneda, 1993) conducted validated the importance of financial assistance in the persistence process. Cabrera (1992) found in his study that financial aid did create an equal playing field among recipients that were mostly minorities and non-recipients that were largely non-minorities. Cabrera, Nora, and Castaneda (1993) revealed in their study two tangible aspects of financial aid. The first aspect, which they referred to as the tangible component, was the actual awarding of financial aid. The attitude associated with having received financial assistance was referred to as the intangible component. Both components were found to directly and indirectly influence

the decisions of Hispanic students to remain in college. The assumption was that the intangible component was not only a reflection of stress reduction that came from being able to pay for college-related expenses but, this may have also represented a student's commitment to their respective institution that centered on the idea that the institution provided students the financial means to have remained in college.

The majority of research on the influence of social experiences on minority student persistence had centered on informal contact between students and faculty (Pascarella, 1985; Iverson, Pascarella, & Terenzini, 1984; Smart & Pascarella, 1986). More recent research had focused on the impact of the adjustment of students to college and not simply on persistence (Nora & Cabrera, 1996; Cabrera, Nora, & Castaneda, 1993). The influence of social experiences on persistence had mostly been found to be minimal for minorities. Nora's (1987) research on Hispanics at community colleges established that the influence of social experiences was felt on the student's academic performance and, in some extent, on persistence decisions (Nora & Cabrera, 1996).

Studies that have been conducted by Cabrera and Nora (1994); Nora, Castaneda, and Cabrera (1992); Allen (1988); and Braddock (1981) found that the student's commitment to an institution exerted a positive affect on a minority student's decision to remain enrolled in college. Nora and Cabrera (1996) tested the influence of a minority student's commitment to his or her institution separately from those of non-minority students. The results validated this commitment as a driving force for non-minority students in their decisions to re-enroll. This factor, though, was not significant in influencing persistence decisions for minorities. Even though a sense of belonging at an

institution affected non-minorities, other cognitive and non-cognitive factors were much more powerful in affecting minority students' retention.

Nora and Wedham (1991) studied the influence of environmental pull factors on the persistence of college students. In their analysis they identified three constructs that exerted a pulling-away effect both on the student's decision to remain enrolled in college and his or her social and academic integration on campus. The three factors included: family responsibilities, such as taking care of a family member or an entire family; working off campus while enrolled in college courses; and commuting to college every day. They confirmed that those students that had family responsibilities or were having to go to work off-campus could not fully integrate socially and academically and ultimately had to drop out of college. Nora, Cabrera, Hagedorn, and Pascarella (1996) found that minorities who had to leave campus to work were 36 percent more likely to have dropped out of college and minority women who had to deal with taking care of a family member were 83% more likely to have withdrawn from college. This sample consisted of both Hispanic and African-American college students. Having to commute to college was found to affect student decisions to remain enrolled, although there were no differences found between minorities and non-minorities.

In a study by Nora and Cabrera (1996), they found that Hispanic students were more prone to sense discrimination and prejudice in the classroom and on campus. These perceptions were found to have affected their academic performance, their academic experiences with faculty, their social experiences on campus, their academic and intellectual development, their commitment to an institution, and their decisions to have remained in college. They also found that almost every aspect of a Hispanic college

student's life was touched by these perceptions of discrimination and intolerance by the institution and others and the effect was negatively felt. Hispanic students' interactions with faculty and peers, grade point averages, and their development as students were moderated by a sense of prejudice on campus and in their classroom.

An influential factor bearing on Hispanic students' withdrawal decisions was their academic performance during their first year in college. While course grades were found to influence the decisions of non-minorities to drop out of college, this factor was more influential for Hispanic students (Nora & Cabrera, 1996). Academic achievement and corresponding perceptions that cognitive gains had or had not been made while attending college were the most prominent factors in deciding to remain enrolled in college for Latino students. A Latino student's sense of belonging in college and his or her perceptions of possessing the ability to earn a college degree was seriously questioned whenever they experienced a lower than expected academic performance. While other students may have adjusted after not doing well during the semester, this could be devastating to a Latino student. Findings suggest that an environment that Latino students perceive as intolerant of minorities contributed significantly to their perceptions that they could not overcome these setbacks. This could definitely influence their decisions to have dropped out.

Research conducted by Nora and Cabrera (1996) focused on three factors that heavily weighed on Hispanic students' decision to remain in college. The three factors included the following: encouragement and support by parents, academic performance, and the student's own sense that he or she was developing academically while in college. Nora and Cabrera found empirical evidence indicating that while perceptions of

discrimination and prejudice on campus negatively affected the adjustment to college and several college-related outcomes, much of the negative influence was negated by the student's perceptions that his or her family was supportive and provided encouragement while they were enrolled in college. Also, the authors tested the contention that successful adjustment to college included severing previous ties with family, friends, and past communities. Parental encouragement and words of support were found to exert a positive effect on students' integration into college, on their academic and intellectual development, on their academic performance and commitments, and on their decision to remain in college. In studies on Hispanic and African American two- and four-year college students (Nora, 1987; Cabrera, Nora, & Castaneda, 1993; Nora & Cabrera, 1996; Nora and Rendon, 1990; Nora, Kraemer, & Itzen, 1997), these factors were found to significantly impact the determination of minority students to persist. It is believed that the influence of family and community in the persistence process is due to the interrelations between Tinto's (1993) transition phase and different sources and forms of encouragement and support from others (Nora, 2002). In another study, Rendon (1994) coined the phrase "validating experiences" in an examination of the behavior of faculty toward minorities in the classroom. Nora noted that when Hispanic two-year college students perceived an air of acceptance and faculty behavior that validates their worth in the class, those students tended to participate more fully in classroom discussions, interacted more effectively with faculty, and reconsidered their decisions to drop out.

The Developmental Student

Hispanic and African-American students have traditionally been the two largest groups of minorities participating in American higher education. Also, Hispanic and

African-American students were the minorities most commonly served by developmental programs (Boylan, Sutton, and Anderson, 2003). Developmental students are often defined by their institution to be under-prepared for college-level work which is usually based on scores from standardized or placement tests (Hardin, 1998). The Southern Regional Education Board's report, as prepared by Abraham and Creech (2000), put developmental students into the following categories:

1. A student who graduated from high school years ago and needs a refresher course in mathematics or writing.
2. A recent high school graduate who completed a college preparatory program and may have received good grades, but whose high school did an inadequate job of preparing him or her.
3. A recent high school graduate who did not take a college preparatory program and was, therefore, not ready for college.
4. A recent high school graduate who completed a college preparatory program but earned low grades.
5. A recent high school graduate who planned to go to college but did not take a college preparatory mathematics class during the senior year. (p.1)

Adelman (2004) found that 46% of all students who earned more than 10 credits took at least one developmental course in English, math, or reading. Adelman (2004) also reported that the top six undergraduate courses with the highest rates of withdrawals, no credit repeats, and incompletes were math classes below the algebra level. Also, four of the top five undergraduate courses with the highest rates of failure or penalty grades were also math courses below the college algebra level.

In his findings, McCabe (2000) asserted that the demographics of seriously deficient students were dramatically different from other remedial education students. He defined seriously deficient students as those who were deficient in reading, writing, and math and were assigned to a lower-level remedial course in at least one area. McCabe's (2000) study showed that 56% of academically deficient students were White-non Hispanic. Even though data showed that the majority of under-prepared students were White non-Hispanic, minorities were overrepresented. Three-quarters of seriously deficient students were minorities—39.8% African-American, 21.6% Hispanic, 8.8% Asian/Pacific Islander, 5.8% other—while 23.9 percent were White non-Hispanic. At the same time, statistics showed that minority women represented 51 percent of all seriously deficient students. “Because the majority of academically deficient students are White non-Hispanics, it has been thought that remedial education is not a special issue for minorities. For minorities, deficiencies produced through K-12 inequities and disproportionate poverty are projected into college” (McCabe, 2000, p. 36).

Developmental Education

Breneman and Harlow stated in 1998 that remediation in higher education was not a new phenomenon even though it was new to the public spotlight. College and universities had a history of providing academic support to students who needed assistance to perform well in institutes of higher education. Institutions used different methods to implement components of developmental/remedial education programs. The majority of the programs included curriculum and design and delivery, assessment and placement, support services, and evaluation.

There are many definitions of remedial education in college. Institutions of higher learning used the terms *remedial* and *developmental* but those words may have different meanings at different campuses. The Institute for Higher Education Policy (1998) reported that there were no consistent standards about what was deemed “college level” work. The Institute also recognized that identifying who needs remediation was often determined by an individual’s institution’s admission standards. What some institutions called remedial, others called developmental. Developmental education was most used to encompass a much broader context that includes student preparation, pedagogical strategies, and the study of how students learn.

The term “remedial” implied that a student has some sort of academic deficiency that needed to be fixed or overcome (Cassaza, 1999). Remedial often was referred exclusively to pre-college level course and not to other services offered to students (Boylan, Bonham, & White, 1999). Lastly, the main goal of remedial education was to improve students’ academic skills. Remedial education was in place to fix or remediate students’ academic skills to prepare them for college level courses. Hence, remedial education did not focus on students’ non-cognitive skills (Boylan & Saxon, 1998).

The term *developmental* was used to define a program that provided students with a broader development of skills and attitudes that were not necessarily designed to make the student eligible for a particular program of study (Roueche & Roueche, 1993). Developmental education included courses, counseling, tutoring, supplemental instruction, orientations, seminars, labs, and workshops. According to Boylan, Bonham, and White (1999) developmental education was a continuum of services that had remedial courses on the low end of the spectrum and tutoring or learning assistance

centers on the high end. As stated by the National Association for Developmental Education (2001):

Developmental education is a field of practice and research within higher education with a theoretical foundation in developmental psychology and learning theory. It promotes the cognitive and affective growth of all postsecondary learners, at all levels of the learning continuum. Developmental education is sensitive and responsive to the individual differences and special needs among learners.

Developmental education programs and services commonly address academic preparedness, diagnostic assessment and placement, development of general and discipline-specific strategies, and affective barriers to learning.

Developmental education includes, but is not limited to: all forms of learning assistance, such as tutoring, mentoring, and supplemental instruction; personal, academic, and career counseling; academic advisement; and coursework. (p. 2)

In summary, when discussing developmental education, it was important to differentiate between developmental education and remedial courses. Remedial courses were known as courses in reading, writing, and math for students lacking those necessary skills needed to perform college-level work at the level required by the institution. Developmental education involved a comprehensive approach to helping all individuals improve their learning skills (Kozeracki, 2002). Successful developmental programs offered many different services to students including placement, orientation, study skills training, freshmen seminars, critical thinking instruction, and other support services (Boylan, 1999a; Boylan, Bonham, & Rodriguez, 2000; Boylan & Saxon, 1998; McCabe & Day, 1998). Remedial courses represented only one potential component of developmental education (Boylan, 1999b; Kozeracki, 2002). If schools decided to focus on remedial courses only, they may have been taking a narrow approach to developmental education. Developmental education involved the application of many

strategies designed to address academically under-preparedness holistically (Boylan, Bonham, & Rodriguez, 2000; Casazza, 1999; Kozeracki, 2002).

Goal of Developmental Education

Many institutions of higher learning in the United States provided plentiful resources in order to provide students with developmental math courses. The National Center for Educational Statistics reported that 72% of colleges and universities offered developmental math courses. Also, nationwide 24% of entering college freshmen were required to take developmental math (Merisotis & Phipps, 2000). The question was whether developmental-level courses made a difference in the ability of students to succeed in other college courses (Saxon & Boylan, 2001). Research previously conducted identified student characteristics related to success in developmental math as having been age, ethnicity, and enrollment status (Penny & White, 1998). Educators were not been able to understand what made a student likely to successfully complete a developmental math course in a timely manner and how the student's decision would have influenced academic performance in other courses.

An important goal of developmental math was to increase preparation of student with poor math skills prior to taking math courses necessary to meet graduation requirements (Johnson & Kuennen, 2004). This goal had been the focus of previous studies which had evaluated developmental math courses based solely on whether they could become competitive with their peers in regular math courses. Another goal of developmental math was to develop a student's ability to apply knowledge gained in one situation to solve problems in another, such as having used math skills in non-math courses that had a quantitative, problem-solving, logical, or abstract component. The

question arose whether developmental math improved a student's performance so they were competitive in advanced math courses and non-math courses (Hagedorn, Siadat, Fogel, Nora, & Pascarella, 1999; Hammerman & Goldberg, 2003; Merisotis & Phipps, 2000; Penny & White 1998; Wright, Wright & Lamb, 2002).

The National Association for Developmental Education (2001) also had a list of goals for developmental education:

1. To preserve and make possible educational opportunity for each postsecondary learner.
2. To develop in each learner the skills and attitudes necessary for the attainment of academic, career, and life goals.
3. To ensure proper placement by assessing each learner's level of preparedness for college coursework.
4. To maintain academic standards by enabling learners to acquire competencies needed for success in mainstream college courses.
5. To enhance the retention of student.
6. To promote the continued development and application of cognitive and affective learning theory. (p. 4)

What the National Association for Developmental Education provided colleges in the sense of definitions and goals was a guideline to help them define what they should have strived for when conducting a successful developmental program. Each institution, or state for that matter, still had to decide what they deemed to be developmental and how their students were going to be assessed to determine if they required developmental education.

The Need for Developmental Education

Developmental programs could meet their potential for enriching campus social and intellectual life through diversity by recognizing that contributing to minority retention should be a priority for the developmental education program. Although developmental programs were not specifically charged with promoting minority retention, “the fact that so many minorities pass through developmental education programs makes them the de facto arbiters of minority enrollment in mainstream and subsequent upper class courses at many colleges and universities” (Boylan, Sutton, and Anderson, 2003, p. 15).

A study of Texas colleges and universities reported fluctuations in the retention of minorities participating in developmental education. One-year retention rates for African-American and Hispanic students enrolled in developmental courses ranged from under 30% to over 80% depending on the institution (Boylan & Saxon, 1998). Campus administrators that wanted to obtain student diversity had to acknowledge developmental education as a major potential contributor to that diversity. After contributing to campus diversity through promoting minority retention, it was imperative that developmental programs must also become truly multicultural organizations. Efforts to retain diverse students were much more likely to be successful when they took place within the context of multicultural organizations (Boylan, Sutton, and Anderson, 2003).

In the world economy, U.S. workers needed to be more productive by becoming a highly-skilled workforce. McCabe (2000) mentioned that 80% of new jobs would require some college, but less than half of the youth in the U.S. were prepared to begin college. Community college remedial education was essential to the U.S. economy as

community college remedial education provided under-prepared students with continued education and constructive employment. Because the U.S. had been transformed by the information age, the academic skills that people needed to compete for better jobs escalated. This left minorities under-prepared. Attaining a college education was a battle for Hispanics as they had only one-third the chance of receiving a bachelor's degree (McCabe, 2000).

As the number of minorities was expected to grow in the U.S., so were their numbers in the college population. Murdock and Hoque (1999) predicted that by 2050 white non-Hispanic college students were expected to drop from 80% to 58%, while Hispanic college students were expected to increase from 6% to 18%. Minorities were more likely to require developmental education as they likely came from a low socioeconomic status and likely be under-prepared.

Besides accommodating students' work and family responsibilities, community colleges must have provided appropriate support to students who were academically under-prepared. Nationally, only 20% of low-income high school graduates with family incomes below \$25,000 were considered "highly qualified" for college, based on their high school course of study (National Center Education Statistics, 2000a). Because of weak preparation in high school, and because many community college students were adults several years removed from high school, the need for remediation was high. Approximately 40% of community college students needed to take at least one developmental course. Many of those who placed into developmental course never advanced to higher levels and only a small proportion attained college degrees (National Center for Education Statistics, 2004).

Until the nation made substantial improvements in K-12 education, especially in schools with concentrations of high-poverty students, there would be large numbers of students who entered college needing remediation. Community colleges must have provided more effective academic support to boost students' success in college programs. In effect, community colleges needed to create a better fit between their services and environment and their students' needs, especially paying close attention to groups of students who were currently not succeeding.

Achieving the Dream

Regardless of whether students sought certificates, degrees, college transfer, or specific career skills, many encountered substantial hurdles along their college paths.

Certain characteristics reduced a student's chance of completing a college program:

- Delayed enrollment after high school graduation;
- Lack of a high school diploma;
- part-time enrollment;
- full-time work (at least 30 hours a week);
- financial independence from one's parents;
- dependents other than a spouse; and
- single parenthood. (National Center for Educational Statistics, 2003a)

More than 70 percent of community college students had at least one of these impeding factors, and half had two or more of these characteristics. Low income students and students of color were especially likely to have had these characteristics (National Center for Educational Statistics, 2003b).

The fact that community colleges enrolled substantial numbers of at-risk students was a strength as it indicated these institutions were providing opportunity to many students who might not otherwise have had access to college. But there was a clear need for colleges to have created experiences and environments that yielded improved outcomes for students, especially for populations with low rates of success (MDC, Inc., 2004).

Some community colleges have demonstrated promising approaches to improve student outcomes. Supportive public policies and community engagement could further bolster students' chances for success by making college more affordable; smoothing transitions from high school to college and from two-to-four-year programs; and ensuring that community colleges have the capacity and resources to provide the services their students need. *Achieving the Dream: Community Colleges Count* would help more colleges adopt promising practices, while also working for changes in policy, public engagement, and other realms to bolster student success (MDC, Inc., 2004).

Achieving the Dream was a long-term effort to increase rates for underserved students at community colleges. Participating colleges are required to maintain high enrollment levels for these students while working to increase the percentage who completed coursework, advanced through programs, and earned certificates and degrees. Each college must identify student populations that experienced low rates of success, developed interventions to improve student outcomes, and measured changes to student success. To gauge the impact of the initiative as a whole, all colleges must have documented over time the percentage of low-income students and students of color who accomplished the following:

- successfully completed developmental courses and progressed to credit-bearing courses;
- enrolled in and successfully completed gatekeeper courses;
- completed the course they took, with a grade of C or higher;
- re-enrolled from one semester to the next; and
- earned certificates and degrees. (MDC, Inc., 2004)

Ultimately, the initiative sought to help more students achieve their individual goals, which may have included obtaining a better job, earning a community college certificate or degree, and/or attaining a bachelor's degree (MDC, Inc., 2004).

To help raise success rates for underserved students, *Achieving the Dream* colleges are required to work for change at five levels. This initiative should (1) promote and support institutional change at community colleges; (2) develop supportive state and national policies; (3) engage the public to support community college access and success; (4) build knowledge about strengthening student outcomes at community colleges; and (5) enhance the capacity of national organizations to work long term for improved student success (MDC, Inc., 2004). Accordingly, *Achieving the Dream* goals should help the faculty, staff, and administrators of community colleges strengthen their institution's capacity to:

- *Pursue student success with commitment and zeal.* Success for all students will be central to the college's mission and to the work of administrators, faculty and staff. The college will create avenues to understand students' educational experiences, their perceptions regarding their experiences, and their ideas and opinions about how the college might better serve them.
- *Function as "learning organizations."* The college will regularly involve administrators, faculty, and staff in reflection and honest self-assessment about barriers and strategies for student success. It will seek out and adapt promising strategies from around the country and the world. And it will encourage innovation in meeting students' needs and helping students succeed.

- *Develop a culture of evidence and accountability.* The college will set clear goals for student outcomes and use data to document successes, identify weaknesses and problems and measure progress toward goals.
- *Make systematic and lasting changes.* These changes must be made in policies, structures, programs, and services to improve student outcomes. (MDC, Inc., 2004)

Before considering particular strategies, it is essential for each college to have a solid diagnosis of its situation. Colleges must analyze data to identify key stumbling blocks for students such as the success in developmental courses and the transition from developmental to core curriculum courses and to determine whether particular groups of students by race, income, or other characteristics experience problems in certain areas. At the same time, colleges must rigorously review their current programs and services for academically under-prepared students and low-income students to determine how well existing approaches are working and why. And they must honestly assess how college policies and the culture of the institution affect students' prospects for success (MDC, Inc., 2004).

While approaches of successful developmental programs vary from college to college, there are some basic requirements for establishing a strong developmental effort: administrative support and stable funding; adequate facilities; ongoing assessment of learners; an atmosphere conducive to adult learning; and a competent committed, and dedicated staff and faculty who have a genuine concern for the success of their students and who enjoyed their work (Roueche & Roueche, 1993). A college cannot work intensively to raise student outcomes without buy-in from faculty and staff. Institutional change means ultimately that people have to change their behavior across the institution. Once they buy into the program, their support will come most readily when they share

responsibility for diagnosing problems and designing solutions. An inclusive process may also help in establishing better strategies as faculty and staffs that are closest to the students can help redesign programs, services, and structures (MDC, Inc., 2004).

According to Roueche and Roueche (1993), there are some common elements that successful colleges have had that have helped with retention in developmental courses:

1. *Strong administrative support.* Board policy manuals, college catalogs, and student handbooks carried written statements as to institutionally shared responsibility for student success, which translated into student assessment and placement in approximate courses.
2. *Mandatory counseling and placement.* Students were tested for basic skill development and then were enrolled in courses appropriate to the outcomes of that assessment and were not allowed to enroll in courses where those skills were required until they are developed to appropriate collegiate levels. Many colleges required the testing and subsequent placement as conditions for enrollment and successful completion before enrolling in other courses.
3. *Structured courses.* The size of the institution was a major factor in determining the programmatic structure of the effort-where the developmental courses were housed-but the courses met regularly, and there was careful monitoring of students attendance and progress.
4. *Award of credit.* Without exception the courses were awarded transcript credit, although institutions differed as to whether the credit was elective and counted toward specific degrees or was transcript credit only.
5. *Flexible completion strategies.* Students were allowed to complete the prescribed work in the number of semesters required to earn a satisfactory grade. Persistence without observable and profitable progress was met with career alternatives and academic counseling.
6. *Multiple learning systems.* From an analysis of their written assessment, students were engaged in learning activities drawn from performance-based objectives, using self-paced modules of instruction, engaging group instruction, and using pre-and post-tests to indicate sequential movement through work. Instructional strategies were varied for meeting the diverse student interests and learning styles.
7. *Volunteer instructors.* Only those who volunteered to teach basic skills, usually after meeting predetermined curricular and instructional criteria, chose to accept the special demands that are made on faculty by at-risk students.

8. *Use of peer tutors.* Usually selected by performance criteria, further trained to work with at-risk students, and regularly evaluated, peer tutors increased the individual contact during class sessions and out-of-class time blocks and increased the number of intervention strategies required to monitor at-risk students' attendance and progress.
9. *Monitoring of student behaviors.* Excessive absences, failure to produce assigned work, and failure to produce acceptable levels of work were intervention signals. Intervention strategies included calling absent students, bringing them up to date on assignments, and providing tutoring or other academic services whenever necessary.
10. *Interfacing with subsequent courses.* The faculty of basic skills courses conducted modified needs assessments to determine the requirements of generic and specific-discipline course and used the results to design their own course content and learning strategies. They designed exit criteria that reflected these assessment demands for successful completion of their own and of the next level of courses.
11. *Program evaluation.* Improving data collection procedures for program evaluation and for developing improved retention strategies was recognized as a priority by administrators and teachers of these successful programs. There were plans to improve pre-assessment strategies for identifying low-achieving students and improving the intervention strategies during the first months and semesters, as well as to refine exit interviews for determining problem areas as yet unidentified. (Roueche and Roueche, 1993, pp. 56-57)

When a college has baseline data on student outcomes for different groups, it can more readily assess the effect of new policies and practices. Over time, the college can see which innovations are making a difference and expand their scope. When an intervention proves ineffective, the college can try something else. As student outcomes improve, the data can provide reinforcement and motivation for faculty and staff (MDC, 2004). *Achieving the Dream* aims to help colleges adopt an evidence-based process for decision making and resource allocation. This initiative serves colleges in helping them evaluate progress each year, set new goals for the coming year, and allocate resources based on evidence about how well various policies and programs will help the college toward its goals. The implementation of an annual planning cycle is cited as the single

most important factor in the Community College of Denver's long-term, highly successful efforts to improve student outcomes and close gaps among racial and ethnic groups (Roueche, Ely, & Roueche, 2001). Colleges need to build in a variety of ways to sustain their commitment to educate developmental students in the long term. Broad-based buy-in from faculty, staff, and administration is essential. A strong focus on student success can be reinforced by supportive policies at the institutional and state level.

Participation in College

Boshier examined researched conducted by Houle, who published his findings in 1961. In his study, Houle interviewed 22 continuing education participants in the Chicago area and developed a three-part typology for describing learners. This typology included the following: 1) goal-oriented learners who use education to achieve some other goal; 2) activity-oriented learners who take part for the sake of the activity itself and the social interaction; and 3) the learning-oriented who seek knowledge for is own sake (Maddox, 2004). Sheffield (1964) expanded on Houle's typology as he studied 453 adult education participants in 20 continuing education conferences held at eight universities in the United States. Sheffield prepared a list of 58 reasons given by adults who participated in adult education classes. His factor analysis produced five factors that included: 1) learning orientation--seeking knowledge for its own sake; 2) desire-activity orientation--taking part because of interpersonal reasons; 3) personal-goal orientation--participating to accomplish clear-cut personal objectives; 4) societal-goal--orientation participating to accomplish clear-cut social or community centered objectives; and 5) need-activity orientation--searching for an introspective or intrapersonal meaning. Boshier (1971) criticized Sheffield's study because the study was drawn from a very

homogenous group, therefore he could not assume that the motivational orientations found would exist in other cultures. Also, Boshier thought that Sheffield did not produce intercorrelations between his factors so no one could know the extent to which they were independent.

Boshier (1969) examined Houle's (1961) and Sheffield's (1964) research and developed his own model to explain dropout from adult education institutions. This model draws on Maslow's hierarchy of needs and suggests that people are either growth-oriented or deficiency-oriented. A growth-oriented person meets the needs in Maslow's hierarchy and is autonomous, creative, inner directed, open to new experience, willing to be spontaneous, and free from deterministic attitudes. Deficiency-oriented people are concerned with lower-order needs and are afraid of the environment (Boshier, 1973).

In the model that Boshier created, persistence and dropout were functions between the participants' self-concept and key aspects of the educational environment. Intra-self incongruence explained the differences between one's self and one's ideal self. The model then showed the perceived congruence between the self and other students, the self and the teacher, and the self and the institutional environment. These discrepancies were mediated by social and psychological variables such as age, sex, and social class and environmental variables such as transportation and class size. The arrows in the model stipulated that these two groups of mediating variables had an effect on the person's orientation in the first place (Boshier, 1973).

This model led Boshier to develop the 48-item Education Participation Scale (EPS), which was eventually published in 1971, to assess discrepancy scores between self/institution, self/other students, and self/teacher to predict dropout using over 1,000

New Zealand adult education participants. The Education Participation Scale (A-Form) was comprised of seven factors that measure motivational orientations. The following descriptions were adapted from the Roger Boshier web site (<http://www.edst.educ.ubc.ca/faculty/boshier.html>):

1. Communication Improvement (COM). People who score high on this factor want to improve their speaking, writing, or general language skills in order to better communicate.
2. Social Contact (SOC). People who score high on this factor participate because of the joy of learning with others. They like being part of a group. High scorers on this factor are quite healthy—their behavior is not significantly impelled by neurosis.
3. Educational Preparation (EDUC). People who score high on this factor often want to make up for a narrow previous education or to prepare for further education.
4. Social Stimulation (STIM). People who score high on this factor are lonely or bored and participate in education to meet others and to grapple with problems in their social life. High scorers on this factor are often more unhappy and neurotic than low scorers.
5. Professional Advancement (ADV). People who score high on this factor participate in education to consolidate their hold on their current job, or to position themselves to get a new job. For them, education is a way to advance professionally.

6. Family Togetherness (FAM). People who score high on this factor want to share a common interest with a spouse or friend, or keep up with their spouse or children. They may want to be able to talk with or answer questions from their children.
7. Cognitive Interest (COG). People who score high on this factor participate in education for its own sake. For them, learning is life. They care less about how the new learning will be used. Rather it is the inherent joy of learning that drives their participation. For them, learning for its own sake is enough.

Boshier (1973) used the EPS to collect data from over 2,000 students enrolled in continuing non-credit classes in New Zealand and examined the structure of his EPS correlation matrix in order to test how well his data fit Houle's typology. Fourteen initial factors accounted for nearly 70% of the variance in success and persistence. After further analysis, Boshier found that students that dropped out of an adult education class were associated with student/educational environment incongruence. Boshier felt that incongruence initially resides within the participant and is generalized onto the adult education situation. His analysis also showed that dropouts manifest greater self/other incongruence than persisters and older students tended to persist more than younger students.

In 1991, Boshier recommended the use of an alternative form of the EPS called EPS (A-Form). In his article titled, "Psychometric Properties of the Alternative Form of the Education Participation Scale," Boshier stated that the first form of the EPS was limited due to two factors. First, he felt that the form's ties to the Houle (1961) typology were limiting because Houle's study was based on only a small data set. Also, there were

an unequal number of items in each F-form factor which made the scoring unnecessarily complicated. Fujita-Starck (1996) used Boshier's A-form to analyze responses from 1,142 students at a large state university. The results of the study confirmed Boshier's (1991) seven factor typology (communication improvement, social contact, educational preparation, professional advancement, family togetherness, social stimulation, and cognitive interest). Fujita-Starck also found the scales to be reliable in helping to differentiate a diverse group of students with different reasons for participating in education.

Boshier's model was based on the assumptions that participation and persistence in adult education were determined by how people felt about themselves and the match between the self and the educational environment. It was imperative that schools found out the students' reasons for participating and how it might have correlated with successful completion of the program. The Congruence Model of Educational Participation and Dropout created by Boshier (1973) viewed participation and dropout as a function of the magnitude of the discrepancy between the participant's self concept, a match between student and other students, instructor, educational processes, and the environment, which includes job and home responsibilities.

Tinto's Theory of Departure

Researchers turned to persistence theory to try and explain and gain an understanding of student departure and persistence patterns. Tinto (1975, 1988, 1993) is one of the most notable researchers of persistence. Tinto drew his research from Spady's (1971) work based on Durkheim's (1951) research on suicide. Tinto (1992) argued that individual departure from institutions arises from a longitudinal process of interactions

between an individual with various attributes, skills, and dispositions (intentions and commitments) and other members of the institutional academic and social systems. According to Tinto's theory, the more a student integrated himself or herself into the social and academic life of the campus, the more the student became committed to the goal of graduation and developed loyalty to the individual institution. This would increase the chances that the student would persist and obtain their degree.

Researchers at community colleges conducted studies using Tinto's theory of departure in attempt to better understand and use findings regarding the departure and persistence behavior of their students to ultimately affect college continuance to goal completion. When exploring the variables of social and academic integration across institutional types, Chapman and Pascarella (1983) determined that two-year college students had more friends attending the same college and had more informal social contact with faculty than did university students. Two-year students seemed to be the least socially integrated of all students studied at all-types of institutions. In another study conducted by Pascarella and Chapman (1983), they found that two-year students were low in both social and academic integration as compared with students from other types of institutions. Those that persisted in two-year colleges had significantly less informal contact with both faculty and peers than those who withdrew.

Other studies have been conducted to determine if Tinto's factors of goal and institutional commitment were related to student persistence. Braxton, Sullivan, and Johnson (1997) reviewed a large number of studies based to varying degrees on Tinto's model and identified 15 testable propositions specified by Tinto and then evaluated the empirical evidence relevant to each. They also examined whether the evidence, which

was generally based on multiple regression or structural equation modeling techniques, varied for single versus multi-institutional studies, for men versus women, and for residential versus commuter campuses. They concluded that the evidence provided only partial support for the model overall, and that was true in residential, but not commuter settings. Their evidence specific to males and females provided low support for the model. Pascarella and Terenzini (2005) have concluded that even after taking into account students' pre-college degree goals, abilities, and other relevant characteristics, initial attendance at a two-year institution reduced the likelihood of bachelor's degree completion by 15 to 20 percent. Pascarella and Terenzini (2005) suggested that students' institutional commitments exerted an important and positive effect in shaping their persistence decisions, both planned and actual. This effect persisted even in the face of controls for the pre-college demographic and academic characteristics and the initial goal and institutional commitments student brought with them to college. They also suggested that the level of student involvement and integration in any of the components of an institution's academic and social systems could be a critical factor in student's persistence decisions.

Tinto's Student Integration Model

There have been several studies detailing why and when students drop out of college. Studies by Tinto (1975), Tierney (1992), Cabrera, Nora, and Castaneda (1993), have shaped how researchers and practitioners viewed the issues of student retention and departure. Tinto's model (1975) was constructed using work by Spady (1970). Spady presented one of the early conceptual models of the student attrition process in higher education. Spady suggested that suicide is more probable when individuals are poorly

integrated into the shared structure and theorized that the social integration of students increases that student's institutional commitment which will ultimately reduce the likelihood of student attrition. Tinto (1975) expanded Spady's theory to include the process of student integration into the academic and social systems of institutions of higher education. Tinto's goal was to clarify the effect of multifaceted interactions within the system on student persistence. Tinto (1975) came to the conclusion that the interplay between the individual's commitment to the goal of college completion and his commitment to the institution would determine whether or not the individual decided to drop out.

Tinto's student integration model consisted of six characteristics. Before they matriculated to postsecondary education, Tinto believed students would develop attributes that were shaped by their familial upbringing. At the same time, he felt that they developed academic and social skills and abilities in both formal and informal settings. In turn, Tinto suggested that these skills and abilities helped form students' goals and commitments regarding college, the workforce, and their place in society as a whole. During their time in college, Tinto hypothesized that formal and informal college experiences influenced the student's level of integration into the college, both academically and socially. According to Tinto, this level of integration had an impact on the student's development of goals and commitments, which resulted in either a decision to persist in or depart from college. The match between student characteristics and institution, according to Tinto, shaped students' goal commitments, which in turn influenced persistence (Swail, Redd, & Perna, 2003).

In 1988, Tinto expanded his view of student dropouts to include a three stage process: separation, transition, and incorporation. He adapted this from Van Gennep's social anthropology theory which drew a parallel between the movement of an individual from one group to another in tribal societies with the departure of a student from home and his or her incorporation into the new college community (Fernandez, Whitlock, Maring, & VanEarden, 1998; Tinto, 1988). The *separation stage* referred to the student's parting from past habits and patterns of associations. According to Tinto, students must in a sense leave their former communities if they want to consider themselves part of the community college. The *transition stage* referred to how students cope with stresses of departing from the familiar, while not completely understanding or integrating into the new college environment. The *incorporation stage* reflected students' competency as an institutional member. After incorporation, Tinto believed the student was no longer the person he or she once was. This student, in effect, had become a new individual. This view added a time dimension in the form of longitudinal stages of the integration process and addressed the early stages of separation, transition, and difficulties students typically face academically and socially before their incorporation into campus life. According to Tinto, lack of integration into the college campus resulted from students' inability to separate themselves from past associations in making the transition to a new community (Swail, Redd, & Perna, 2003; Tinto, 1988).

*Incorporating Boshier's Educational Participation Scale
With Tinto's Theory of Student Departure*

Tierney (1992) criticized Tinto's theory by stating that Tinto's theory did not fully explain experiences of students from historically underrepresented groups and it placed

too large a responsibility on the student to adapt without asking the institution to modify policies or practices to respond to changing student populations. Rendon, Jalomo, and Nora (2001) criticized Tinto's departure model because they felt it assumed that the retention of minority students was similar to those of majority students. They felt that the majority of student persistence researchers began their studies before minorities became a large part of student enrollments in college so, therefore, the research on minority persistence represented a monolithic view of students devoid of issues of race/ethnicity, culture, gender, and identity.

The Educational Participation Scale measures motivations to participate in higher education from communication improvement, social contact, educational preparation, professional advancement, family togetherness, social stimulation, and cognitive interest. In this study there will be an attempt to explain how a student's motivation to participate in college relates to success. Tinto (1975) suggested that a theoretical model of dropout from college must include background characteristics of students as well as expectational and motivational attributes of individuals. Since the Educational Participation Scale measures students' motivations for attending college, it seemed to fit with Tinto's background characteristics. This study measured the effects of students' motivations using the Educational Persistence Scale and using Maddox's (2004) path model of educational participation impact on Tinto's model (see Figure 3) as the conceptual framework for participation.

Review of Current Studies

Two most recent studies (Maddox, 2004; Geller, 2003) looked at student motivation and curriculum programs in detailing the success of students in developmental

math courses. Geller's study (2003) found that a number of institutions in North Dakota used mandatory assessment in institutions, but found a lack of a mandatory placement except at one institution. According to the findings in this study, none of the developmental math programs had clearly defined and stated program goals, but most course syllabi included course goals or objectives. None of the programs reviewed for this study were regularly or systematically assessed and evaluated.

Maddox (2004) examined whether there were differences between traditional and nontraditional students' motivations to attend college, and whether there were relationship between persistence and educational motivations, background variables, and institutional variables of developmental math students at Jackson State University. Using Boshier's Education Participation Scale (EPS), Maddox (2004) integrated EPS motivations and background variables into Tinto's Model of Student Departure. This suggested that the more involved students are in the academic and social systems of the institution, the more likely they are to persist. The scope of the study involved an examination of under-prepared community college math students' educational motivations to participate in higher education, looking for comparisons between traditional and nontraditional students. Only two research questions were posed for this study:

1. Are there significant differences in motivations to attend between traditional and non-traditional students?
2. What is the relationship between background variables, motivations to attend college, institutional variables, and persistence?

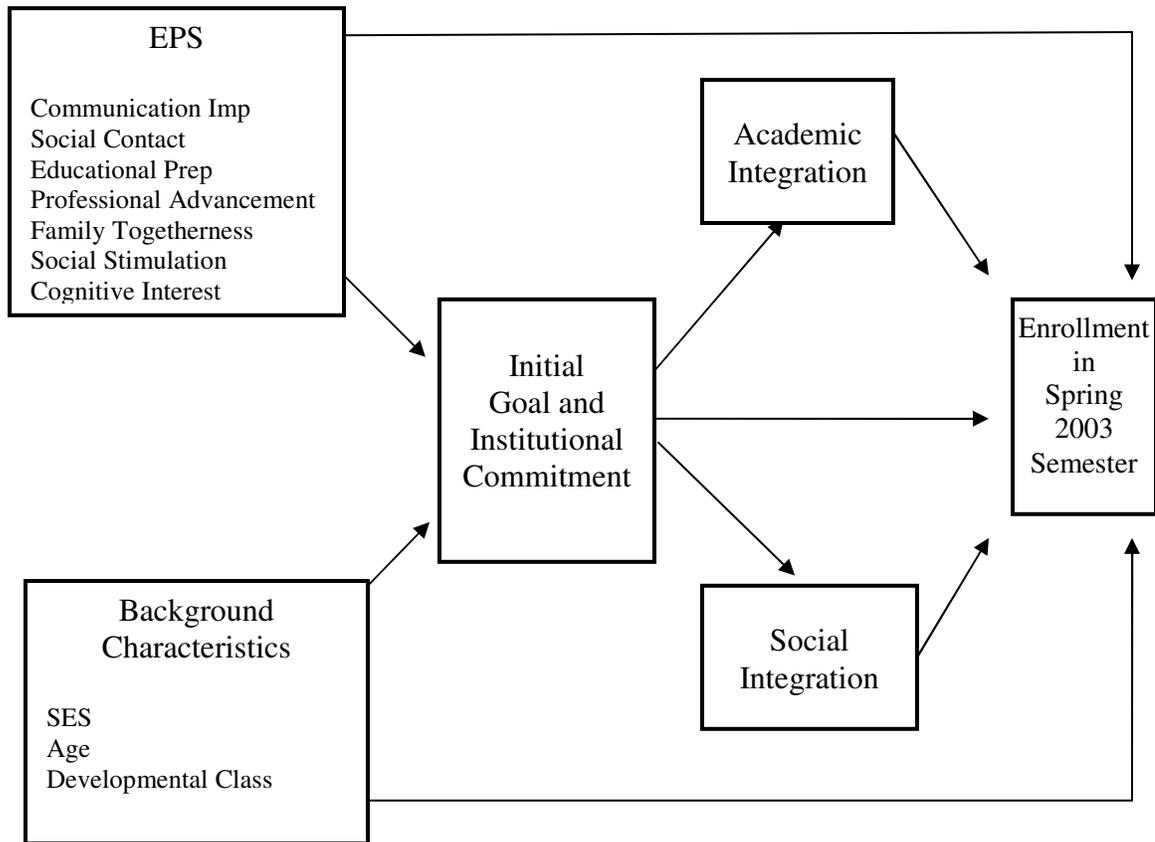


Figure 3. Path Model of Educational Participation Scale Impact on Tinto's Model (Maddox, 2004).

In addition, the study conducted by Maddox tried to determine whether there were relationships between those educational motivations to participate, background variables, institutional variables, and persistence from the Fall 2002 semester to the Spring 2003 semester. T-tests were used to determine the first goal of the study: whether there were differences between traditional and nontraditional students' motivations to attend college as measured by Boshier's Educational Participation Scale. Path analysis was used to

determine the second goal of the study: measuring effects that background variables, EPS variables, and variables from Tinto's model have on persistence.

Path analysis was conducted through ordinary multiple regression analysis. First, persistence was regressed on GPA, Academic System, Initial Commitment, EPS Motivations, Age, Socio-economic Status, and Math Ability. The results of this statistical analysis suggested that six of Boshier's seven EPS variables had little effect on Persistence. Maddox found that only Family Togetherness had a significant total effect on Persistence, thus suggesting that students with family issues were more likely to have difficulties persisting than students with no family responsibilities. Although there were differences on the EPS findings between traditional and nontraditional students' motivations in Social Contact, Family Togetherness, and Educational Preparation, the other variables were similar enough in rank order of importance to suggest that Boshier's EPS could be used with both groups. In the order of importance in the study, both groups felt that Professional Advancement, Educational Preparation, and Cognitive Interest were the most important reasons to attend college, and both found that Communication Improvement, Social Contact, Social Stimulation, and Family Togetherness were less important.

GPA was the most important predictor of Persistence, but the only EPS variable that had any significant effect on GPA was Social Stimulation. In the end, EPS variables added very little to Tinto's Interactionist Theory of Student Departure. The results of the Maddox's study also suggested that only two of the thirteen variables had significant total effects on persistence, those being GPA and Family Togetherness.

This study of the developmental math program at Northwest Vista College was similar to Maddox's research but focused on the success of Hispanic students drawing from Boshier's EPS motivations and Tinto's Model of Student Departure. This study focused on the relationship between background, motivation, institutional variables, and Hispanic student success in developmental math courses.

Summary Review of Literature

Two-year colleges have become an increasingly important part of the American higher education system, especially for Hispanics who are more likely to start their careers at two-year colleges. College enrollment data reveal that Hispanic students value university education. Latino families show that they are willing to invest in their children's education. The number of Latino students that graduate, though, is reduced by part-time enrollment, a concentration in two-year colleges, and the tendency to prolong undergraduate education beyond the traditional age. This type of college attendance is matched by the tradeoff of gaining an education versus not going to school because of family, community, and affordability. First generation Latinos lack the support systems at home that others may take for granted. Lastly, many Latinos are the products of underfunded, under-staffed, and under-performing high schools, which have not always given them an adequate preparation for college work. This has contributed to a number of Hispanics having to take developmental courses in college.

As the fastest growing ethnic group in the nation, Latinos' success in college is crucial to the economic and civic health of this country. By improving Latino educational success through the highest levels in education, colleges and universities will have an opportunity to solve what could easily become a large social problem in this

country. Colleges and universities can also work to erase the under-preparation of Hispanics, a large portion of its workforce that can eventually grow into leaders and professionals.

Hopefully, this investigation provided important information to community college administrators, faculty, and student service personnel related to community college student success in developmental math courses. These findings may have implications for the development of new math retention strategies to better meet Latino students' needs at the community college level.

CHAPTER THREE

Methodology

Introduction

As the population of Hispanic college-going students continues to grow, college and university personnel across the United States must continue to become better informed on the issues that affect persistence of this group. In spite of enrollment growth, Hispanic students continue to trail all other groups in earning undergraduate degrees and suffer from a college persistence problem. The continued population growth, especially in regions that previously lacked a Hispanic presence, is challenging college and university personnel to better understand this diverse group of students.

This study attempted to determine the effectiveness of the *Achieving the Dream* initiative in relation to developmental math at Northwest Vista College and how this might improve success and persistence of Hispanic students. Persistence and success patterns of Hispanic students and non-Hispanic students were compared in this study during the implementation of the *Achieving the Dream* initiative. The chapter contains sections describing the research design, population and sample, instrumentation, variables, data collection, pilot study, analysis of data, and summary.

Research Design

The research design consisted of a quantitative study of developmental math students. Specifically, Hispanic student success was examined in all four developmental math courses at Northwest Vista College (NVC) in San Antonio, Texas during the Fall

2005 semester. The study involved the use of a control-group interrupted time-series, quasi-experimental survey design in order to analyze and compare the data collected from students enrolled in developmental math courses at NVC during the implementation of the *Achieving the Dream* initiative in the Fall of 2005. This study also addressed motivations and the entry characteristics of students taking developmental math classes at NVC.

Population and Sample

Students enrolled in developmental math courses at Northwest Vista College were selected for the sample. In the Fall of 2005, eleven Math 0300, twenty-six Math 0301, twenty-eight Math 0302, and twenty-nine Math 0303 courses were offered at Northwest Vista College. A total of 1,905 students from each of the four developmental math classes were asked to participate in the study during the first week of December, 2005. Surveys were distributed to all students in each of the 94 courses. The students then submitted the completed surveys to their respective instructors. The surveys were then collected from the instructors within a week's time. Not all instructors participated in the study. Table 2 on page 66 provides demographic information on the number of surveys that were given out and completed. The sample was controlled where only the data of first-time-to-NVC Hispanic students were used in the analysis. Hispanic students were targeted since a larger proportion of Hispanic students attempted developmental coursework than students in other ethnic groups at NVC. Data from a total of 405 Hispanic students was extracted from the survey for analysis.

Instrumentation

Students were surveyed (see both Appendix A and Appendix B) using Boshier's 42-item Education Participation Scale (EPS A-Form) with Maddox's (2004) instrument utilized as an example. Additional entry-level characteristics and student goals were obtained from the literature review of Tinto's Interactionist Theory of Student Departure and included in this survey. The EPS F-Form was revised in 1984 to the A-Form (see Appendix C) which changed its six-factor scoring key to a seven factor scoring key, standardizing the number of items in each factor. Coefficient alphas range from .76 to .91 with the mean scale test/retest coefficient being .65 (Boshier, 1991, Fujita-Stark, 1996). The EPS list consisted of reasons for participation in educational activities and may require about 15 minutes to complete. The instrument used in this study was modeled after the one used in Maddox's study (2004).

Table 2

Students Surveyed and Their Response Rates in Fall 2005 Developmental Math Classes

Math Courses And Number of Sections	Surveys Sent	Number of Students Surveyed	Response Rate	Number of Hispanic Students Responding
0300 (N=11)	217	50	23.0%	27
0301 (N=26)	548	219	40.0%	112
0302 (N=28)	537	239	44.5%	128
0303 (N=29)	603	272	45.1%	138
Total (N=94)	1905	780	40.9%	405

Variables

Three independent sets of variables were used in this study. The first set included the seven motivations from Boshier's EPS (Cognitive Interest, Communication Improvement, Educational Preparation, Family Togetherness, Professional Advancement, Social Contact, and Social Stimulation) along with student background characteristics, which included Gender, Family Income, Parent Education, Students' Age and Math Ability (as demonstrated by placement in a developmental math class as measured by the Accuplacer Test). Data for these variables were gathered from the student surveys given to developmental math students. The second set of independent variables were Initial Commitment (Goal and Institutional Commitment), including student intent to graduate, commitment to a major, and commitment to Northwest Vista College. Data for these variables were gathered from the student surveys. The third set of independent variables was Academic System (Academic Integration and Social Integration) which included financial aid (Pell Grant), success (a grade of C or better in the developmental math courses), peer interactions, and faculty interactions. Data for these variables were gathered from the student surveys and institutional records. The dependent variable was success as measured by a student achieving a grade of C or better in their Fall 2005 developmental math course. This information was gathered from institutional student enrollment data.

Description of Exogenous (External) Variables

EPS Variables

The EPS Variables are listed and described in Table 3. Descriptions are adapted from Morstain and Smart (1974) and Fujita-Stark (1996).

Table 3

Listing and Definition of EPS Variables

EPS Motivations	Definitions
<p>1. Communication Improvement (COM) Questions on survey: 1, 8, 15, 22, 29, 36</p>	<p>Composite of six survey items representing those who want to improve their speaking, writing, and communications skills. In addition, this scale may include people who are interested in learning a new language or culture. Items are: “to improve language skills,” “to speak better,” “to learn another language,” “to write better,” “to help me understand what people are saying and writing,” and “to learn about the usual customs here.</p>
<p>2. Social Contact (SOC) Questions on survey: 2, 9, 16, 23, 30, 37</p>	<p>Composite of six survey items which state a need for personal involvement, membership in group activities, and wanting to make new friends. In addition, these items show a need to gain insight into personal problems, to be accepted by others, and to share an interest with acquaintances. Items are: “to become acquainted with friendly people,” “to have a good time with friends,” “to meet different people,” “to make friends,” and “to meet new people.”</p>
<p>3. Educational Preparation (EDUC) Questions on survey: 3, 10, 17, 24, 31, 38</p>	<p>Composite of six survey items which describe a need to compensate for an incomplete education or to prepare for additional schooling. Items include: “to make up for a narrow previous education,” “to get education I missed earlier in life,” “to acquire knowledge to help with other educational courses,” “to prepare for further education,” “to do courses for another school or college,” and “to get entrance to another school or college.”</p>

(table continues)

Table 3. Listing and Definition of EPS Variables

EPS Motivations	Definitions
<p>4. Professional Advancement (PA) Questions on survey: 4, 11, 18, 25, 32, 39</p>	<p>Composite of six survey items which reflect those who perceive their education as vocationally oriented, leading to greater competence and higher status. They tend to be highly motivated and competitive.</p>
<p>5. Family Togetherness (FAM) Questions on survey: 5, 12, 19, 26, 33, 40</p>	<p>Items are: “to secure professional advancement,” “to achieve an occupational goal,” “to prepare for getting a job,” “to give me higher status in my job,” “to get a better job,” and “to increase my job competence.”</p> <p>Composite of six survey items which describe people who anticipate family changes or seek to communicate better with a spouse or with children. Items are: “to get ready for changes in my family,” “to share a common interest with my spouse or friend,” “to keep up with others in my family,” “to keep up with my children,” “to answer questions asked by my children,” and “to help me talk with my children.”</p>
<p>6. Social Stimulation (STIM) Questions on survey: 6, 13, 20, 27, 34, 41</p>	<p>Composite of six survey items which represent the need to escape from a boring environment. High scorers tend to regard their coursework as a means of relief from everyday boredom and responsibilities, providing a contrast to their daily routine, and overcoming everyday life frustrations. Items are: “to overcome the frustration of day to day living,” “to get away from loneliness,” “to get relief from boredom,” “to get a break in the routine of home work,” “to do something rather than nothing,” and “to escape an unhappy relationship.”</p>

(table continues)

Table 3. Listing and Definition of EPS Variables

EPS Motivations	Definitions
<p>7. Cognitive Interest (COG)</p> <p>Questions on survey: 7, 14, 21, 28, 35, 42</p>	<p>Composite of six survey items which represents something meaningful for the student. Items are: “get something meaningful,” “to acquire general knowledge,” “to learn at school for the joy of it,” “to satisfy one’s inquiring mind,” “to seek knowledge,” and “to expand one’s mind.”</p>

An analysis of Boshier’s factors were analyzed as motivators which might influence Academic System, Initial Commitment variables, and success adapted from Tinto’s Model of Student Dropout (1975).

Background Variables

Tinto suggested that characteristics of individuals that were closely related to dropout included the characteristics of family, the characteristics of the individual, and educational experiences prior to college entry (Tinto, 1975). These characteristics were hypothesized to directly influence two components of the model in that they affect initial commitment and the likelihood of persistence in college (Braxton, Sullivan, & Johnson, 1997; Pascarella & Terrenzini, 1993).

Three background variables that were included in Tinto’s Model of Student Dropout (1975) are family background, individual attributes, and math ability. Family background is important because those that persist in college more than likely come from families whose parents are more educated and more affluent (Verba, Burns, & Schloman, 2003). Secondly, an individual attribute to look for is gender. Gender is important since

studies have shown that college students, especially women, demonstrate negatively toward math and science relative to arts and language (Nosek, Banaji, & Greenwald, 2002). The third background variable includes math ability. According to Tinto, a student's own ability and not the family's determine the student's educational performance (Tinto, 1975). The initial placement into one of four developmental math classes was used in this investigation as an ability measure. Students were placed into one of the developmental math courses based on their scores on the Accuplacer Test which is used as their indicator of their math ability.

In order to measure background variables, survey questions adapted from Pascarella and Terenzini (1980) were used (see Table 4).

Table 4

Listing and Description of Background Variables

Variables	Definitions
8. Socioeconomic Status (SES) Question on survey: 43	Socioeconomic status will be generated from two question sets. First, is a question about family income, specifically whether the student is eligible to receive a Pell Grant. Pell Grant recipient will be coded 1 and Non-Pell Grant recipient will be coded 2.
9. Gender Question on survey: 46	Participants will be asked to indicate whether they are male or female. Male students will be coded with a 1 and Female students will be coded with a 2.

(table continues)

Table 4. Listing and Description of Background Variables

Variables	Definitions
10. Math Ability Question on survey: 48	Math ability will be measured by asking students to list their initial math placement: Basic Mathematics will be coded 1, Introduction to Algebra and Geometry will be coded 2, Elementary Algebra will be coded 3, and Intermediate Algebra will be coded 4.
11. Race Question on survey: 47	Participants will be asked to indicate what race they belong to. White students will be coded with a 1, Hispanic students will be coded with a 2, African-American students will be coded with a 3, and students that mark Other will be coded with a 4.

Description of Endogenous (Internal) Variables

Endogenous variables in this study were adapted from Tinto’s Model of Student Dropout (1975) which illustrated five variable sets in this sequence: 1) background characteristics, 2) initial commitment, 3) academic system (to include academic and social integration), 4) subsequent goal and institutional commitments, and 5) persistence.

Table 5 lists and describes the endogenous variables in this study.

Table 5

Listing and Description of Endogenous Variables

Variables	Description
12. Initial Commitment	Initial Commitment is a composite of Goal Commitment and Institutional Commitment.

(table continues)

Table 5. Listing and Description of Endogenous Variables

Variables	Description
<p>A. Goal Commitment (GC)</p> <p>Questions on survey: 49, 51</p>	<p>Goal Commitment is a composite of the following survey items (adapted from Pascarella & Terenzini, 1980): It is important for me to graduate from college with a degree (1=strongly disagree, 5=strongly agree). I have no idea at all what I want to major in (1=strongly disagree, 5=strongly agree).</p>
<p>B. Institutional Commitment (IC)</p> <p>Questions on survey: 51, 52</p>	<p>Institutional Commitment is a composite of the following survey items (adapted from Pascarella & Terenzini, 1980): It is important for me to be enrolled at Northwest Vista College (1=strongly disagree, 5=strongly agree). I am confident that choosing to attend this college was the right decision (1=strongly disagree, 5=strongly agree).</p>
<p>13. Academic System</p>	<p>Composite including both Academic Integration and Social Integration.</p>
<p>A. Academic Integration</p>	<p>Composite of grade performance and intellectual development.</p>
<p>1. Grade Performance</p>	<p>The student success of achieving a “C” or better in the developmental courses will be the measure for grade performance in this study.</p>
<p>2. Intellectual Development (ID)</p> <p>Questions on survey: 53, 54</p>	<p>Composite of two survey items (adapted from Pascarella & Terenzini, 1980): I am satisfied with my academic experience at this college (1=strongly disagree, 5=strongly agree). My academic experience at this college has had a positive influence on my intellectual growth and interest in ideas (1=strongly disagree, 5=strongly agree).</p>
<p>B. Social Integration</p>	<p>Social Integration is composed of Peer Group Interactions and Faculty Interactions.</p>

(table continues)

Table 5. Listing and Description of Endogenous Variables

Variables	Description
<p>1. Peer Group Interactions (PGI)</p> <p>Questions on survey: 55, 56, 57</p>	<p>Composite of three survey items (adapted from Pascarella & Terenzini, 1980): It is important for me to know my fellow students in class (1=strongly disagree, 5=strongly agree). It is important to be active in extracurricular activities at college (1=strongly disagree, 5=strongly agree). Since coming to college I have developed a close personal relationship with other students (1=strongly disagree, 5=strongly agree).</p>
<p>2. Faculty Interactions (FI)</p> <p>Questions on survey: 58, 59</p>	<p>Composite of two survey items (adapted from Pascarella & Terenzini, 1980): Most faculty members I have had contact with are genuinely interested in teaching (1=strongly disagree, 5=strongly agree). My interactions with faculty have had a positive influence on my personal growth, values, and attitudes (1=strongly disagree, 5=strongly agree).</p>
<p>14. Success</p>	<p>Defined as passing with a grade of C or better. Data will be retrieved from institutional data.</p>

Initial Commitment

Initial Commitment has two sets of variables, Goal Commitment and Institutional Commitment. Tinto's (1975) model suggests that family background and prior education helps students make a commitment to achieving success in college. This is a reflection of interactions between the individual, the student's family, and the student's prior experiences in schooling. Researchers have suggested that once an individual's ability is taken into account, the student's commitment to a college degree is most influential in

determining persistence (Braxton, Sullivan, & Johnson, 1997; Pacarella & Terenzini, 2005; Tinto, 1975).

Academic System

The academic system plays an important factor in college persistence. Tinto (1975) theorizes that dropping out of school can be the result of a student's experience in both the academic and social systems of a college. His model does suggest that initial commitment can have an effect on the academic system of the school where academic and social integration are included.

Academic Integration

Academic Integration occurs when a student meets the criteria and standards of the college they attend. A student's grades can reflect the assessment of a student's ability to meet an institution's values and objectives for academic achievement (Braxton, Sullivan, & Johnson, 1997). Studies suggest that the level of commitment to the goal of graduation from college is greater when there is a greater level of academic integration (Braxton, Sullivan, & Johnson, 1997; Pascarella & Terenzini, 2005). Pascarella & Chapman (1983) do not support these findings; therefore, academic integration were measured by survey questions that asked about students' intellectual development.

Social Integration

Social Integration is the second component of Tinto's Model (1975). Social integration in college occurs through student faculty interactions, informal peer group associations, and semi-formal extracurricular activities. These mechanisms allow students to receive social rewards such as social communication and support from peers

and faculty (Braxton, Sullivan, & Johnson, 1997). Tinto (1975) has suggested that social integration connects a student's intellectual development and the school's intellectual environment. Studies (Braxton, Sullivan, & Johnson, 1997; Pascarella & Terenzini, 2005) have supported Tinto's hypothesis that the greater the level of social integration, the greater the level of commitment to the school. This study will measure social integration measured by a set of questions composed of peer group interactions and faculty interactions adapted from Pascarella and Terenzini (1980).

Pilot Study

A pilot study was conducted in October 2005 to insure that the Student Education Participation Survey was effective in understanding the experiences of students enrolled in developmental math courses. This pilot study utilized the survey instrument (Appendix B) that was given to students at the end of the Fall 2005 semester. The survey was distributed to 24 students in one developmental math class at Northwest Vista College. The responses from the pilot study group were evaluated in order to determine if there were questions that were consistently skipped and to evaluate any feedback that it provided about the instrument.

Data Collection

In December 2005, surveys were distributed to students in several classes divided evenly by the four developmental math courses. The surveys were collected by the instructors in the math classes and then distributed to the researcher within a week. Data pertaining to the success of the students enrolled in the four developmental math courses

in the Fall of 2005 was extracted by the Institutional Research Department at Northwest Vista in February, 2006.

Analysis of Data

The problem of this study was to make a statistical comparison between populations of Hispanic students attending Northwest Vista College that were enrolled in their first developmental math course and to determine relationships among variables in Tinto's Model of Student Dropout (1975) and Boshier's Education Participation Scale (EPS) and student success.

There were three specific questions this study tried to answer:

1. Is there a significant difference in the success of Hispanic male students who were enrolled in their first developmental math course in the Fall 2005 semester compared to Hispanic female students who were enrolled in their first developmental math course in the Fall 2005 semester?
2. Is there a significant difference between Hispanic students who were enrolled in their first developmental math course in the Fall 2005 semester who received financial aid compared with Hispanic students who were enrolled in the same developmental math course during the Fall 2005 semester who did not receive financial aid?
3. Were background variables (socioeconomic status, gender, students' age, parents attending college, and math ability), Education Participation Scale variables (Communication Improvement, Social Contact, Educational Preparation, Professional Advancement, Family Togetherness, Social Stimulation, and Cognitive Interest), and personal variables (goal commitment,

institutional commitment, intellectual development, peer group interactions, and faculty interactions) significant predictors of success in each of the four developmental math courses during the Fall 2005 semester?

A proportion test was used with the first two research questions. The proportion test is a comparison of the probabilities or the decimal equivalents of percentages which makes it a binomial distribution. The test statistic for the proportion test does take the form of all test statistics ((sample statistic) – (claimed population parameter)) ÷ (standard deviation of the sample statistic). The test used was a two-tailed test. With this test, in order to reflect the hypothesis, the test statistic, Z , must fall in the critical right-or-left-tailed region of the standard normal distribution. This shows that it must be greater than the Z value associated with a 95% confidence level for a two-tailed test or, the p -value must be less than the significance level of 0.05. This test of significance tests a null hypothesis, whereas, rejection of the null hypothesis provides more conducive support for a positive research hypothesis. In statistics, a hypothesis is a claim or statement about a property of a population. A hypothesis test, or test of significance, is a standard procedure for testing a claim about a property of a population. The elements of a test of hypothesis are specified before the sampling experiment is performed. In no case will the results of the sample be used to determine the hypotheses as the data are collected to test the predetermined hypotheses, not to formulate them. The null hypothesis (H_0) is the theory about the values of one or more population parameters. The theory generally represents the status quo, which is accepted until it is proven false. The alternative (research) hypothesis (H_a) is the theory that contradicts the null hypothesis. The theory generally represents that which will be accepted only when sufficient evidence exists to

establish its truth. When deciding whether to reject the null hypothesis, a sample statistic called the test statistic, is used. A rejection region is chosen which contains the numerical values of the test statistic for which the null hypothesis will be rejected. The value of alpha, or α , is usually chosen to be small (e.g., .01, .05, or .10), and is referred to as the level of significance of the test. If the numerical value of the test statistic falls in the rejection region, the null hypothesis is rejected and the conclusion is that the alternative hypothesis is true. If the test statistic does not fall in the rejection region, the null hypothesis is not rejected.

For research questions one and two, a proportion test was used to test two populations. The proportion test is a comparison of the probabilities or the decimal equivalents of percentages thereby making it a binomial distribution. A population proportion is associated with a number of successes in each group and is denoted by p_1 and p_2 . The test of the null hypothesis is designed to demonstrate that $p_1 - p_2$ is less or equal to zero. The test statistic fits the common format of ((sample statistic) – (claimed value of parameter)) ÷ (standard deviation of the sample statistic). In mathematical terms, the equation would look like the following:

$$Z = \frac{(\hat{p}_1 - \hat{p}_2) - (p_1 - p_2)}{\sqrt{\frac{pq}{n_1} + \frac{pq}{n_2}}}$$

The symbol \hat{p} is the sample proportion, a ratio of the number of successes to the sample size. The claimed difference in population proportions is zero so the numerator of the equation reduces immediately to the difference of the two sample proportions. The symbol \bar{p} represents the pooled estimate of the population proportions. The sample

proportion is represented by the symbol \hat{p} , a ratio of the number of successes to the sample size. To reject the null hypothesis, the test statistic, Z , must fall in the critical two-tailed region of the standard normal distribution. It must be greater than the Z value associated with a 95 percent confidence level for a two-tailed test. The p-value must be less than the significance level of 0.05 (Triola, 2005).

Regression analysis, specifically logistic regression, was used in this study to test the significance of research question three in order to examine the significance of the direct and indirect effects of the variables that determined and success. Before the variables were loaded into the logistic regression analysis, a chi-square analysis was used to determine if the background variables (status, gender, students' age, parents attending college, and math ability) were significant. In a normally distributed population with variance, independent samples were randomly selected and computed with the sample variance. Regression analysis examines the dependence of a random variable, called dependent or response variable, on other random or deterministic variables, called independent variables or predictors. Along with the dependent and independent variables, regression equations usually contain one or more unknown regression parameters which are to be estimated from the given data in order to maximize the quality of the model. Logistic regression makes fewer restrictive assumptions than multiple regression. Logistic regression was used to predict a categorical dichotomous variable from a set of predictor variables which consisted of the background variables that were found to be significant using the chi-square analysis, including Education Participation Scale variables (Communication Improvement, Social Contact, Educational Preparation, Professional Advancement, Family Togetherness, Social Stimulation, and

Cognitive Interest), and personal variables (goal commitment, institutional commitment, intellectual development, peer group interactions, and faculty interactions. For logistic regression, the predicted dependent variable is a function of the probability that a particular subject will be in one of the categories. (Gay & Airasian, 2003). A confidence level of 95% was used for this study where if “Significance” was <0.05 , then there was a statistically significant association. Conversely, if “Significance” was >0.05 , then there was no statistically significant association (Triola, 2005).

In Figure 4, the straight, unidirectional arrows in the model represent hypothesized causal effects. The arrows point from the variables taken as causes to the variables taken in effects. Although Maddox (2004) used persistence in her model, success was the only variable looked at in this study.

The anticipated findings in this research were to see if the results of this study suggested that Hispanic student success was affected by each of the independent variables, either directly or indirectly. The hope was that by adding Boshier’s EPS motivations to Tinto’s model, the model would be strengthened since critics felt that Tinto’s model lacked motivational elements (Attinasi, 1989; Braxton, 2000; Braxton, Sullivan, & Johnson, 1997; Tinto, 1992).

Summary

This study was conducted in the hope that information could be provided as to what variables led to student success, especially in the Hispanic community. This research added to the literature that is understudied—the motivation of Hispanic students to succeed in college. The goal of this study was that it would lead to significant data

that would help administrators at Northwest Vista College and similar community colleges to better understand a Hispanic student's motivation to succeed in class,

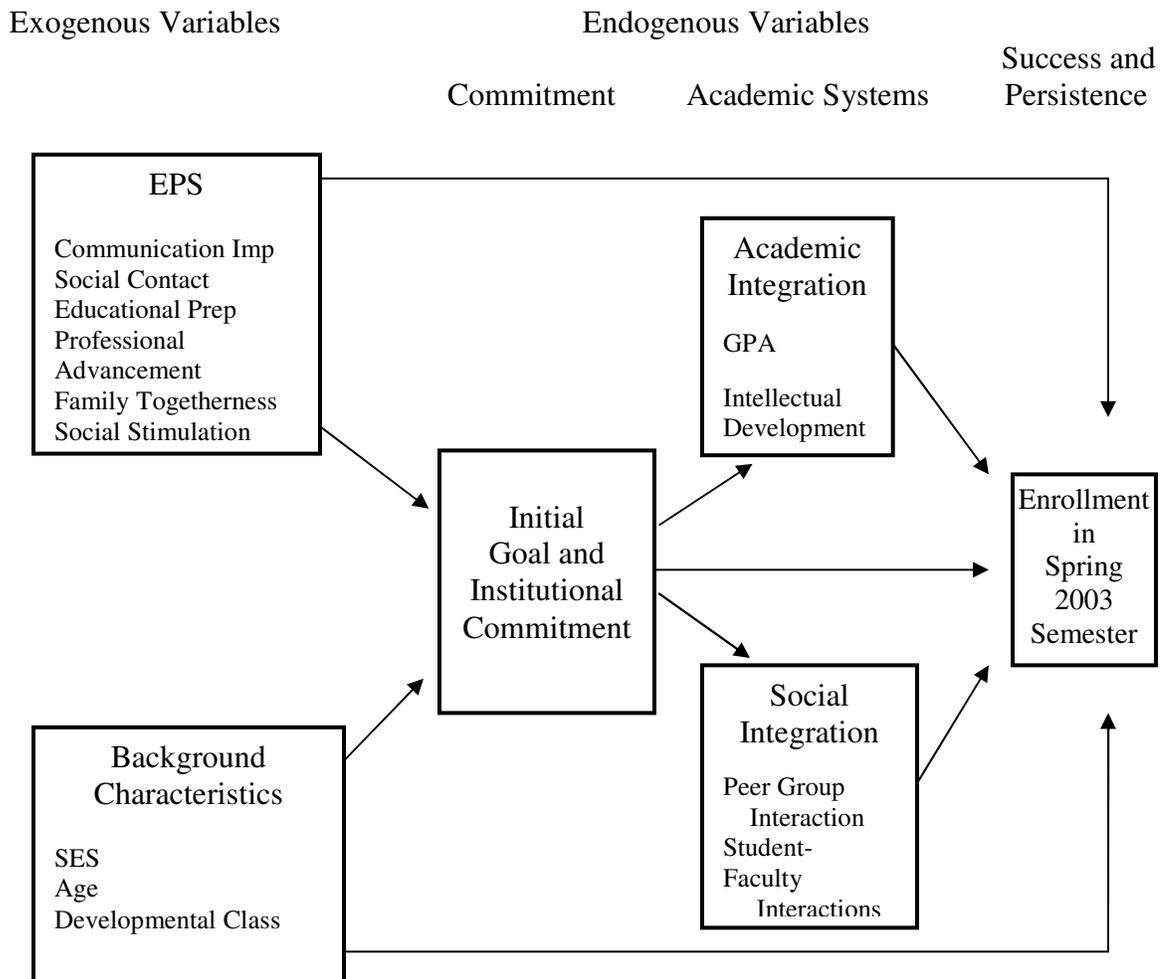


Figure 4. Hypothesized Effects of Variables on Persistence (Maddox, 2004)

specifically in developmental math courses. This study began with an introduction to the issue to be examined in chapter one, with chapter two presenting a review of the relevant literature in this area, and chapter three providing the detailed methodology that was utilized in the research. Chapter four presented the findings of the study and the answers

to the three research questions. Chapter five provides an interpretation of the findings, presents recommendations as a result of these findings, and includes suggestions for future research.

CHAPTER FOUR

Results

Introduction

Chapter Four presents a narrative description of the results of the investigation, a review of the hypotheses, the results of statistical analyses of data, and where appropriate, tables and charts to summarize the information. This study was the examination of part of the Lumina Foundations' "Achieving the Dream" initiative which addressed a national imperative to increase the success of low income students and students of color. This initiative tracked Fall 2005 semester, first-time-to Northwest Vista College student cohorts in order to more fully understand the success rates of students taking developmental coursework. This study specifically looked at the completion of developmental math courses by Hispanic students to see how well they succeeded in their first developmental math courses at Northwest Vista College. The organization of this chapter is structured to reflect the four specific research questions and hypothesis raised in Chapter One. Data is presented with respect to Hispanic students who were enrolled in their first developmental math course in the Fall 2005 semester. Specific student demographic data reported here includes information on gender, ethnicity, success in the course, and financial aid status.

Hypotheses

Using a design that compares those students that succeeded and persisted in their developmental math courses with those that did not, and variables related to their success

and persistence, the following hypotheses from research questions 1 through 3 were tested.

Research Question One

Is there a significant difference in the success of Hispanic male students who were enrolled in their first developmental math course in the Fall 2005 semester compared to Hispanic female students who were enrolled in their first developmental math course in the Fall 2005 semester?

Hypothesis One

There is no significant difference in the success of Hispanic female students who were enrolled in their first developmental math course in the Fall 2005 semesters compared to Hispanic male students.

Research Question Two

Is there a significant difference in the success of Hispanic students who were enrolled in their first developmental math course in the Fall 2005 semester who received financial aid compared with Hispanic students who were enrolled in the same developmental math course during the Fall 2005 semester who did not receive financial aid?

Hypothesis Two

There was no significant difference between Hispanic students who did not receive financial aid and were enrolled in their first developmental math course during

the Fall 2005 compared to Hispanic students who did receive financial aid during the same timeframe.

Research Question Three

Were background variables (socioeconomic status, gender, students' age, parents attending college, and math ability), Education Participation Scale variables (Communication Improvement, Social Contact, Educational Preparation, Professional Advancement, Family Togetherness, Social Stimulation, and Cognitive Interest), and personal variables (goal commitment, institutional commitment, intellectual development, peer group interactions, and faculty interactions) significant predictors of success in each of the four developmental math courses during the Fall 2005 semester?

Research Question One

The first research question was tested to determine the success of males compared to females in the four developmental math courses. A proportion test was used to test the second hypothesis. The first research question examined in this study was: what was the persistence and success of Hispanic male students who were successful in their first developmental math course compared to female students who were successful in their first developmental math course?

Math 0300

As shown in Table 6, there were a total of 27 students that were enrolled in Math 0300. Out of the 27 students, there were a total of 11 male and 16 female students. According to the data, 45.5% of the male students were successful and 54.5% were

unsuccessful. Female students had a 56% success rate compared to 44% that were unsuccessful.

Table 6

Hispanic Males Compared to Hispanic Female Students Enrolled in Developmental Math 0300 (N=27)

Males	Totals	Females	Totals
Enrolled	11	Enrolled	16
Successful	5	Successful	9
Unsuccessful	6	Unsuccessful	7
% Successful	45.5	% Successful	56.3
% Unsuccessful	54.5	% Unsuccessful	43.7

After running a proportional test with the data presented in Table 6, Table 7 compared the sample size and sample proportions of Hispanic male students with Hispanic female students that were successful in Math 0300. The pooled sample of both populations was 27 students. Based on a level of significance of 0.05, the test results failed to lead to a rejection of the null hypothesis. The p value was larger at 0.581 than the criterion significance level of 0.05. The samples did not provide enough evidence to reject the claim; therefore, there was no significant difference found in the success of Hispanic male students who were successful in their first developmental math course under the *Achieving the Dream* initiative compared with Hispanic female students who were enrolled in their first developmental math course in the Fall 2005 semester.

Table 7
Proportion Test for First Hypothesis
Math 0300 (N=27)

Measures	Males	Females
Sample Size	11	16
Sample Proportion	0.45	0.56
Pooled Sample Size	27	
Pooled Population Proportion	0.518	
Test Statistic, Z	-0.551	
Critical Z	± 1.96	
p value	0.58	

Math 0301

As shown in Table 8, there were a total of 112 students who enrolled in Math 0301. Out of the 112 students who enrolled, there were a total of 40 male and 72 female students. According to the data, 80% of the male students were successful and 20% were unsuccessful. Female students had an 86.1% success rate compared to 13.9% that were unsuccessful.

Table 9 contains a comparison of the Sample Size and Sample Proportions of Hispanic male students with Hispanic female students that were successful in Math 0301. The pooled sample of both populations, whether they succeeded or not, was 112. Based on a level of significance of 0.05, the evidence showed that it failed to reject the null hypothesis. The *p* value was larger at 0.398 than the significance level of 0.05. The

Table 8

Hispanic Males Compared to Hispanic Female Students Enrolled in Developmental Math 0301 (N=112)

Males	Totals	Females	Totals
Enrolled	40	Enrolled	72
Successful	32	Successful	62
Unsuccessful	8	Unsuccessful	10
% Successful	80.0	% Successful	86.1
% Unsuccessful	20.0	% Unsuccessful	13.9

Table 9

*Proportion Test for First Hypothesis
Math 0301(N=112)*

Measures	Males	Females
Sample Size	40	72
Sample Proportion	0.80	0.86
Pooled Sample Size	112	
Pooled Population Proportion	0.839	
Test Statistic, Z	-0.843	
Critical Z	± 1.96	
p value	0.398	

sample did not provide enough evidence to reject the claim; therefore, there was no significant difference in the success of Hispanic male students who were successful in their first developmental math course compared with Hispanic female students who were enrolled in their first developmental math course in the Fall 2005 semester.

Math 0302

As shown on Table 10, there were a total of 128 Hispanic students who were enrolled in Math 0302. Out of the 128 students, there were a total of 42 male and 86 female students. The data showed that 81% of the male students were successful and 19% were unsuccessful. Female students had a 90.7% success rate compared to 9.3% that were unsuccessful.

Table 11 contains a comparison of the sample size and sample proportions of Hispanic male students with Hispanic female students that were successful in Math 0302. The pooled sample, whether the students succeeded or not, was 128 students. Based on a level of significance of 0.05, the evidence showed that it failed to reject the null hypothesis. The p value was greater at 0.117 than the significance level of 0.05. Consequently, the sample did not provide enough evidence to reject the claim. Therefore; there was no significant difference in the success of Hispanic male students who were successful in their first developmental math course under the *Achieving the Dream* initiative compared with Hispanic female students who were enrolled in their first developmental math course in the Fall 2005 semester.

Table 10

Hispanic Males Compared to Hispanic Female Students Enrolled in Developmental Math 0302 (N=128)

Males	Totals	Females	Totals
Enrolled	42	Enrolled	86
Successful	34	Successful	78
Unsuccessful	8	Unsuccessful	8
% Successful	81.0	% Successful	90.7
% Unsuccessful	19.0	% Unsuccessful	9.3

Table 11

*Proportion Test for First Hypothesis
Math 0302 (N=128)*

Measures	Males	Females
Sample Size	42	86
Sample Proportion	0.81	0.91
Pooled Sample Size	128	
Pooled Population Proportion	0.875	
Test Statistic, Z	-1.565	
Critical Z	± 1.96	
p value	0.117	

Math 0303

As shown on Table 12 there were a total of 138 students who were enrolled in Math 0303. Out of the 138 students who were enrolled, there were a total of 53 male and 85 female students. The data showed that 84.9% of the male students were successful and 15.1% were unsuccessful. Female students had an 81.2% success rate compared to 18.8% that were unsuccessful.

Table 12

Hispanic Males Compared to Hispanic Female Students Enrolled in Developmental Math 0303 (N=138)

Males	Totals	Females	Totals
Enrolled	53	Enrolled	85
Successful	45	Successful	69
Unsuccessful	8	Unsuccessful	16
% Successful	84.9	% Successful	81.2
% Unsuccessful	15.1	% Unsuccessful	18.8

Table 13 contains a comparison of the sample size and sample proportions of Hispanic male students with Hispanic female students that were successful in Math 0303. The pooled sample of both populations, whether they succeeded or not, was 138. Based on a level of significance of 0.05, the evidence showed that it failed to reject the null hypothesis. The p value at 0.574 was larger than the significance level of 0.05. The sample did not provide enough evidence to reject the claim; therefore, there was no significant difference in the success of Hispanic male students who were successful in

their first developmental math course under the *Achieving the Dream* initiative compared with Hispanic female students who were enrolled in their first developmental math course in the Fall 2005 semester.

Table 13

*Proportion Test for First Hypothesis
Math 0303 (N=138)*

Measures	Males	Females
Sample Size	53	85
Sample Proportion	0.85	0.81
Pooled Sample Size	138	
Pooled Population Proportion	0.826	
Test Statistic, Z	0.562	
Critical Z	± 1.96	
p value	0.574	

In summary, the data analysis conducted in all four developmental math courses (0300, 0301, 0302, and 0303) failed to lead to a rejection of the null hypothesis. In Math 0301, 0302, and 0303, the success rates for the students were over 80%. Only in Math 0300 did the data reveal that the success rates were low at 45.5% for males and 56.3% for female students. Institutional data from Fall of 2005 shows that the overall success rate of developmental students in Math 0300 was at 68%, which is significantly higher than the success rate of the students surveyed.

Research Question Two

The second research question was tested to determine the success of Hispanic students in the four developmental math courses who received financial aid compared to those students who did not receive financial aid. A proportion test was used to test the third hypothesis. The second research question examined in this study was: what was the persistence and success of Hispanic students who were successful in their first developmental math course who received financial aid compared to students who were successful and did not receive financial aid in their first developmental math course?

Math 0300

As shown on Table 14, there were a total of 27 students that were enrolled in Math 0300. Out of the 27 students, there were a total of 19 Hispanic students who received financial aid and 8 Hispanic students who did not receive financial aid. According to the data, 79% of the students who received financial aid were successful and 21% were unsuccessful. Hispanic students who did not receive financial aid had a 50% success rate compared to 50% that were unsuccessful.

After running a proportional test with the data presented in Table 14, the researcher discovered that the sample size of 27 students was not large enough thus, creating an error in the results. To conclude, the data collected and analyzed could not help in determining whether there was any significant difference in the success of financial aid versus non-financial aid Hispanic students who were successful in their first developmental math course (0300).

Table 14

Hispanic Students Receiving Financial Aid Compared to Hispanic Students Who Did Not Receive Financial Aid Enrolled in Developmental Math 0300 (N=27)

Financial Aid	Totals	Non-Pell	Totals
Enrolled	19	Enrolled	8
Successful	15	Successful	4
Unsuccessful	4	Unsuccessful	4
% Successful	79.0	% Successful	50.0
% Unsuccessful	21.0	% Unsuccessful	50.0

Math 0301

As shown on Table 15, there were a total of 112 students that persisted in Math 0301. Out of the 112 students, there were a total of 69 Hispanic students who received financial aid and 43 Hispanic students who did not receive financial aid. According to the data, 87% of the students who received financial aid were successful and 13% were unsuccessful. Hispanic students who did not receive financial aid had a 79% success rate compared to 21% that were unsuccessful.

Table 16 contains a comparison of the sample size and sample proportions of Hispanic students who received financial aid who were successful in Math 0301 with Hispanic students who were successful in Math 0301 who did not receive financial aid.

The pooled sample of both populations, whether they succeeded or not, was 112. Based on a level of significance of 0.05, the evidence showed that it failed to reject the null hypothesis. The *p* value was larger at 0.269 than the significance level of 0.05. The

Table 15

Hispanic Students Receiving Financial Aid Compared to Hispanic Students Who Did Not Receive Financial Aid Enrolled in Developmental Math 0301 (N=112)

Financial Aid	Totals	Non-Pell	Totals
Enrolled	69	Enrolled	43
Successful	60	Successful	34
Unsuccessful	9	Unsuccessful	9
% Successful	87.0	% Successful	79.0
% Unsuccessful	13.0	% Unsuccessful	21.0

Table 16

*Proportion Test for Second Hypothesis
Math 0301 (N=112)*

Measures	Financial Aid	Non-Pell
Sample Size	69	43
Sample Proportion	0.87	0.75
Pooled Sample Size	112	
Pooled Population Proportion	0.839	
Test Statistic, Z	1.105	
Critical Z	± 1.96	
p value	0.269	

sample did not provide enough evidence to reject the claim; therefore, there was no significant difference in the success of Hispanic students who were successful in their first developmental math course under the Achieving the Dream initiative who received financial aid compared with Hispanic students who were enrolled in their first developmental math course who did not receive financial aid in the Fall 2005 semester

Math 0302

As shown on Table 17, there were a total of 128 students that were enrolled in Math 0302. Out of the 128 students, there were a total of 72 Hispanic students who received financial aid and 56 Hispanic students who did not receive financial aid.

According to the data, 88.9% of the students who received financial aid were successful and 11.1% were unsuccessful. Hispanic students who did not receive financial aid had an 87.5% success rate compared to 12.5% that were unsuccessful.

Table 17

Hispanic Students Receiving Financial Aid Compared to Hispanic Students Who Did Not Receive Financial Aid Enrolled in Developmental Math 0302 (N=128)

Financial Aid	Totals	Non-Pell	Totals
Enrolled	72	Enrolled	56
Successful	64	Successful	49
Unsuccessful	8	Unsuccessful	7
% Successful	88.9	% Successful	87.5
% Unsuccessful	11.1	% Unsuccessful	12.5

Table 18 contains a comparison of the sample size and sample proportions of Hispanic students who received financial aid who were successful in Math 0302 with Hispanic students who were successful in Math 0302 who did not receive financial aid. The pooled sample of both populations, whether they succeeded or not, was 128. Based on a level of significance of 0.05, the evidence showed that it failed to reject the

Table 18
Proportion Test for Second Hypothesis
Math 0302 (N=128)

Measures	Financial Aid	Non-Pell
Sample Size	72	56
Sample Proportion	0.88	0.87
Pooled Sample Size	128	
Pooled Population Proportion	0.882	
Test Statistic, Z	0.242	
Critical Z	± 1.96	
p value	0.808	

null hypothesis. The p value was larger at 0.808 than the significance level at 0.05. The sample did not provide enough evidence to reject the claim; therefore, there was no significant difference in the success of Hispanic students who were successful in their first developmental math course under the *Achieving the Dream* initiative who received financial aid compared with Hispanic students who were enrolled in their first developmental math course who did not receive financial aid in the Fall 2005 semester.

Math 0303

As shown on Table 19, there were a total of 138 students that were enrolled in Math 0303. Out of the 138 students, there were a total of 70 Hispanic students who received financial aid and 68 Hispanic students who did not receive financial aid.

According to the data, 77.1% of the students who received financial aid were successful

Table 19

Hispanic Students Receiving Financial Aid Compared to Hispanic Students Who Did Not Receive Financial Aid Enrolled in Developmental Math 0303 (N=138)

Financial Aid	Totals	Non-Pell	Totals
Enrolled	70	Enrolled	68
Successful	54	Successful	60
Unsuccessful	16	Unsuccessful	8
% Successful	77.1	% Successful	88.2
Unsuccessful	22.9	% Unsuccessful	11.8

and 22.9% were unsuccessful. Hispanic students who did not receive financial aid had an 88.2% success rate compared to 11.8% that were unsuccessful.

Table 20 contains a comparison of the sample size and sample proportions of Hispanic students who received financial aid who were successful in Math 0303 with Hispanic students who were successful in Math 0303 who did not receive financial aid. The pooled sample of both populations, whether they succeeded or not, was 138. Even though the data clearly signified that there was a disparity in the percentages of the success rates, based on a level of significance of 0.05, the evidence showed that it failed

Table 20

*Proportion Test for Second Hypothesis
Math 0303 (N=138)*

Measures	Financial Aid	Non-Pell
Sample Size	70	68
Sample Proportion	0.77	0.88
Pooled Sample Size	138	
Pooled Population Proportion	0.826	
Test Statistic, Z	-1.718	
Critical Z	± 1.96	
p value	0.085	

to reject the null hypothesis. The p value of 0.085 is slightly larger than the 0.05 level of significance. The sample did not provide enough evidence to reject the claim; therefore, there was no significant difference in the success of Hispanic students who were successful in their first developmental math course under the *Achieving the Dream* initiative who received financial aid compared with Hispanic students who were enrolled in their first developmental math course who did not receive financial aid in the Fall 2005 semester.

In summary, the data analysis conducted in all four developmental math courses (0300, 0301, 0302, and 0303) failed to lead to the rejection of the null hypothesis. The success rates for those students that did not receive financial aid in Math 0301, 0302, and 0303 were at least above 79%. Although there was an error in the results of the data

collected and analyzed in Math 0300, there was a large disparity in the success rates of the students who received financial aid (79%) and those that did not (50%).

Research Question Three

The third research question was tested to determine whether there was a significant relationship between background variables (socioeconomic status, gender, and math ability), motivations to attend college, institutional variables, and persistence and success for Hispanic students that were enrolled in their first developmental math courses during the Fall 2005 semester. Success was the dependent variable used in this regression analysis. This model considered various types of independent variables including Education Participation Scale variables (Communication Improvement, Social Contact, Educational Preparation, Professional Advancement, Family Togetherness, Social Stimulation, and Cognitive Interest), background variables (socioeconomic status, parents education, gender, students' age, and math ability), and personal variables (goal commitment, institutional commitment, intellectual development, peer group interactions, and faculty interactions).

A chi-square analysis was conducted with the background variable data to determine individual relationships between the predictors and the outcome variables. This preliminary analysis was conducted to determine if there were any covariates significantly related to the outcome variable of success (Yes=grades of A-C, No=grades below a C). Covariates which were significant at the $p < .05$ level were then included in the logistic regression analysis to answer research question three.

The second method of analysis used to answer research question three utilized logistic regression where significant covariates and all the predictors were entered into

the logistic regression equation. The logistic regression analysis provided a classification table and a significance score. The classification table summarized the fit between the actual and predicted groups used in the analysis and provided information showing the quality of the predictors to significantly classify students who succeeded in their developmental math course and those that did not succeed.

Math 0300

Table 21 shows that 19 out of 27 total students, or 70.4%, enrolled in Math 0300 were eligible to receiving a Pell Grant. Eight of the 27 total students, or 29.6%, were not eligible for a Pell Grant. A chi-square analysis reported in Table 26 confirmed that the difference in those students who received a Pell Grant compared to those who did not was statistically significant. The chi-square value of 4.48 was significant at the .03 level.

Table 22 shows that 13 of the 27 total students, or 48.1%, enrolled in Math 0300 reported that at least one of their parents attended college. Fourteen out of 27 total students or 51.9% reported that neither of their parents attended college. A chi-square analysis reported in Table 26 confirmed that the difference in those students who had at

Table 21
Pell Grant Eligibility

Enrollment	Eligible	Not Eligible	Total
Students Enrolled in Math 0300	19	8	27
Percentage	70.4%	29.6%	100%

least one parent attend college compared to those that did not was not statistically significant. The chi-square value of .92 was not significant at the .05 level ($p=.33$).

Table 22
College Attendance of Parents

Enrollment	Attended College	Did Not Attend College	Total
Students Enrolled in Math 0300	13	14	27
Percentage	48.1%	51.9%	100%

Table 23 shows that 20, or 74.1%, of the 27 total students enrolled in Math 0300 were in the 17-22 age range. Three students fell in the 23-27 (11.1%) age range, two fell in the 28-32 (7.4%) age range, and two fell in the 33-37 (7.4%) age range. There were no students that fell in the 38 or older range. A chi-square analysis reported in Table 26 confirmed that the difference in the age ranges of the students was statistically significant. The chi-square value of 18.61 was significant at the .00 level.

Table 24 shows that of the 27 total students enrolled in Math 0300, 11, or 40.7%, were male students. Sixteen of the students enrolled in the course, or 59.3%, were

Table 23
Age Range of Developmental Students in Math 0300

Enrollment	17-22	23-27	28-32	33-37	38 or older	Total
Students Enrolled in Math 0300	20	3	2	2	0	27
Percentage	74.1%	11.1%	7.4%	7.4%	0%	100%

female. A chi-square analysis reported in Table 26 confirmed that the difference in the age ranges of the students was not statistically significant. The chi-square value at .92 was not significant at the .05 level ($p=.33$).

Table 24

Gender of Math 0300 Developmental Math Students

Enrollment	Male	Female	Total
Students Enrolled in Math 0300	11	16	27
Percentage	40.7%	59.3%	100%

Table 25 shows that of the 27 total students enrolled in Math 0300, 24, or 88.9%, were initially placed in Math 0300. Three students, or 11.1%, were initially placed in 0301. No students were initially placed in Math 0302 or 0303. A chi-square analysis reported in Table 26 confirmed that the difference in the age ranges of the students was statistically significant. The chi-square value of 18.61 was significant at .00.

Table 25

Initial Placement in Developmental Math Courses

Enrollment	0300	0301	0302	0303	Total
Students Enrolled in Math 0300	24	3	0	0	27
Percentage	88.9%	11.1%	0%	0%	100%

The background variables were tested for statistically significant differences using a chi-square analysis with the results found in Table 26. The first column of the table indicates each variable which was evaluated for its impact on student success. The second column indicates the chi-square score produced for that variable with the third column reflecting the degrees of freedom for that variable. The final column, Sig., presents the significance score for each variable which can refer to the likelihood that

Table 26
Summary of Chi-Square Results for Math 0300

Variable	Chi-Square	df	Sig.
Pell Grant Eligibility	4.48	1	.03
Parents Education	.92	1	.33
Students' Age Range	11.63	1	.00
Gender	.92	1	.33
Math Ability	18.61	1	.00

this impact could have happened by chance. As the table indicates, the three variables which were found to be statistically significant at the $p < .05$ level were: (1) Pell Grant Eligibility (.03); (2) Student's Age Range (.00); and (3) Math Ability (.00). These three variables were included as covariates in the subsequent analysis using logistic regression.

Math 0301

Table 27 shows that 69 of the 112 total students, or 61.6%, enrolled in Math 0300 reported that they were eligible to receive a Pell Grant. Forty-three out of 112 total

students or 38.4% reported that they were not eligible to receive a Pell Grant. A chi-square analysis reported in Table 32 confirmed that the difference in those students who received a Pell Grant to those that did not was statistically significant. The chi-square value of 6.03 was significant at .01.

Table 27

Pell Grant Eligibility

Enrollment	Eligible	Not Eligible	Total
Students Enrolled in Math 0301	69	43	112
Percentage	61.6%	38.4%	100%

Table 28 shows that 49 of the 112 total students, or 43.8%, enrolled in Math 0301 reported that at least one of their parents attended college. Sixty-three out of 112 total students or 56.2% reported that neither of their parents attended college. A chi-square analysis reported in Table 32 confirmed that the difference in those students who had at least one parent attend college to those that did not was not statistically significant. The chi-square value of 1.73 was not significant at the .05 level ($p=.18$).

Table 28

College Attendance of Parents

Enrollment	Attended College	Did Not Attend College	Total
Students Enrolled in Math 0301	49	63	112
Percentage	43.8%	56.2%	100%

Table 29 shows that 82, or 73.4%, of the 112 total students enrolled in Math 0301 were in the 17-22 age range. Three students fell in the 23-27 (11.1%) age range, two fell in the 28-32 (7.4%) age range, and two fell in the 33-37 (7.4%) age range. There were no

Table 29

Age Range of Developmental Students in Math 0301

Enrollment	17-22	23-27	28-32	33-37	38 or older	Total
Students Enrolled in Math 0301	82	12	5	5	8	112
Percentage	73.2%	10.7%	4.5%	4.5%	7.1%	100%

students that fell in the 38 or older range. A chi square analysis reported in Table 32 confirmed that the difference in the age ranges of the students was statistically significant. The chi-square value of 11.63 was significant at .00.

Table 30 shows that of the 112 total students enrolled in Math 0301, 40, or 35.7%, were male students. Seventy-two of the students enrolled in the course, or 64.3%, were female. A chi-square analysis reported in Table 32 confirmed that the difference in gender of the students was statistically significant. The chi-square value of .92 was significant at .00.

Table 31 shows that of the 112 total students enrolled in Math 0301, 14, or 12.5%, were initially placed in Math 0300. Ninety-six students, or 85.7%, were initially placed in 0301. One student each was initially placed in Math 0302 or 0303. A chi-square analysis reported in Table 32 confirmed that the difference in the age ranges of the

students was statistically significant. The chi-square value of 18.61 was significant at .00.

Table 30

Gender of Math 0301 Developmental Math Students

Enrollment	Male	Female	Total
Students Enrolled in Math 0300	40	72	112
Percentage	35.7%	64.3%	100%

Table 31

Initial Placement in Developmental Math Courses

Enrollment	0300	0301	0302	0303	Total
Students Enrolled in Math 0300	14	96	1	1	112
Percentage	12.5%	85.7%	0.9%	0.9%	100%

indicates each variable which was evaluated for its impact on student success. The second column indicates the chi-square score produced for that variable with the third column reflecting the degrees of freedom for that variable. The final column, Sig.,

The background variables were tested for statistically significant differences using a chi-square analysis with the results found in Table 32. The first column of the table presents the significance score for each variable which can refer to the likelihood that this impact could have happened by chance. As the table indicates, the four variables which

were found to have different responses that were statistically significant at the $p < .05$ level were: (1) Pell Grant Eligibility (.01); (2) Student's Age Range (.00); (3) Gender (.00);

Table 32

Summary of Chi-Square Results for Math 0301

Variable	Chi-Square	df	Sig.
Pell Grant Eligibility	6.03	1	.01
Parents Education	1.73	1	.18
Students' Age Range	11.63	1	.00
Gender	.92	1	.00
Math Ability	18.61	1	.00

and (4) Math Ability (.00). These four variables were included as covariates in subsequent analysis using logistic regression.

Math 0302

Table 33 shows that 72 of the 128 total students, or 56.3%, enrolled in Math 0302 reported that they were eligible to receive a Pell Grant. Fifty-six out of 128 total students or 43.7% reported that they were not eligible to receive a Pell Grant. A chi square analysis reported in Table 38 confirmed that the difference in those students who received a Pell Grant to those that did not was not statistically significant. The chi-square value of 2.00 was not significant at the .05 level ($p = .15$).

Table 34 shows that 82 of the 128 total students, or 64.0%, enrolled in Math 0302 reported that at least one of their parents attended college. Forty-six out of 128 total

students or 36.0% reported that neither of their parents attended college. A chi-square analysis reported in Table 38 confirmed that the difference in those students who had at least one parent attend college to those that did was statistically significant. The chi-square value of 10.12 was significant at .00.

Table 33

Pell Grant Eligibility

Enrollment	Eligible	Not Eligible	Total
Students Enrolled in Math 0302	72	56	128
Percentage	56.3%	43.7%	100%

Table 34

College Attendance of Parents

Enrollment	Attended College	Did Not Attend College	Total
Students Enrolled in Math 0302	82	46	128
Percentage	64.0%	36.0%	100%

Table 35 shows that 92, or 72.0%, of the 128 total students enrolled in Math 0302 were in the 17-22 age range. Thirteen students fell in the 23-27 (10.1%) age range, nine fell in the 28-32 (7.0%) age range, ten fell in the 33-37 (7.9%) age range, and four (3.0%) fell in the 38 or older range. A chi-square analysis reported in Table 38 confirmed that the difference in the age ranges of the students was statistically significant. The chi-square value of 59.43 was significant at .00.

Table 35

Age Range of Developmental Students in Math 0302

Enrollment	17-22	23-27	28-32	33-37	38 or older	Total
Students Enrolled in Math 0302	92	13	9	10	4	128
Percentage	72.0%	10.1%	7.0%	7.9%	3.0%	100%

Table 36 shows that of the 128 total students enrolled in Math 0302, 40, or 32.8%, were male students. Eighty-six of the students enrolled in the course, or 67.2%, were female. A chi-square analysis reported in Table 38 confirmed that the difference in the gender of the students was statistically significant. The chi-square value of 15.12 was significant at .00.

Table 36

Gender of Math 0302 Developmental Math Students

Enrollment	Male	Female	Total
Students Enrolled in Math 0303	42	86	128
Percentage	32.8%	67.2%	100%

Table 37 shows that of the 128 total students enrolled in Math 0302, 15, or 11.7%, were initially placed in Math 0300. Forty students, or 31.3%, were initially placed in 0301. Seventy one students, or 55.5%, were enrolled in 0302, and two students were initially placed in Math 0303. A chi-square analysis reported in Table 38 confirmed that

the difference in the age ranges of the students was statistically significant. The chi-square value of 11.36 was significant at .00.

Table 37

Initial Placement in Developmental Math Courses

Enrollment	0300	0301	0302	0303	Total
Students Enrolled in Math 0302	15	40	71	2	128
Percentage	11.7%	31.3%	55.5%	1.5%	100%

Table 38

Summary of Chi-Square Results for Math 0302

Variable	Chi-Square	df	Sig.
Pell Grant Eligibility	2.00	1	.15
Parents Education	10.12	1	.00
Students' Age Range	59.43	1	.00
Gender	15.12	1	.00
Math Ability	11.36	1	.00

The background variables were tested for statistically significant differences using a chi-square analysis with the results found in Table 38. The first column of the table indicates each variable which was evaluated for its impact on student success. The second column indicates the chi-square score produced for that variable with the third

column reflecting the degrees of freedom for that variable. The final column, Sig., presents the significance score for each variable which can refer to the likelihood that this impact could have happened by chance. As the table indicates, the four variables which were found to be statistically significant at the $p < .05$ level were: (1) Parents' Education (.00); (2) Student's Age Range (.00); (3) Gender (.00); and (4) Math Ability (.00). These four variables were included as covariates in subsequent analysis using logistic regression.

Math 0303

Table 39 shows that 70 of the 138 total students, or 50.7%, enrolled in Math 0303 reported that they were eligible to receive a Pell Grant. Sixty-eight out of 138 total students or 49.3% reported that they were not eligible to receive a Pell Grant. A chi-square analysis reported in Table 44 confirmed that the difference in those students who received a Pell Grant to those that did not was not statistically significant. The chi-square value of .029 was not significant at the .05 level ($p = .86$).

Table 39
Pell Grant Eligibility

Enrollment	Eligible	Not Eligible	Total
Students Enrolled in Math 0303	70	68	138
Percentage	50.7%	49.3%	100%

Table 40 shows that 83 of the 138 total students, or 60.1%, enrolled in Math 0303 reported that at least one of their parents attended college. Fifty-five out of 138 total

students or 39.1% reported that neither of their parents attended college. A chi-square analysis reported in Table 44 confirmed that the difference in those students who had at least one parent attend college to those that did was statistically significant. The chi-square value of 5.68 was significant at .01.

Table 40

College Attendance of Parents

Enrollment	Attended College	Did Not Attend College	Total
Students Enrolled in Math 0303	83	55	138
Percentage	60.1%	39.1%	100%

Table 41 shows that 96, or 69.6%, of the 138 total students enrolled in Math 0303 were in the 17-22 age range. Eighteen students fell in the 23-27 (13.0%) age range, 10 fell in the 28-32 (7.2%) age range, two fell in the 33-37 (1.5%) age range, and 12 (8.7%) fell in the 38 or older range. A chi-square analysis reported in Table 44 confirmed that the difference in the age ranges of the students was statistically significant. The chi-square value of 53.36 was significant at .00.

Table 41

Age Range of Developmental Students in Math 0303

Enrollment	17-22	23-27	28-32	33-37	38 or older	Total
Students Enrolled in Math 0303	96	18	10	2	12	138
Percentage	69.6%	13.0%	7.2%	1.5%	8.7%	100%

Table 42 shows that of the 138 total students enrolled in Math 0303, 53, or 38.4%, were male students. Eighty-five of the students enrolled in the course, or 61.6%, were female. A chi-square analysis reported in Table 44 confirmed that the difference in the gender of the students was statistically significant. The chi-square value of 7.42 was significant at .00.

Table 42

Gender of Math 0303 Developmental Math Students

Enrollment	Male	Female	Total
Students Enrolled in Math 0303	53	85	138
Percentage	38.4%	61.6%	100%

Table 43 shows that of the 138 total students enrolled in Math 0303, 15, or 11.7%, were initially placed in Math 0300. Forty students, or 31.3%, were initially placed in 0301. Seventy one students, or 55.5%, were enrolled in 0302, and two students were initially placed in Math 0303. A chi-square analysis reported in Table 44 confirmed that

Table 43

Initial Placement in Developmental Math Courses

Enrollment	0300	0301	0302	0303	Total
Students Enrolled in Math 0303	22	54	21	41	138
Percentage	16.0%	39.1%	15.2%	29.7%	100%

the difference in the age ranges of the students was statistically significant. The chi-square value of 13.47 was significant at .00.

The background variables were tested for statistically significant differences using a chi-square analysis with the results found in Table 44. The first column of the table indicates each variable which was evaluated for its impact on student success. The

Table 44
Summary of Chi-Square Results for Math 0303

Variable	Chi-Square	df	Sig.
Pell Grant Eligibility	.029	1	.86
Parents Education	5.68	1	.01
Students' Age Range	53.36	1	.00
Gender	7.42	1	.00
Math Ability	13.47	1	.00

second column indicates the chi-square score produced for that variable with the third column reflecting the degrees of freedom for that variable. The final column, Sig., presents the significance score for each variable which can refer to the likelihood that this impact could have happened by chance. As the table indicates, the four variables which were found to be statistically significant at the $p < .05$ level were: (1) Parents Education (.01); (2) Student's Age Range (.00); (3) Gender (.00); and (4) Math Ability (.00). These four variables were included as covariates in subsequent analysis using logistic regression.

A logistic regression analysis was used to predict success (grades A-C) in the four developmental math courses. Success was the dependent variable used in this regression analysis. Again, this model considered various types of independent variables to include Education Participation Scale variables (Communication Improvement, Social Contact, Educational Preparation, Professional Advancement, Family Togetherness, Social Stimulation, and Cognitive Interest), background variables (socioeconomic status, parents education, gender, students' age, and math ability), and personal variables (goal commitment, institutional commitment, intellectual development, peer group interactions, and faculty interactions). In Table 45, the first column is labeled B and it indicates the effect of the predictor variable. The S.E. column indicates the standard error of measure and the dispersion of B. The Wald column is a measure of the significance of B for the predictor variable and the df column indicates the degrees of freedom. The Exp (B) column records the odds ratio which provides an estimate of the change in the odds of membership in the success group with each unit of increase in the predictor variable. After running the analysis with all constructs, the low number of responses for Math 0300 only allowed for one variable (Intellectual Development) to be measured. Intellectual Development and the rest of the variables did not prove to be significant.

Table 45

Logistic Regression Results for Math 0300

Variable	B	S.E.	Wald	df	Sig.	Exp (B)
ID	-1.23	.69	3.16	1	.07	.29

Table 46 provides further insight into the predictability of the variables in the constructs. This table shows that the constructs predicted success at a rate of 94.7%. However, the construct could only correctly predict 25.0 of the students that did not succeed. The overall prediction percentage was 74.1.

Table 46

Classification Table for Math 0300

Observed	Success	Non-Success	Percentage Correct
	Predicted	Predicted	
Success	18	1	94.7
Non-Success	6	2	25.0
Overall Percentage			74.1

For Math 0301, after all variables were loaded into the logistic regression equation, only one variable proved to be significant as reported in Table 47. That variable was students' age ($p=.00$). Parents that attended college was a variable not loaded into the regression equation because it did not prove significant after a chi-square analysis was conducted.

Table 48 provides further insight into the predictability of student success for Math 0301. This table shows that the variables correctly predicted success at a rate of 100%. However, the construct could only correctly predict 27.8% of the students that were unsuccessful. The overall prediction percentage was 88.4.

Table 47

Logistic Regression Results for Math 0301

Variable	B	S.E.	Wald	df	Sig.	Exp (B)
Pell	.48	.73	.44	1	.50	1.63
Age	.70	.39	3.13	1	.00	.49
Gender	-.69	.75	.84	1	.35	2.00
Math	-1.13	.83	1.87	1	.17	.32
Comm	.16	.55	.08	1	.77	1.11
Soc	-.19	.52	.14	1	.70	.89
Educ	.82	.56	2.14	1	.14	2.27
PA	-.31	.54	.34	1	.55	.72
Fam	.27	.51	.29	1	.59	1.36
Stim	.42	.46	.85	1	.35	1.52
Cog	.69	.60	1.31	1	.25	2.00
GC	-.07	.95	.00	1	.93	.94
IC	.34	.79	.87	1	.66	1.40
ID	-.45	.44	1.07	1	.30	.63
PGI	-.67	.44	2.30	1	.12	.50
FI	-.18	.51	.12	1	.72	.83

Note: See Tables 3, 4, and 5 for full variable names.

Table 48

Classification Table for Math 0301

Observed	Success	Non-Success	Percentage Correct
	Predicted		
Success	94	0	100.0
Non-Success	13	5	27.8
Overall Percentage			88.4

For Math 0302, after all variables were loaded into the logistic regression equation, only three variables proved to be significant (Table 49). Those variables included Stimulation (Stem) ($p=.00$), Peer Group Interaction (PGI) ($p=.02$), and Faculty Interaction (FI) ($p=.00$). Students eligible for Pell Grants was variable not loaded into the regression equation because it did not prove significant after a chi-square analysis had been conducted earlier.

Table 50 provides further insight into the predictability of student success. This table shows that the variables correctly predicted success at a rate of 98.2%. However, the construct could only correctly predict 26.7% of the students that were unsuccessful. However, the overall prediction percentage was 89.8%.

Table 49

Logistic Regression Results for Math 0302

Variable	B	S.E.	Wald	df	Sig.	Exp (B)
Parents	.53	.85	.38	1	.53	1.70
Age	-.13	.54	.05	1	.81	.87
Gender	1.19	.78	2.33	1	1.27	3.29
Math	-2.32	.58	1.56	1	.69	.79
Comm	-5.92	.62	.90	1	.34	.55
Soc	-.19	.71	2.23	1	.13	.34
Educ	.82	.84	3.29	1	.07	.21
PA	-.31	.70	1.29	1	.24	2.22
Fam	.25	.67	8.49	1	.70	1.20
Stim	.21	.72	.85	1	.00	8.30
Cog	-.07	.73	.01	1	.92	.93
GC	1.63	1.19	.42	1	.17	5.14
IC	-.74	1.13	.78	1	.51	.47
ID	-.61	.68	-4.81	1	.37	.54
PGI	1.40	.64	7.21	1	.02	4.07
FI	-1.91	.71	3.20	1	.00	.14

Note: See Tables 3, 4, and 5 for full variable names.

Table 50

Classification Table for Math 0302

Observed	Success	Non-Success	Percentage Correct
	Predicted		
Success	111	2	98.2
Non-Success	11	4	26.7
Overall Percentage			89.8

For Math 0303, after all variables were loaded into the logistic regression equation, only one variable proved to be significant (Table 51). That variable included Family Togetherness (Fam) ($p=.00$). Students eligible for Pell Grants was variable not loaded into the regression equation here because it did not prove significant after a chi-square analysis had been conducted earlier.

Table 51

Logistic Regression Results for Math 0303

Variable	B	S.E.	Wald	df	Sig.	Exp (B)
Parents	.33	.55	.37	1	.54	1.40
Age	-.30	.32	.88	1	.34	.73

(table continues)

Table 51. Logistic Regression Results for Math 0303

Variable	B	S.E.	Wald	df	Sig.	Exp (B)
Gender	-.05	.55	.01	1	.92	.94
Math	-4.90	.25	3.71	1	.54	.61
Comm	.44	.55	.65	1	.41	1.55
Soc	.46	.46	.99	1	.32	1.59
Educ	-.35	.42	.70	1	.40	.70
PA	-1.46	.32	.20	1	.64	.86
Fam	.16	.45	.13	1	.01	1.83
Stim	-.21	.55	.14	1	.70	.80
Cog	-.53	.46	1.37	1	.24	.58
GC	.64	.62	1.07	1	.24	.58
IC	.34	.58	.35	1	.29	1.91
ID	-.08	.45	.03	1	.84	.91
PGI	-.35	.37	.90	1	.34	.70
FI	-.53	1.36	.15	1	.69	.58

Note: See Tables 3, 4, and 5 for full variable names.

Table 52 provides further insight into the predictability of student success. This table shows that the variables correctly predicted success at a rate of 98.2%. However, the construct could only correctly predict 16.7% of the students who were unsuccessful. The overall prediction percentage was 84.1%.

After chi-square analysis was conducted to identify the significance of the background variables used to examine research question three, logistic regression was utilized to help predict success in the four developmental math courses. Success was the dependent variable used in the regression analysis. In Math 0300, there were not enough data to determine whether any of the variables were significant in predicting success. In

Table 52

Classification Table for Math 0303

Observed	Success	Non-Success	Percentage Correct
	Predicted		
Success	112	2	98.2
Non-Success	20	4	16.7
Overall Percentage			84.1

Math 0301, students' age range was the only variable that was found to be significant. In Math 0302, stimulation, peer group interaction, and faculty interaction were variables that proved to be significantly related to student success. In Math 0303, family togetherness was the only variable that was found to be significant at the .05 level.

Summary

This chapter has presented the results of this study of student success as it addressed the three research questions. First, the study was conducted to determine whether or not there were significant differences in the success rates of male and female

Hispanic students in their first developmental math courses in the Fall of 2005. In all four courses (0300, 0301, 0302, 0303), the data analysis failed to reject the null hypothesis. The samples did not provide enough evidence to reject the claim.

The second research question examined whether there was a significant difference in the success of financial aided versus non-financial aided Hispanic students who were enrolled in their first developmental math course in the Fall 2005 (0300, 0301, 0302, 0303). In Math 0301, 0302, and 0303, the data analysis failed to reject the null hypothesis. Whether or not a Hispanic student has financial aid does not appear to be related to his or her success. The samples did not provide enough evidence to reject the claim. An error in the results for Math 0300 precluded an answer to the relationship for this first level of developmental math.

For research question three, a chi-square analysis was conducted to identify the significance of the background variables used to examine the research question. In Math 0300, Pell Grant eligibility, students' age range, and math ability proved to be significant predictors of success. In Math 0301, Pell Grant eligibility, students' age, gender, and math ability proved to be significant predictors of success. In Math 0302 and Math 0303, parents attending college, students' age range, gender, and math ability proved to be significantly related to student success. These variables were included in all subsequent analysis used to address research question three.

Logistic regression was then utilized to further examine research question three in order to predict success in the four developmental math courses. Success was the dependent variable used in this regression analysis. Again, this model considered various types of independent variables to include Education Participation Scale variables

(Communication Improvement, Social Contact, Educational Preparation, Professional Advancement, Family Togetherness, Social Stimulation, and Cognitive Interest), background variables (socioeconomic status, parents education, gender, students' age, and math ability), and personal variables (goal commitment, institutional commitment, intellectual development, peer group interactions, and faculty interactions).

In Math 0300, there were not enough data to determine whether any of the variables were significant in predicting success. In Math 0301, students' age range was the only variable that was found to be significant. In Math 0302, stimulation, peer group interaction, and faculty interaction were variables that proved to be significantly related to student success. In Math 0303, family togetherness was the only variable that was found to be significant.

This current study began with Chapter One as an introduction to the issues to be examined, with Chapter Two providing a review of relevant literature, and Chapter Three containing a detailed description of the methodology that was utilized in this study. This chapter contained a presentation of the findings of the study and answers to the three research questions which were part of this investigation. The following chapter, Chapter Five, provides a summary, major findings and discussion, recommendations, and conclusions.

CHAPTER FIVE

Summary, Major Findings, Discussion, and Recommendations

Introduction

The commitment by community colleges to providing open access to students brings to the forefront the challenge of educating a very diverse student population. What many community college students have in common, though, is that many of them need developmental education. Many students that enroll in community colleges do so without the skills needed to enroll in college level math. Colleges are now being encouraged to identify students with greater need for developmental education, and at the same time, develop strategies to help them succeed. Of the developmental education subjects, math can typically be the largest barrier to success for incoming students. Today, more students are referred to developmental math than to developmental reading or English. Furthermore, fewer students complete their coursework in developmental math than in other subjects. Also, persistence rates for students needing developmental education are lower than rates for students who do not need developmental education. Failure to complete developmental education classes may be related to poor persistence. According to the 2005 Community College Survey of Student Engagement (CCSSE), passing rates in college-level math courses by students are as high or higher than those for students who were not referred to take a developmental course. Further, research has shown that students who successfully complete their developmental course with a C or

better are more likely to complete their developmental education requirements in a timely manner.

The Lumina Foundation has funded an initiative called *Achieving the Dream*, a national initiative to help more community college students, particularly students of color and low-income learners, succeed. The *Achieving the Dream* initiative is seeking to help more students reach their individual goals such as earning a community college certificate or associate degree, or making themselves more marketable in the job market. Students that need to reach these goals, especially Hispanic students, must successfully complete their developmental education requirements and advance to credit-level courses.

Summary of Results

This study investigated a first-time-to Northwest Vista College cohort in the Fall 2005 semester in order to more fully understand the success rates of Hispanic students. The problem of this study was to determine whether or not there was a significant difference in success rates between Hispanic students enrolled in developmental math courses at Northwest Vista College during the implementation of the *Achieving the Dream* initiative in the Fall 2005 semester. There were three specific questions that stemmed from the main research question:

1. Was there a significant difference in the success of Hispanic male students who were enrolled in their first developmental math course in the Fall 2005 semester compared to Hispanic female students who were enrolled in their first developmental math course in the Fall 2005 semester?

2. Was there a significant difference in the success of Hispanic students who were enrolled in their first developmental math course in the Fall 2005 semester who received financial aid compared with Hispanic students who were enrolled in the same developmental math course during the Fall 2005 semester who did not receive financial aid?
3. Were background variables (socioeconomic status, gender, students' age, parents attending college, and math ability), Education Participation Scale variables (Communication Improvement, Social Contact, Educational Preparation, Professional Advancement, Family Togetherness, Social Stimulation, and Cognitive Interest), and personal variables (goal commitment, institutional commitment, intellectual development, peer group interactions, and faculty interactions) significant predictors of success in each of the four developmental math courses during the Fall 2005 semester?

Review of Methodology

Three independent sets of variables were investigated in this study. The first set included the seven motivations from Boshier's EPS (Cognitive Interest, Communication Improvement, Educational Preparation, Family Togetherness, Professional Advancement, Social Contact, and Social Stimulation) along with student background characteristics, which included Gender, Family Income, Parent Attending College, Students' Age and Math Ability (as demonstrated by placement in a developmental math class as measured by the Accuplacer Test). Data for these variables were gathered from the student surveys given to developmental math students. The second set of independent variables were Initial Commitment (Goal and Institutional Commitment), including student intent to

graduate, commitment to a major, and commitment to Northwest Vista College. Data for these variables were gathered from the student surveys. The third set of independent variables were Academic System items (Academic Integration and Social Integration) which included financial aid (Pell Grant), success (a grade of C or better in the developmental math courses), peer interactions, and faculty interactions. Data for these variables were gathered from the student surveys and institutional records in December of 2005 and in the Spring 2006 semester. The dependent variable was success as measured by a student achieving a grade of C or better in their Fall 2005 developmental math course. This information was gathered from institutional student enrollment data.

Major Findings

Success of Hispanic Male Students Compared to Hispanic Female Students

The first research question dealt with the success of Hispanic male students compared to the success of Hispanic female students. In Developmental Math 0300, there were a total of 27 students who were enrolled in Math 0300. Out of the 27 students, there were a total of 11 male and 16 female students. According to the data, 45.5% of the male students were successful. Female students had a 56.0% success rate. A proportion test on the data demonstrated that there was no significant difference in the success of Hispanic males compared with Hispanic females.

There were a total of 112 students who enrolled in Math 0301. Out of the 112 students who enrolled, there were a total of 40 male and 72 female students. According to the data, 80% of the male students were successful. Female students had an 86% success rate. A proportion test on the data demonstrated that there was no significant difference in the success of Hispanic males compared to Hispanic females.

There were a total of 128 Hispanic students who were enrolled in Math 0302. Out of the 128 students, there were a total of 42 male and 86 female students. The data showed that 81% of the male students were successful. Female students had a 91% success rate. A proportion test on the data demonstrated that there was no significant difference in the success of Hispanic males compared with Hispanic females.

There were a total of 138 students who were enrolled in Math 0303. Out of the 138 students who were enrolled, there were a total of 53 male and 85 female students. The data showed that 85% of the male students were successful. Female students had an 81.2% success rate. A proportion test on the data proved that the difference in the success rates were not statistically significant. Even though there were differences in the success rates, no statistically significant differences were found between male and female Hispanic students in their success rates in the four developmental courses (0300, 0301, 0302, and 0303).

The Effect of Financial Aid on Success

The second research question dealt with whether there were significant statistical differences in the success of students who received financial aid versus those students who did not. There were a total of 27 students that were enrolled in Math 0300. Out of the 27 students, there were a total of 19 Hispanic students who received financial aid and 8 Hispanic students who did not receive financial aid. According to the data, 79% of the students who received financial aid were successful. Hispanic students who did not receive financial aid had a 50% success rate. The data collected and analyzed in this course could not be used to determine significance in this part of the study.

There were a total of 112 students that were enrolled in Math 0301. Out of the 112 students, there were a total of 69 Hispanic students who received financial aid and 43 Hispanic students who did not receive financial aid. According to the data, 83% of the students who received financial aid were successful. Hispanic students who did not receive financial aid had a 75% success rate. A proportion test on the data proved that the difference in the success rates were not statistically significant.

In Math 0302, there were a total of 128 students that were enrolled in the course. Out of the 128 students, there were a total of 72 Hispanic students who received financial aid and 56 Hispanic students who did not receive financial aid. According to the data, 88.9% of the students who received financial aid were successful. Hispanic students who did not receive financial aid had an 87.5% success rate. A proportional test on the data proved that the difference in the success rates were not statistically significant.

Finally, in Developmental Math 0303, there were a total of 138 students who were enrolled in the course. Out of the 138 students, there were a total of 70 Hispanic students who received financial aid and 68 Hispanic students who did not receive financial aid. According to the data, 77.1% of the students who received financial aid were successful. Hispanic students who did not receive financial aid had an 88.2% success rate. A proportional test on the data proved that the difference in the success rates were not statistically significant. Even though there were differences in the success rates, no statistically significant differences were found between Hispanic students that received financial aid versus Hispanic students who did not receive financial aid in their success rates in the four developmental courses (0300, 0301, 0302, and 0303).

The Effect of Other Variables

For research question three, the researcher identified and analyzed several other independent variables along with one method of study to determine if these variables had an appreciable effect on the success of Hispanic students enrolled in developmental math courses in the Fall 2005 semester. The third research question was developed to determine whether there was a significant relationship between background variables, motivations to attend college, institutional variables, and persistence and success for Hispanic students that were enrolled in their first developmental math course. Success was the dependent variable used in this regression analysis. This model considered various types of independent variables that included: Education Participation Scale variables (Communication Improvement, Social Contact, Educational Preparation, Professional Advancement, Family Togetherness, Social Stimulation, and Cognitive Interest); background variables (socioeconomic status, parents college attendance, gender, students' age, and math ability); and personal variables (goal commitment, institutional commitment, intellectual development, peer group interactions, and faculty interactions).

A chi-square analysis was conducted using the background variables to determine the individual relationships between the predictors and the outcome variable. This preliminary analysis was conducted to determine if there were any covariates significantly related to the outcome variable of success. Covariates which were significant at the $p < .05$ level were then included in the logistic regression analysis to answer research question three.

The second method of analysis used to answer research question three utilized logistic regression, where significant covariates and all the predictors were entered into the logistic regression equation. The logistic regression analysis provided a classification table and a significance score. The classification table summarized the fit between the actual and predicted group used in the analysis and provided information showing the quality of the predictors to significantly classify students who succeeded in their developmental math course and those who did not.

After loading all variables for the logistical regression analysis for Math 0300, the data could not be used to compute the analysis needed to determine significance. The small number of student responses (27) contributed to the failure to significantly test the data. For Math 0301, after all variables were loaded into the logistic regression equation, only one variable proved to be significant. That variable was student age ($p=.00$). For Math 0302, after all variables were loaded into the logistic regression equation, only three variables proved to be significant. Those variables included Social Stimulation ($p=.00$), Peer Group Interaction ($p=.02$), and Faculty Interaction ($p=.00$). For Math 0303, after all variables were loaded into the logistic regression equation, only one variable proved to be significant. That variable was Family Togetherness ($p=.00$).

Discussion

The first research question addressed the following: Was there a significant difference in the success of Hispanic male students who were enrolled in their first developmental math course in the Fall 2005 semester compared to Hispanic female students who were enrolled in the first developmental math course in the Fall 2005 semester? Even though the data analysis showed that there were no significant

differences in the success of female and male students in the four developmental classes, female students did have higher success rates than their male counterparts in three of the four courses. The female success rate was the lowest in Math 0300 (56%), but in Math 0301 it was at 86%, in Math 0302 it was at 91%, and in Math 0303, female students had an 81% success rate. This data is encouraging as Hispanic females usually face different challenges when attempting to complete college successfully. Rodriguez, Guido-DeBrito, Torres, & Talbot (2000) found in their study that some Hispanic women face conflict with their families, who believe that they are not supposed to go to college but should get married instead. Hispanic women of new generations also have to deal with parents who expect them to stay close to home which causes them to attend community colleges. This prevailing attitude is most common among first-generation college students. The lower performance of both groups in Math 0300 may have been due to the fact that some of these students may have been first generation college students. Pascarella and Terenzini (2005) provide evidence that it is reasonably clear that first-generation students as a group have a more difficult transition from secondary school to college than their peers. First-generation students not only confront all the anxieties and difficulties of any college student, their experiences also often involve substantial cultural as well as social and academic transitions.

The second research question dealt with the following: Was there a significant difference in the success of Hispanic students who were enrolled in their first developmental math course in the Fall 2005 semester who received financial aid compared with Hispanic students who were enrolled in the same developmental math course during the Fall 2005 semester who did not receive financial aid? It was surprising

to see that in each of the developmental math courses financial aid did not appear to have a bearing on how students performed in their respective courses. Studies (Cabrera, Stampen, & Hansen, 1990; Cabrera, Nora, & Castaneda, 1993; Linsenmeier, Rosen, & Rouse, 2006) have validated the importance of financial aid in the success process. In their 1990 study, Cabrera et al. found that financial aid created an equal playing field among recipients. In their 1993 study, Cabrera et al. found that the actual awarding of financial aid and a student's attitude associated with having actually received financial assistance may directly and indirectly lead to student success and retention. A student's stress level is reduced knowing he can pay for his tuition thus helping him become committed to his institution. In their 2006 study, Linsenmeier, et al. found that schools that formulated a plan where the entire loan portion of a financial aid package for low-income students was replaced with grants saw that the matriculation by low-income minority students rose between 8 and 10 percentage points.

The third research question addressed the following: Were background variables (socioeconomic status, gender, students' age, parents attending college, and math ability), Education Participation Scale variables (Communication Improvement, Social Contact, Educational Preparation, Professional Advancement, Family Togetherness, Social Stimulation, and Cognitive Interest), and personal variables (goal commitment, institutional commitment, intellectual development, peer group interactions, and faculty interactions) significant predictors of success in each of the four developmental math courses during the Fall 2005 semester? After running a logistic regression analysis in each of the four developmental math courses, the following were found to be significant variables attributing to the success of Hispanic students in their respective developmental

math courses: student age (0301); stimulation, peer group interaction, and faculty interaction (0302); and family togetherness in (0303).

The majority of the students in Math 0301 fell in the age range of between 17-22 years of age, which in these courses represented 73.2% of the student enrollment. This age range does fall in the traditional age range for college attendance where students in this age range are more persistent in pursuing their education. A significant number of Hispanic students attend college at ages that do not provide them with maximum benefits. Economically, individuals who earn their degrees at a younger age earn more earning power than older graduates (Monks, 1997). Research has consistently shown that older students—those who enter college for the first time at age 25 or older—are less likely to complete a degree or certificate. Calcagno, et al. (2007) estimated a single-risk discrete-time hazard model using transcript data on a cohort of first-time community college students in Florida to compare the educational outcomes of older and traditional-age students. Contrary to conventional wisdom, and perhaps in this study, the authors' results suggest that after controlling for cognitive mathematics ability, older students enrolled in Florida community colleges have a higher conditional probability of completing a degree or certificate in the observed event period.

In Math 0302, faculty interaction was a variable important to student success. Student development and learning are part of motivating an individual to succeed in the classroom. This is linked to a student's college experience and educational opportunities afforded to them by the college. Research indicates that frequent interactions with faculty contribute to a variety of developmental and educational outcomes as well as academic performance (Barefoot, et al., 2005). All math faculty members at Northwest

Vista College are trained in collaborative classroom techniques and are student-centered. The instructors are all expected to be committed to student-centered learning to reflect continuously on what students are doing and why they are doing it as part of the classroom learning experience. The math department is also part of the college initiative to assess student outcomes across the curriculum. This is designed to encourage interdisciplinary dialogue among faculty and to improve student learning. Tinto (1993) reported that when students have frequent contact with the faculty, students are more apt to succeed and persist. Students that are mentored and have faculty interactions are generally more interested in pursuing their education. Students at Northwest Vista College probably rely on faculty interaction to compliment their success in Math 0302 since students in the previous course (Math 0301) are jumping from working on linear equations to working on polynomials, factoring, and exponents.

Peer group interaction was a significant factor in student success in Math 0302. Effective college faculty members are using collaborative learning methods to facilitate a shift to learner-centered instruction. Socially organized, task-oriented activities are critical to improved skill development and application. Students working in pairs and in larger groups improve on long-and short-term memories and increase their interests in continuing their work (Roueche & Roueche, 1993). The Center for Collaborative Learning Center at Northwest Vista College has allowed students a chance to collaborate outside of the classroom. The center fosters community among the students with the aid of trained tutors. The principle ideas here are that collaboration allows for mathematical independence and alleviates students from the frustration and fear of math homework. Also, what might have added to strong peer-group collaboration in Math 0302 courses

was the fact that the classroom where these courses are taught had dry-erase boards on all four sides of the room. This may have promoted collaboration among student groups as they attempted math problems on the board. Also, it may have toned down the level of anxiety students often have when working out problems in front of an entire class.

Social stimulation was another significant variable in Math 0302. Both peer-group interaction and faculty interaction values that are pushed at Northwest Vista College are key to a student's stimulation to succeed in the classroom. Pascarella and Terenzini (2005) found that the most important contributing factor of students not succeeding in the classroom is the lack of integration into the college environment. This is usually due to a student failing to secure sufficient contact with significant members of the campus community. Minority students tend to withdraw from school because they have trouble conforming to the campus environment. Collaboration with peers and faculty members will allow students to achieve successful stimulation and social integration as they build relationships with peers, staff, and faculty.

In Math 0303, the most significant variable to student success was family togetherness. For Hispanic students, their families are considered their single most important institution. Due to the importance of family in the Hispanic culture, it is critical to examine the role of family support when considering a student's success and persistence in school. Gloria & Rodriguez (2000) reported that family support is a major component in ensuring a Hispanic student's success and persistence until graduation. Continuous encouragement by both parents increased the likelihood that Hispanic students would succeed in college. Although the data that reported parents' college attendance was not a significant factor in student success, 83 out of the 138 Hispanic

students that responded to the survey noted that at least one of their parents had attended college. Parental education on the processes of attaining a college education may be linked to student success. Parents' knowledge of the higher education system will assist them in providing direction and support to their children attending college. A supportive relationship with parents has been shown to be important for the maintenance of psychological well-being for ethnic minority college students (Rodriguez, et al. 2003). There is some evidence that social support, including support from parents, is related specifically to adjustment in college for ethnic minority college students.

Student success is a critical issue for students, institutions, and society in general. Right now there is still a gap in the academic achievement and the educational attainment of Hispanic students in college completion. As the fastest growing racial group in the country, Hispanic students have the potential to positively affect the economic future of the United States. Politicians, higher education policy groups, and institutions of higher learning must work harder to close the educational achievement gap between Hispanic students and the country as a whole. In order to accomplish the mission, high expectations for achievement must be set, goals for what must be accomplished should be identified, and the measurement of this progress should have clear and specific benchmarks tied to it.

The success rates of the Hispanic students enrolled in their appropriate developmental math courses at Northwest Vista College were high for the last three courses (0301, 0302, 0303), thus demonstrating that the developmental math program has been fairly successful in their mission in developing independent learners with the knowledge, attitudes, and skills to succeed both academically and personally. One of the

unique aspects of the developmental math program at Northwest Vista College is the use of the Developmental Advocacy Center for tutoring students and the electronic mentoring groups set up by the lead instructor for each developmental math level that allows for interactive mentoring of adjunct instructors. These two things are prime examples of the improvement of success and retention rates at Northwest Vista College. The full-time faculty at Northwest Vista College, who are strongly encouraged to teach developmental as well as other various college-level math courses, are well trained in collaborative classroom techniques.

Although Northwest Vista College may have a program which results in increased student persistence and success, its program philosophy may not necessarily be transferred easily to another institution. The success of efforts at Northwest Vista College and various institutions should serve as models of change, encouragement, and improvement for others. Maddox (2004) examined whether there were differences between traditional and nontraditional students' motivations to attend college, and whether there were relationships between persistence and educational motivations, background variables, and institutional variables of developmental math students at Jackson State University. Using Boshier's Education Participation Scale (EPS), Maddox (2004) integrated EPS motivations and background variables into Tinto's Model of Student Departure, which suggested that the more involved students are in the academic and social systems of the institution, the more likely they were to persist. The scope of the study involved an examination of under prepared community college math students' educational motivations to participate in higher education, looking for comparisons between traditional and nontraditional students. GPA was the most important predictor

of persistence, but the only EPS variable that had any significant effect on GPA was social stimulation. In the end, EPS variables added very little to Tinto's Interactionist Theory of Student Departure. The results of the Maddox's study also suggested that only two of the thirteen variables had significant total effects on Persistence, with those being GPA and Family Togetherness.

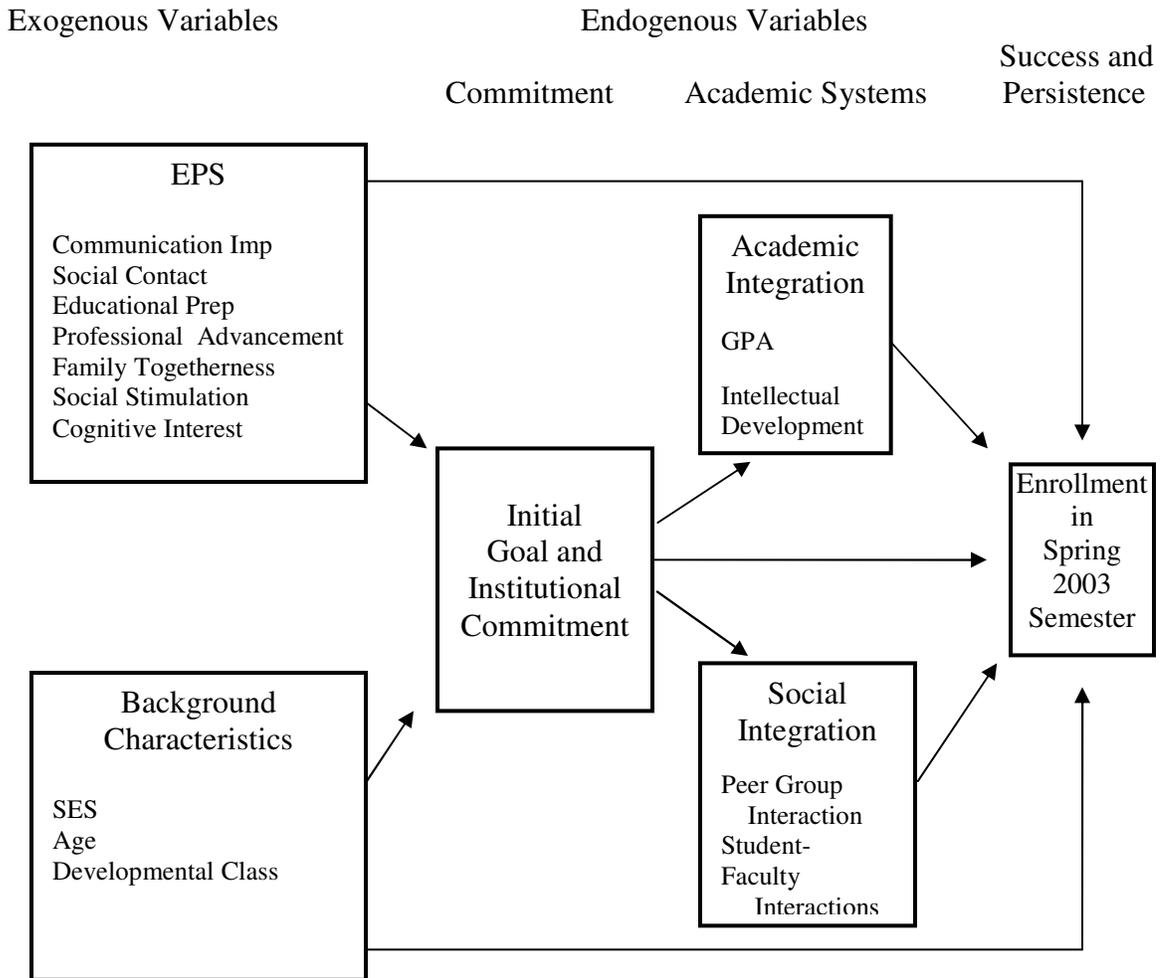


Figure 5. Hypothesized Effects of Variables on Persistence (Maddox, 2004)

Whereas an adult population was used in the Maddox (2004) study, the scope of this study involved the examination of Hispanic community college students' educational motivations to participate in higher education. Also Maddox's study involved looking at the significant total effects on persistence, while this study involved an examination of the significant total effects of selected variables on student success (grade of C or higher). In Math 0302 at Northwest Vista College, peer group interaction and faculty interaction, the two variables in Tinto's student integration model (social integration), were proved here to be significant in the success of students. Social stimulation (0302) and family togetherness (0303) were variables from Boshier's Education Participation Scale (EPS) that also proved to be significant here. As in Maddox's study, EPS variables added little to Tinto's Interactionist Theory of Student Departure in this study, but the variables are too important to ignore if studies are to continue concerning student success.

Recommendations for Practice

1. In Math 0302, stimulation, peer group interaction, and faculty interaction were variables that were significantly related to a Hispanic student's success. These students showed characteristics of being more socially motivated. Contact between participants and between participants and instructors should be encouraged in all developmental math courses. According to Tinto (1993), the classrooms, the hallways, and the offices of the institution become testing grounds for student judgment regarding the intellectual character and worth of the college experience

2. In Math 0303, family togetherness was found to be the most important factor related to Hispanic student success. The family needs to be included and informed about the higher education experience in recruitment seminars and orientation programs.

According to Gloria and Rodriguez (2000), when the family is involved, the encouragement and support provided by the college is of great support to Hispanic students and helps them to have positive experiences and successfully complete college.

3. Colleges should continue to embrace a culture of continuous innovation and quality improvement in forming developmental programs. In order to promote success and retention in developmental math courses, the Northwest Vista College math program has created the Center for Collaborative Learning. Here, groups of students work with each other in order to alleviate students the frustration and fear of math homework. This idea provides peer tutoring opportunities for students who have already mastered their college level coursework. All collaborative work is supported by trained tutors.

Northwest Vista College's Advocacy Center Services provides students with one-on-one tutoring for students who are at risk of dropping or failing their developmental course. It provides for early intervention for students who are missing class or having difficulty through faculty members who are specifically trained for retention counseling. The program also acts as an outreach to repeaters who have been unsuccessful in the same course by working individually with them before classes begin.

4. Schools should continue to provide a supportive and positive learning experience for Hispanic students which include the establishment of a network of staff, faculty and other students. This can be done by fostering best organizational and administrative practices to support Hispanic student success. Reporting on progress with respect to Hispanic and all other group student achievement in developmental courses can lend to better support of these courses and their students.

5. Schools should have knowledge of students' goal and institutional commitments to further distinguish between those students who are successful and those that are not. According to Tinto (1993), students with high academic competence and moderate to high goal commitment are most likely to be successful. Those students with moderate to low commitment are most likely to be unsuccessful and will not persist.

6. Colleges should take note of the large proportions of students who either did not attempt, or attempted but did not complete, all of their required developmental math coursework. With this in mind, colleges must look to build successful developmental math programs with early interventions in order to assist in making important gains in student success.

7. That an adequately funded state grant program with increasing federal aid dollars be created as a compliment to the Pell Grant Program. Analysis conducted through the *Achieving the Dream* initiative indicates that the Pell Grant Program appears to be successful in helping close achievement gaps. Data shows that from 2002 through 2005, the *Achieving the Dream* student cohort members that received Pell Grants after two or three years have achieved course-completion rates that match those of non-recipients.

Further Research

1. Further study is needed which compares Hispanic students with students of other races to identify similarities and differences for the purpose of improving existing developmental math programs or developing additional support programs for developmental students.

2. A replication study similar to this one, which would add an interview

component, would serve to capture the motivations, thoughts, and feelings of students in their quest to succeed in their developmental math courses.

3. A longitudinal study that would follow developmental students beginning with their first appropriate developmental math course through the completion of their education goals would offer a different perspective and provide answers to questions raised in this study.

4. Further study into why Hispanic students do not access financial aid available to them and to identify what assistance these students need related to financial aid is recommended.

5. A national study as to whether similar developmental math programs being implemented at other institutions are being evaluated for their effectiveness and the extent to which evaluation processes are being used in order to identify successful components should be valuable.

6. Further study is needed which describes how effective early intervention programs are in improving student achievement for Hispanic students in developmental math courses.

7. A longitudinal study with multiple regression used as the analysis as other variables are included in the study.

8. Further study looking at faculty members and how variables such as their methodology, experience, ethnicity, and number of classes taught have any bearing on student success.

Conclusion

Student success in developmental math courses and effective and efficient remediation is a great challenge for community colleges. Research is revealing that when accompanied by quality learning support systems, remediation can be done with long-term success. Community colleges should assure that they can provide access, diversity, and educational opportunity for all academically under-prepared students within the community. Remedial educators must continue to invest a lot of time in one-on-one efforts with students. Northwest Vista College aims at student success by having its faculty members teach both developmental and upper level courses in a student-centered environment. Because the entire NVC faculty is trained in collaborative classroom techniques, the classroom becomes an excellent way for students to achieve higher quality in their work. Students who frequently have to explain their own ideas to their peers and then listen to and assess the ideas of their peers will help students with the quality of their thought processes, thus leading to student success.

It is this researcher's hope that this study can lead colleges to insure that they can create realistic expectations regarding their ability to provide an effective education for every underserved population in the community. Colleges must insure that students are placed in the most accurate and appropriate learning environments to fit their needs. Community colleges must also insure that their faculty members go through an initial training process and then go through ongoing professional development in order to understand how to work with under-skilled students in an ever growing multicultural society. This training is to include not only effective teaching practices, but a clear understanding of how to approach the idea of diversity in the classroom. Fostering a

process for determining specific knowledge, skills, and attitudes, as is being done at Northwest Vista College, may help college educators determine what appropriate remediation should be. If community colleges are successful in providing their students with basic skills and knowledge, then everyone is a winner as the student will become an asset to all in the community in this ever expanding global economy.

APPENDICES

APPENDIX A

Cover Letter

November, 2005

Dear Student,

I am asking for your help in a study concerning the success and retention of developmental math students at Northwest Vista College. This study is a part of an effort to learn how students persist in developmental math classes and about their experiences at this institution. It is my understanding that you are currently enrolled in a developmental math course here at Northwest Vista College. I am asking students like you to fill out a survey in order to measure your motivations for being at this institution.

The results of this survey will be used to help improve the educational experience for students in order to understand what helps students succeed and persist in developmental math courses. This will also help me in completing my dissertation as a partial fulfillment of my Ed.D in Educational Administration at Baylor University. By better understanding the motivations of students participating in education, this institution will be able to provide information and services to better assist students enrolled in developmental math courses.

Your answers are completely confidential and will be released only in summary form. In this manner, no individual answers can be identified. You may submit your survey to your instructor upon completion.

If you have any questions or comments about this study, do not hesitate to contact me at 210-348-2070 or at hguevara@accd.edu. You may also contact my faculty advisor, Dr. Albert Smith, at 254-710-3070.

Thank you very much for your help with this important study.

Sincerely,

Homer Guevara, Jr.
Doctoral Candidate
Baylor University

APPENDIX B

Student Education Participation Survey

Student Education Participation Survey

Thank you for participating in this study of student experiences at Northwest Vista College (NVC). In the first section, you will find a list of statements characterizing educational participation motivations with which you feel may or may not have any influence on your attendance at NVC. Please indicate the extent of your agreement or disagreement with each statement, as it applies to your experience during this semester, by circling the appropriate number after each question.

I am currently enrolled at Northwest Vista College.....

1.in order to improve my language skills.
1. no influence 2. little influence 3. moderate influence 4. much influence
2.in order to become acquainted with friendly people.
1. no influence 2. little influence 3. moderate influence 4. much influence
3.in order to make up for a narrow previous education.
1. no influence 2. little influence 3. moderate influence 4. much influence
4.with the hope of securing professional advancement.
1. no influence 2. little influence 3. moderate influence 4. much influence
5.with the hope of getting ready for changes within my family structure.
1. no influence 2. little influence 3. moderate influence 4. much influence
6.with the idea that attending classes will help me overcome the frustration of day to day living.
1. no influence 2. little influence 3. moderate influence 4. much influence
7.the hope to be successful in my classes with the hope of achieving something meaningful such as a certificate or a degree.
1. no influence 2. little influence 3. moderate influence 4. much influence
8.in order to improve my speaking skills.
1. no influence 2. little influence 3. moderate influence 4. much influence
9.in order to have a good time with friends.
1. no influence 2. little influence 3. moderate influence 4. much influence
10. ...in order to get an education I missed earlier in my life.
1. no influence 2. little influence 3. moderate influence 4. much influence
11. ...in order to achieve an occupational goal.
1. no influence 2. little influence 3. moderate influence 4. much influence
12. ...in order to gain an education enabling me to share a common interest with my spouse or friend.
1. no influence 2. little influence 3. moderate influence 4. much influence

13. ...in order to get away from loneliness.
1. no influence 2. little influence 3. moderate influence 4. much influence
14. ...in order to acquire general knowledge.
1. no influence 2. little influence 3. moderate influence 4. much influence
15. ...in order to learn a new language.
1. no influence 2. little influence 3. moderate influence 4. much influence
16. ...in order to meet different people.
1. no influence 2. little influence 3. moderate influence 4. much influence
17. ...in order to acquire knowledge to help with other educational courses.
1. no influence 2. little influence 3. moderate influence 4. much influence
18. ...in order to prepare for landing a job in the future.
1. no influence 2. little influence 3. moderate influence 4. much influence
19. ...in order to keep up with others in my family regarding education.
1. no influence 2. little influence 3. moderate influence 4. much influence
20. ...in order to get relief from boredom.
1. no influence 2. little influence 3. moderate influence 4. much influence
21. ...in order to learn for the joy of it.
1. no influence 2. little influence 3. moderate influence 4. much influence
22. ...in order to improve my writing skills.
1. no influence 2. little influence 3. moderate influence 4. much influence
23. ...in order to make friends.
1. no influence 2. little influence 3. moderate influence 4. much influence
24. ...in order to prepare myself for further education.
1. no influence 2. little influence 3. moderate influence 4. much influence
25. ...in order to give me a higher status in my job.
1. no influence 2. little influence 3. moderate influence 4. much influence
26. ...in order to keep up with my children regarding education.
1. no influence 2. little influence 3. moderate influence 4. much influence
27. ...in order to get a break from the routine of doing house work.
1. no influence 2. little influence 3. moderate influence 4. much influence
28. ...in order satisfy my inquiring mind.
1. no influence 2. little influence 3. moderate influence 4. much influence
29. ...in order to help me understand what people are saying and writing.
1. no influence 2. little influence 3. moderate influence 4. much influence

30. ...in order to meet new people.
1. no influence 2. little influence 3. moderate influence 4. much influence
31. ...in order to complete courses for another college or university.
1. no influence 2. little influence 3. moderate influence 4. much influence
32. ...in order for me to gain a better job.
1. no influence 2. little influence 3. moderate influence 4. much influence
33. ...in order for me to be able to answer questions asked by my children.
1. no influence 2. little influence 3. moderate influence 4. much influence
34. ...in order for me to do something rather than nothing.
1. no influence 2. little influence 3. moderate influence 4. much influence
35. ...in order for me to seek knowledge.
1. no influence 2. little influence 3. moderate influence 4. much influence
36. ...in order to learn about the usual customs here.
1. no influence 2. little influence 3. moderate influence 4. much influence
37. ...in order to make new friends.
1. no influence 2. little influence 3. moderate influence 4. much influence
38. ...in order to help me gain entrance to another college or university.
1. no influence 2. little influence 3. moderate influence 4. much influence
39. ...in order to help me increase my job competence.
1. no influence 2. little influence 3. moderate influence 4. much influence
40. ...in order to help me talk with my children.
1. no influence 2. little influence 3. moderate influence 4. much influence
41. ...in order for me to escape an unhappy relationship.
1. no influence 2. little influence 3. moderate influence 4. much influence
42. ...in order to help me expand my mind.
1. no influence 2. little influence 3. moderate influence 4. much influence

Student Experience and Retention Survey (Part 2)

In this section, please circle the answer that best applies to you and circle the number that applies to that question.

43. Are you eligible for a Pell Grant?
1. yes
2. no
44. Did either of your parents attend college?

1. yes
2. no

45. Age—Please put your age in the blank _____

46. Sex
1. female
 2. male

47. Race
1. White
 2. Hispanic
 3. African-American
 4. Other

48. What developmental math class were you first placed into?

1. Basic Math
2. Intro to Algebra and Geometry
3. Elementary Algebra
4. Intermediate Algebra

49. It is important for me to graduate from college with a degree.

1. strongly disagree
2. disagree
3. neither agree nor disagree
4. agree
5. strongly agree

50. I have no idea at all what I want to major in.

1. strongly disagree
2. disagree
3. neither agree nor disagree
4. agree
5. strongly agree

51. It is important for me to be enrolled at Northwest Vista College.

1. strongly disagree
2. disagree
3. neither agree nor disagree
4. agree
5. strongly agree

52. I am confident that choosing to attend Northwest Vista College was the right decision.

1. strongly disagree
2. disagree
3. neither agree nor disagree
4. agree
5. strongly agree

53. I am satisfied with my academic experience at Northwest Vista College

1. strongly disagree
2. disagree
3. neither agree nor disagree
4. agree
5. strongly agree

54. My academic experience has had a positive influence on my intellectual growth and interest in ideas.

1. strongly disagree
2. disagree
3. neither agree nor disagree
4. agree
5. strongly agree

55. It is important for me to know my fellow students in class.

1. strongly disagree
2. disagree
3. neither agree nor disagree
4. agree
5. strongly agree

56. It is important to be active in extracurricular activities at college.

1. strongly disagree
2. disagree
3. neither agree nor disagree
4. agree
5. strongly agree

57. Since coming to college I have developed a close personal relationship with other students.

1. strongly disagree
2. disagree
3. neither agree nor disagree
4. agree
5. strongly agree

58. Most faculty members I have had contact with are genuinely interested in teaching.
1. strongly disagree
 2. disagree
 3. neither agree nor disagree
 4. agree
 5. strongly agree
59. My interactions with faculty have had a positive influence on my personal growth, values, and attitudes.
1. strongly disagree
 2. disagree
 3. neither agree nor disagree
 4. agree
 5. strongly agree
60. Do you plan to attend Northwest Vista College next semester?
1. yes, I plan to attend
 2. I plan to drop out permanently
 3. I plan to stop temporarily
 4. I plan to transfer to another institution
 5. I don't know
61. Social security number (**for statistical purposes only**) _____.

Thank you for your participation in this important study.

APPENDIX C

Educational Participation Scale

Educational Participation Scale (Revised 1991)

1. Improve language skills (COM)-Communication Improvement
2. Meet friendly people (SOC)-Social Contact
3. Make up for narrow education (EDUC)-Educational Preparation
4. Secure advancement (ADV) (PA)-Professional Advancement
5. Prepare for family changes (FAM)-Family Togetherness
6. Overcome frustration (STIM)-Social Stimulation
7. Get something meaningful (COG)-Cognitive Interest
8. Speak better (COM)-Communication Improvement
9. Have fun with friends (SOC)-Social Contact
10. To get missed education (EDUC)-Educational Preparation
11. Achieve an occupational goal (ADV) (PA)-Professional Advancement
12. Share common interest (FAM)-Family Togetherness
13. Get away from loneliness (STIM)-Social Stimulation
14. Acquire general knowledge (COG)-Cognitive Interest
15. Learn another language (COM)-Communication Improvement
16. Meet different people (SOC)-Social Contact
17. To get knowledge for class (EDUC)-Educational Preparation
18. Prepare for job (ADV) (PA)-Professional Advancement
19. Keep up with family members (FAM)-Family Togetherness
20. Get relief from boredom (STIM)-Social Stimulation
21. Learn for the joy of it (COG)-Cognitive Interest
22. Write better (COM)-Communication Improvement
23. Make friends (SOC)-Social Contact
24. Prepare for further education (EDUC)-Educational Preparation
25. Get higher job status (ADV) (PA)-Professional Advancement
26. keep up with children (FAM)-Family Togetherness
27. Take break from routines (STIM)-Social Stimulation
28. Satisfy inquiring mind (COG)-Cognitive Interest
29. Understand what other say (COM)-Communication Improvement
30. Make new friends (SOC)-Social Contact
31. Do courses for school (EDUC)-Educational Preparation
32. Get a better job (ADV) (PA)-Professional Advancement
33. Answer child's questions (FAM)-Family Togetherness
34. Do something (STIM)-Social Stimulation
35. Seek knowledge (COG)-Cognitive Interest
36. Learn local customs (COM)-Communication Improvement
37. Meet new people (SOC)-Social Contact
38. Get entrance to school (EDUC)-Educational Preparation
39. Increase competence (ADV) (PA)-Professional Advancement
40. Help me talk to children (FAM)-Family Togetherness
41. Escape unhappy relationship (STIM)-Social Stimulation
42. Expand my mind (COG)-Cognitive Interest

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