MAKING THE GRADE: A STUDY OF ACADEMIC SUCCESS

A THESIS

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS

FOR THE DEGREE OF MASTER OF SCIENCE

IN THE GRADUATE SCHOOL OF THE

TEXAS WOMAN'S UNIVERSITY

DEPARTMENT OF MATHEMATICS AND COMPUTER SCIENCE

COLLEGE OF ARTS AND SCIENCES

BY

CHRISTINA ACOSTA, B.S.

DENTON, TEXAS

DECEMBER 2013

TEXAS WOMAN'S UNIVERSITY
DENTON, TEXAS

October 28, 2013

To the Dean of the Graduate School:

I am submitting herewith a thesis written by Christina Acosta entitled "Making the Grade: A Study of Academic Success." I have examined this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Science with a major in Mathematics.

Don E. Edwards, Ph. D., Major Professor

We have also read this thesis and recommend its acceptance:

Department Chair

Accepted:

Interim-Dean of the Graduate School

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DEDICATION

This thesis is dedicated to my husband, Guillermo Acosta who has motivated, supported, and inspired me since the day we met. I can't imagine my life without you!

I also dedicate this thesis to my three beautiful children who have helped me since the beginning of my studies. Thank you for the endless hours of silence so that I could study for my many exams and to write this thesis.

ACKNOWLEDGMENTS

I would like to express my gratitude to the many individuals who have contributed to this thesis.

Dr. Edwards, thank you for giving me the opportunity to work on the Comprehensive Student Success Program which led to the topic of this thesis. Your guidance, encouragement, and support have been vital to my research and to my education.

I would also like to express my deep appreciation to Dr. Carlsen-Landy for being my mentor. Without your support and inspiration, the content and details of this thesis wouldn't have been the same. Thank you for keeping me encouraged and motivated.

I am extremely grateful to Dr. Marshall for your guidance, support, and expertise in statistical analysis. Your approach to statistical analysis will stay with me throughout my career.

I am grateful to my wonderful husband, Guillermo Acosta, for taking time to read this thesis and point out the areas that could be improved upon. Thank you for believing in me and for always taking the time to help me.

Finally, I would like to thank my brother-in-law, Ian Pierce, for the many hours of reviewing and editing my thesis for formatting and grammatical errors. Without your help, it would have taken me another year to write this thesis.

ABSTRACT

CHRISTINA ACOSTA

MAKING THE GRADE: A STUDY OF ACADEMIC SUCCESS

DECEMBER 2013

Freshmen account for more than fifty percent of students who drop out before completing their degree, which means that increasing the success rates for freshmen is a critical challenge for many colleges and universities. In order for these academic institutions to increase student retention, programs or policies, geared towards identifying and assisting at-risk students must be successfully developed and implemented. One such study was the Comprehensive Student Success Program, which was implemented and developed for high failure and withdrawal rate mathematics courses to provide additional support such as supplemental lessons, tutoring, and peer mentoring administered by course assistants outside of the classroom at Texas Woman's University.

The results of the study showed no significance in success rates among courses that provided the additional assistance when compared to traditionally taught courses. However, students who completed the additional supplemental lessons and tutoring requirements had a significant increase in success rates over students who only attended tutoring or weren't required to attend supplemental lessons or tutoring. In addition, students with additional support showed increases in academic skills such as time management, use of study aids, and most notably motivation.

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CHAPTER I

INTRODUCTION

According to the National Center for Higher Education Management System, based on a 2009 study, seventy-six percent of college freshmen return for their sophomore year, and only fifty-five and a half percent of students graduate with a bachelor's degree within six years of beginning their education. Alternatively, fifty-four percent of all students that drop out do so during their freshmen year. To increase student academic success and retention, new and revised policies are being implemented at many national universities. Mandatory freshmen orientations, advisory sources, additional financial aid options, and early warning system are just a few of these policies being implemented. However, are there additional measures that can be taken by the university to improve academic success?

As college freshmen enter an independent phase of their lives, many are overwhelmed by the responsibilities of class expectation, time management, and newly found freedoms when rules from home no longer exist. Unfortunately, when students begin to struggle, if no effort is made to address the reasons for those struggles, the student will not achieve academic success; without success, a student may choose not to continue their academic studies. Achieving success is not only beneficial to the student, it's also beneficial to the university; higher retention rates mean students are achieving their educational goals and therefore, the university revenues and prestige also increases.

Universities, therefore, are investing in their students by implementing various policies to address the challenges commonly faced by freshmen students. An early warning system, for example, identifies early in the semester those students who are at risk of failing a course. However, if the student doesn't understand the material or have a way to gain comprehension of the material, the warning is ineffective. As a result, struggling students tend to fail or withdraw from courses, or even drop out of school. One subject that is typically required in many degree plans that students struggle with is mathematics. Could providing additional student support services to entry level mathematics courses with high failure rates increase overall academic success?

Purpose of Study

Texas Woman's University (TWU), a university located in Denton, Texas, follows the national university's average. In 2009-2010, TWU's freshmen student retention rate, based on the entire freshmen class, was measured at seventy-two percent, a result comparable to the nationwide averages. However, TWU's six-year graduation rate, in 2009-2010, was below the nationwide average at forty percent.

To increase academic success and retention, TWU provides programs and services to students throughout their academic career. Some of these services include New Student Orientation and Pioneer Camp programs that introduce the services and opportunities that Texas Woman's University offers prior to enrollment. Entrance exams and academic advisors are provided to every student to ensure that students take the necessary courses needed to successfully complete their degree plans. When students

struggle in a course, early-warning notifications alerts the students that they are in danger of failing the course. Computer labs, tutoring, and other on-campus services are provided to all students enrolled at TWU.

TWU's Mathematics and Computer Science Department identified two entry level mathematics courses with a twenty percent or greater failure and withdrawal rate. The focus of this study is to determine if introducing selected interventions including the use of an early detection system to identify students at risk of failing, implementation of mandatory supplemental lessons and tutoring, and peer mentoring, to all students enrolled in an entry level course, identified as having a constantly high failure/withdrawal rate, will help increase academic success. Will the students participating in tutoring and supplemental instructions that is administered by a course assistant be more successful than those who did not attend tutoring or supplemental lessons? Course assistants are undergraduate students who have successfully passed the course, attend the class in which they assist, and work closely with the instructor to effectively help students. Measured by a Likert response scale survey, will skills such as time management, use of study aids, and motivation increase with students who are provided with peer mentoring, supplemental lessons, and tutoring provided by the course assistants?

When a student is identified as at risk of failing, the student is required to attend additional supplemental lessons and tutoring sessions taught by course assistants. By providing the at-risk student with assistance early, the student is then expected to perform better on assignments and exams throughout the semester. For the purpose of this

research, students, at Texas Woman's University, successfully passing a course that implements such interventions will be compared to the same course taught without any modifications to measure if academic success increases. Academic success is defined as passing the course with a letter grade of C or better. The information gathered will include, but not be limited to, students' demographic profiles, attendance records, and final course letter grades.

The math department, recognizing the need to provide additional support to struggling students, applied for a federal grant. Texas Woman's University was awarded the federal grant, the Comprehensive Student Success Program (CSSP) by the Texas Higher Education Coordinating Board (THECB), for the 2012-2013 school year. The TWU CSSP program provides support to students through the use of an early detection system to identify students at risk of failing, the implementation of mandatory supplemental lessons, tutoring, and peer mentoring to help students overcome their obstacles and achieve success. The data collected from courses identified through the TWU CSSP grant will serve as the primary data source for this study.

Limitations

The TWU CSSP began in the fall semester of 2011; however, as with many newly implemented programs, the quality of the data collected was not as comprehensive as in the second semester. The data collected in the fall included, number of visits by the student to tutoring sessions, supplemental lessons, and the tutoring labs. By the end of the semester, the TWU CSSP team determined the number of hours spent at each session

would provide more comprehensive information. Data collection in the second semester of the TWU CSSP program, included number of hours of supplemental lessons and tutoring, additional survey questions, and number of hours of tutoring in the Math & Technology Success Center (MTSC). Since more comprehensive data was collected during the spring semester, only the spring semester will be used in this study.

The course section was selected, prior to the semester, to be a control or treatment class, so students were not individually assigned to a control or treatment section. Freshmen, followed by sophomores, were expected to be primarily enrolled in the entry-level mathematics course; however, all student classifications, including post-bachelor and master's students, were enrolled. The inclusion of students who have earned a bachelor's degree could skew the results since these students have already achieved academic success. In addition, data shows that the majority of students who abandon their academic studies are freshmen; therefore, an increase of student retention for post-bachelor and master's students does not apply to increasing undergraduate success. Therefore, all master and post-bachelor students enrolled in the studied courses were removed for this analysis.

Students had the option, at the beginning of the semester, to opt out of the study; and for those students, although the requirements were still mandatory, the data was not included in this study. In addition, some student may have changed course sections. Only the students enrolled on the 12th class day of the semester, and signed consent form, were tracked for this study.

Assumptions

An increase in academic success, with a final letter grade of C or better, is expected to be more prominent in the TWU CSSP treatment courses than in the traditional taught mathematics courses at Texas Woman's University. All surveys administered are assumed to be filled out by the student truthfully.

The Reason for the Study's Significance

The significance of this study is to apply selected interventions to students enrolled in a high failure or withdrawal rate mathematics course, and to evaluate if students who utilized the support increased their probability of academic success when compared to students enrolled in the same course without any modifications. If academic success was achieved, did it strengthen skills such as time management, use of study aids, and motivation to struggling students? Academic success could contribute to an increased retention rate and graduation rates for the university.

Additional support for students in a consistently high withdrawal/failure mathematics course could increase academic success and reduce the overall need for additional mathematics sections. By allocating resources to consistently high failure rate math courses, the need for additional teaching staff and classrooms could be reduced and therefore could possibly save the department significant financial and human resources. This study could, in turn, increase students' overall satisfaction with the university resulting in an increase in retention and graduation rates. In addition, the mathematics' department could use the course success as a recruiting tool to potential students.

CHAPTER II

LITERATURE REVIEW

First Year Challenges

Great Schools, as well as many other websites dedicated to academic success, stresses that organizational skills, time management, prioritization, concentration/study habits, and motivation are the five key skills needed to be successful at the university level. Many upper-level students, who have successfully graduated, report not having learned these skills until their sophomore or junior year. What could universities do to help introduce these skills to entry-level students? Feldman and Zimbler (2011) believe the solution is to provide "programs that directly instruct [freshmen] students in effective learning strategies and critical thinking skills" (p. 3). If classes were taught in "small groups and each group run by a competent, closely supervised teaching assistant... to help the student catch up" early in the semester, then they can "retain more students and channel them to graduation" (Pang, 2013).

Besides financial obstacles, The McGraw-Hill Research Foundation's "Engendering College Student Success: Improving the First Year and Beyond" suggests that poor academic preparation and study skills, mismanagement of time due to newly found freedoms, lack of organizational skills, and loneliness are some reasons for a high drop-out rate among college freshmen (Feldman and Zimbler, 2011, p. 2).

"In some cases, the student fails because they are simply not intellectually or cognitively ready for the challenges of college work" (Feldman and Zimbler, 2011, p. 2). In US News & World Report's (2012) article entitled "High School Students Not Prepared for College, Career" states that a student "deemed college-ready in a subject has a 75 percent chance of passing a first-year college course in that area," with math and sciences courses being the most difficult subjects.

Mismanagement of student's time directly impacts the amount of time spent they spend studying and preparing for classes. McCormick's (2011) study finds that study hours, for a full-time student, have declined by an average of 10 hours per week from 1961 to 2003, and that an increased percentage of the students' time is being spent either on leisure activities or working. A university's typical class consists of three credit hours, meaning that the class will meet for three hours a week in a classroom setting. McCormick (2011) suggests "that students should devote two hours of study time for every hour of class time" per week for additional coursework (p.30). Therefore, a three-credit-hour class requires three hours in the classroom and approximately six hours a week for assignments, reading, and studying. The earlier college students learn to adhere to study guidelines like this, the better their chances for academic success.

Unfortunately, "many students do not persist for reasons unrelated to academics and intellectual pursuits. In fact, some students cite a lack of social engagements with instructors or peers" and freshmen students "simply feel personally isolated and lonely" (Feldman and Zimbler, 2011, p. 2). "Most students, especially those in their first year of

college, require some form of support", to include mentoring programs and clubs that are "readily available and connected to other parts of student collegiate experience" (Tinto, n.d., p. 3).

Another study suggests that ethnicity also plays a role in student success, as "only 23 percent of African Americans, Hispanics, and Native American students tested hit the math benchmark, and fewer than 15 percent were prepared for college-level science courses" (Sheehy, 2012). Therefore, the demographics of a university with a high population of African Americans, Hispanics, and/or American Indian students would have an academic disadvantage.

Academic Success in Texas

"Certain demographic populations are at even greater risk than the general population. Students from low socioeconomic levels are less likely to return for their second year and are less likely to graduate after four years" (Feldman and Zimbler, 2011, p. 1). According to the United States Census Bureau, the State of Texas's population as of 2012 consisted of 38.2 percent Hispanic compared to a national average of 16.9 percent, and 44.5 percent of Caucasians compared to a national average of 63 percent. All other enthicities, in Texas, are on par with the national averages.

As stated previously in one study, approximately 23 percent of Hispanics graduate from high school college ready. Further studies support similar findings, The *Dallas Morning News* reported that, in 2011, one in four high school students was ready for college and nationally only "25 percent showed college readiness in all subjects" (Stutz).

In March 1999, the Texas Higher Education Coordinating Board (THECB) recognized that a "new plan should concentrate on the most critical goals" for higher education (Texas Higher Education Coordinating Board, 2008, 3). By September 1999, a contract was awarded to "perform a priority and efficiency analysis of higher education programs and services in Texas" (Texas Higher Education Coordinating Board, 2013). In October 2000, the "Closing the Gaps by 2015" plan was adopted to close educational gaps in Texas and among other states by improving student "participation, success, excellence, and research" (Texas Higher Education Coordinating Board, 2008, 3).

The THECB offers various grants to institutions to "close the gaps" among universities in Texas, including the Comprehensive Student Success Program (CSSP). In 2011, THECB announced the request for applications for the CSSP grant stating that the purpose for the CSSP grant is to "improve student success in postsecondary institutions by providing a comprehensive program of interventions that increase completion of either a diploma or certification program" emphasizing on "under-represented students groups such as African American and Hispanic or economically disadvantaged students" (Texas Highter Education Coordinating Board, 2011).

Academic Success at Texas Woman's University

According to Texas Woman's University: A Program to "Boost" Retention for First-Generation Students (BOOST), the student population of TWU includes over 90 percent females, making it one of the largest universities primarily for women and includes a "unique student populations: 40 percent of the students are minorities and 59

percent of the students are first generation" (2011, p. ii). Therefore, with a high percentage of minorities and first-generation students, Texas Woman's University students are at an academic disadvantage.

"In 2006, TWU was one of six organizations to receive a Public Benefit Grant exclusively for retention services" (Texas Guaranteed Student Loan Corporation, 2010, p. 4). The program focused on providing academic support and peer mentoring to first time generation college students. Participants were required to attend "a college study skill class," mandatory weekly tutoring hours, and advising (Texas Guaranteed Student Loan Corporation, 2010, p. 5). The results of this study found that slightly more than half of participants' GPAs improved, and all students agreed that the BOOST program "helped them achieve greater academic success", and the "most successful [students] took the most advantage of the tutoring services (Texas Guaranteed Student Loan Corporation, 2010, p. 5 & 8).

Students participants in the BOOST study, were not allowed to have jobs while taking part of the study because "working over 20 hours a week in an off-campus position is negatively associated with college persistence" (Texas Guaranteed Student Loan Corporation, 2010, p. 9). Although successful, the BOOST program is no longer available to Texas Woman's University's students; however, Texas Woman's University continues to "develop more services that promote retention and success" for all students (Texas Guaranteed Student Loan Corporation, 2010, p. 9).

As previously indicated, mathematics and science are among the two subjects students struggle with the most nationwide. The Mathematics and Computer Science Department at Texas Woman's University experiences similar results as evident by an increase for additional course sections for mathematic classes, as students are repeating courses multiple times. To remedy this growing issue, studies have been focused on by the Mathematics and Computer Science Department to find alternative ways to help struggling students. Emerson's "A Statistical Study of the Effectiveness of Four Instructional Methods and Two Curricula on Student Achievement in Developmental Mathematics at Texas Woman's University" and Kosine's "Success of Entering College Freshmen Taking Developmental Mathematics at Texas Woman's University" are two studies focused on increasing academic success by evaluating various computer software programs and teaching methods.

Emerson's (2004) study determined which instructional method "is most effective in the terms of student progress", if students completing two developmental math courses are "more prepared to pass the THEA [Texas Higher Education Assessment]", and if "instructional methods and curriculum combined have a significant relationship on student progress" (p. iv & 3). The finding of this study showed that a "computer with problem solving to be the most effective instructional method" for developmental mathematics courses (Emerson, 2004, p. iv).

Kosine's (2011) study "measures the overall success in students' performances using several different variables in developmental mathematics" at Texas Woman's

University (p. v). The study followed three instructional methods to teach developmental math: traditionally taught lecture class, a course redesign that included technology, hands-on manipulatives, and various classroom activities, and a paired course that requires a "co-enrollment in a computer literacy course and developmental mathematics, which were both taught in computer labs using software online" (Kosine, 2011, p. 3). The findings of this study supported that "students who were enrolled in the redesign or paired redesign courses produced, overall, greater mean scores than students who were enrolled in traditionally taught lecture and computer based courses" (Kosine, 2011, p. v).

In 2012, Texas Woman's University's Mathematics and Computer Science Department applied for a Comprehensive Student Success Program through the Texas Higher Education Coordinating Board to continue its efforts to improve academic success among struggling students. According to Texas Woman's University's application to the CSSP grant, the university faces "institutional-wide challenges due to increased enrollment, including high numbers of underserved and at-risk students who lack adequate preparation for successfully completing academic studies" (2012). The CSSP follows students enrolled in high failure and withdrawal rate mathematics courses, identifies those who are at risk of failure or withdrawal as detected by an early warning system, and provides them with peer mentoring, mandatory supplemental and tutoring sessions to increase the probability for academic success. The grant was awarded for the school year of 2012 – 2013 and the data collected has been evaluated in this study.

CHAPTER III

METHODOLOGY

General Perspective

The purpose of this study was to evaluate if providing additional student support for a mathematics course with consistently high withdrawal and failure percentage, would increase academic success when compared to traditionally taught mathematics courses at Texas Woman's University. In addition, the study would also determine if students who participated with peer mentoring and attended tutoring and supplemental lessons increased academic success when compared to students who did not comply with the requirements. A Likert format survey was given to all treatment participants and randomly selected control participants to measure if skills, such as time management, use of study aids, and motivation, improved for those who received peer mentoring, tutoring, and supplemental lessons.

The Comprehensive Student Success Program

The Comprehensive Student Success Program (CSSP) was awarded to TWU for the 2012-2013 school year. The goal was to increase academic success in two mathematics courses identified as a high failure and withdrawal rate courses by providing the students with peer mentoring, tutoring, and supplemental lessons taught by course assistants, who have previously, and successfully, passed the course. TWU, Department of Mathematics and Computer Science, spring of 2013, is the setting for this study.

Two introductory mathematics courses, Math 1303: College Algebra and Math 1703: Elementary Statistics, were identified as high failure and withdrawal courses and selected for the TWU CSSP grant. TWU's grant proposal reported that 66 of 172 students, or thirty-eight percent enrolled in Math 1303 either did not pass or withdrew from the course in the fall of 2010. Similarly, TWU reported that 82 out of 412 students, twenty percent, in Math 1703 failed to complete the course. For this study, control and treatment sections were selected for the each course.

The control course section was taught without any modification in teaching style or methods of instruction. The data collected from the control section include: student demographics, absences, final letter grades, and hours spent at the MTSC. This section was informed that they were taking part in the study but had no additional expectations.

In the treatment section, teaching techniques and assignments did not change; however, all students were required to attend two supplemental lessons and two tutoring sessions outside of the classroom. Students enrolled in the treatment sections were informed that the class required attending additional sessions taught by course assistants that would be tracked and account for a portion of their grade, approximately 10 percent. Data from the treatment section included the following: student demographics, absences, final letter grades, hours spent with the course assistant for tutoring and supplemental lessons, and hours spent in MTSC.

In addition, all students enrolled in the treatment section and some randomly selected students enrolled in the control sections were required to take a Learning and

Study Strategies Inventory (LASSI) survey, to evaluate personal study skills, the students' attitude about education, and self-regulation abilities at the beginning and end of the semester. An increase in scores, from the beginning of the semester to the end of the semester, indicates if a student improved in areas over the course of the semester. With additional support provided in the treatment sections, survey scores are expected to increase by the end of the semester.

The TWU CSSP's participants consisted of all students, excepted opted outs and others excluded, enrolled in Math 1303 and Math 1703 in the spring of 2013. The control are designated Math 1303C and Math 1703C, and the treatment classes are Math 1303T and Math 1703T. All participants are undergraduate students, 18 and over, who signed a consent form for their data to be used in this study.

Data Collection

Data collection included absences, hours spent in the MTSC, final letter grades, and student demographics for all sections in the study, in addition to tutoring hours and supplemental hours provided by the course assistants in the treatment sections. Since the purpose of this study is to measure academic success, letter grades of A, B, and C are defined as success while letter grades of D, F, W, and WF are defined as failure.

All weekly tutoring and supplemental lesson tracking sheets were collected from each course assistant. Each tracking sheet was compiled onto one master list that tracked all visits and number of hours each student attended for tutoring and supplemental lessons. Student absences were provided by the instructor, for each course section in the

study, and tabulated for the TWU CSSP. Students were required to log in and out of the MTSC each time they visited the tutoring center. Weekly reports were submitted to the TWU CSSP and the total number of visits and time (in hours) were tabulated. The LASSI surveys, administered on-line by TWU through H&H Publishing, consisted of 80 questions measured by the Likert response scale to measure 10 scales that focused on students' skills, determination, and self-regulation aspects of strategic learning.

Additional Data Sources

For comparison purposes, data from the spring semesters of 2011, 2012, and 2013, compiled from TWU's Institutional Research and Data Management, were provided for all course sections for both classes being studied. No night time or dual credit courses were used because the demographics of these students typically differs significantly from the students enrolled in on-campus classes held during the day. The additional three year data includes: course name, section, final letter grade, year taken, and student demographics. As previously mentioned, all post-bachelor and master students were removed from this additional data. Letter grades of A, B, and C are defined as success and letter grades of D, F, W, and WF are defined as failure.

Data Analysis

This study is will answer four main research questions. Unless otherwise stated, the courses were analyzed individually since the subject matter in each course is different.

Research Question One

Will students enrolled in the treatment sections will have higher success rates than students enrolled in the control sections? Academic success has only two outcomes, students will either succeed or not, therefore a cross tabulation, Chi-Square test, and odds ratio will determine if there is a greater probability of achieving success in the treatment sections. For this analysis, the treatment sections for the TWU CSSP program were compared to all other sections from spring semesters of 2011, 2012, and 2013.

Research Question Two

Will students enrolled in the treatment section, who attend supplemental instruction and tutoring will be more successful than students who do not attend supplemental lessons and tutoring within that section? A cross tabulation, Chi-Square test, Fisher's Exact test, and odds ratio will determine if there is a greater chance of achieving success among students who completed the interventions when compared to non-complying students in the treatment section.

Research Question Three

Will students enrolled in the treatment section, who attend supplemental lessons and tutoring will be more successful than students in the control sections, where the additional intervention are not in place? Since academic success has only two outcomes, a cross tabulation, Chi-Square test, Fisher's Exact test, and odds ratio will determine if there is a greater chance of achieving success among students who completed the minimum interventions, two supplemental lessons and two tutoring sessions, when

compared to a traditionally taught course with no required interventions. For this analysis, complying students in the treatment section will be compared to the control section, identified in the TWU CSSP program.

Research Question Four

Will skills, such as time management, use of study aids, and motivation, increase with students enrolled in the treatment section as a result of peer mentoring, supplemental lessons, and tutoring requirements? For this analysis, the difference in LASSI scores will be measured by the end of the semester minus the scores at the beginning of the semester. The Univariate Analysis of Variance model was used to determine if the difference in LASSI means for dependent variables such as time management, use of study aids, and motivation, are the result of independent variables, such as which section students are enrolled in and whether academic success was achieved. The Univariate Model will also be used to analyze which classification benefited the most with treatment when compared to the control sections. For these analyses, the combined treatment sections will be compared to the combined control sections.

Statistical Package for Social Science, SPSS v. 19, is the statistical software package that was used to analyze all the data collected from this study.

CHAPTER IV

RESULTS

The purpose of this study was to determine if academic success would increase if interventions were made mandatory in two high failure, or withdrawal, rate mathematics courses. Two sections for each course were selected. The control section was a traditionally taught class and the treatment section implemented additional tutoring, supplemental lessons, and peer mentoring by a course assistant, outside of the classroom. In addition, data from sections from previous spring semesters were used to compare to the treatment section.

Treatment versus Three Year Data

Math 1303 had two sections per spring semester. Each section appeared normally distributed, so all data was kept for this analysis. There were 314 students enrolled, in Math 1303, in the spring semesters of 2011, 2012, and 2013. Table 1 shows that the treatment section, consisting of 54 students, had a 74.1% passing rate while all other sections, consisting of 260 students, had a passing rate of 64.6%.

Table 1

Success Rate for Math 1303

			Success		
			Fail	Pass	Total
Section	Control	Count	92	168	260
		% within Section	35.4%	64.6%	100.0%
	Treatment	Count	14	40	54
		% within Section	25.9%	74.1%	100.0%
Total		Count	106	208	314
		% within Section	33.8%	66.2%	100.0%

Using Pearson's Chi-Square test, the probability of having a higher success rate in the treatment group, based on the results in Table 1, is 0.181. The standard significance of 0.05 or less means that there is a significant difference between treatment and the other sections. Therefore, for Math 1303, the treatment section failed to show a significant chance of passing when compared to other sections within the last three years. This is confirmed when looking at the odds ratio. The 95% confidence interval for the odds of failure and passing include a value of 1, which indicates that the odds are the same for passing and failing.

Math 1703 had a total of 22 sections in the spring semesters of 2011, 2012, and 2013. There were 1045 students enrolled in Math 1703 during the springs of 2011, 2012, and 2013. As indicated on Table 2, the treatment section, consisting of 46 students, had a passing rate of 71.7% while all other sections, consisting of 999 students, had a passing rate of 65.5%.

Table 2

Success Rate for Math 1703

			Success		
			Fail	Pass	Total
Section	Control	Count	345	654	999
		% within Section	34.5%	65.5%	100.0%
	Treatment	Count	13	33	46
		% within Section	28.3%	71.7%	100.0%
Total		Count	358	687	1045
		% within Section	34.3%	65.7%	100.0%

Using Pearson's Chi-Square test, the probability of having a difference between the two groups is 0.381. There is no significance between the treatment and control course success rates. This is confirmed again with the odds ratio 95% interval, the value of 1 is included within the interval.

Tutoring versus No Tutoring in Treatment Section

When students comply with requirements, does the probability of passing increase? For Math 1303, the treatment group consisted of 54 students, of which 12 did not complete the requirements and 42 students did, as indicated on Table 3.

Table 3

Math 1303 Students within Treatment Section

			Success		Total
			Failure	Pass	
Tutoring	No Tutoring or Not Complete	Count	8	4	12
		% within Tutoring	66.7%	33.3%	100.0%
	Tutoring & 2 Supplemental lessons	Count	6	36	42
		% within Tutoring	14.3%	85.7%	100.0%
Total		Count	14	40	54
		% within Tutoring	25.9%	74.1%	100.0%

When students complied with course requirements, in the treatment group, 85.7% of students passed as compared to 33.3% of those who did not complete the mandatory tutoring, supplemental lessons, and peer mentoring. However, there was one cell that did not meet the minimum requirement of having 5 counts; therefore, the Fisher Exact test should be considered instead of the Pearson Chi-Square test. The results show that there is a significant difference between those who completed tutoring and those who did not complete tutoring with a p-value of 0.001. The odds ratio shows that the odds of failure when requirements are not completed is nearly 5 times greater when compared to students who complete course requirements.

Students were not as cooperative with attending supplemental instructions in Math 1703; in fact, 42 out of 44 students in the treatment section did not attend any supplemental lessons. Therefore, for this analysis, students who attended at least three

hours of tutoring, were considered as meeting the requirements. Table 4 indicates that only 11 students attend at least 3 hours of tutoring, so results were not significant.

Table 4

Math 1703 Students within Treatment Section

			Success		
			Fail	Pass	Total
Tutoring	Did not meet minimum requirements	Count	10	23	33
		% within Tutoring	30.3%	69.7%	100.0%
	Attended at least 3 hours of tutoring	Count	2	9	11
		% within Tutoring	18.2%	81.8%	100.0%
Total		Count	12	32	44
		% within Tutoring	27.3%	72.7%	100.0%

The Fisher Exact test shows that there is no significance, p-value of 0.698, between success rates between those students that did and did not attend at least three hours of tutoring with a course assistant. The odds ratio also confirms that the odds of success are not greater when students attended at least three hours of tutoring.

Students Adhering to Treatment versus Control Section

When students who complied with course requirements in the treatment section are compared with the treatment section, would the probability of success increase? In this analysis, the complying students are compared to the students in the control section. For Math 1303, Table 5 shows that 85.7 % of students who completed requirements achieved academic success in the treatment group when compared to the control section which obtained a 72.2% rate of passing when no requirements were imposed.

Table 5

Math 1303 Control versus Students that Complied in Treatment Section

			Success		
			Failure	Pass	Total
Tutoring	Control Section	Count	10	26	36
		% within Tutoring	27.8%	72.2%	100.0%
	Treatment: Completed Tutoring & 2 Supplemental Lessons	Count	6	36	42
		% within Tutoring	14.3%	85.7%	100.0%
Total		Count	16	62	78
		% within Tutoring	20.5%	79.5%	100.0%

With a 0.141 significance, the Pearson Chi-Square test indicates that students who complete tutoring and supplemental lessons have a higher probability, but not significance, of passing in the treatment section as compared to the control section. The odds ratio finds that students in the control section have nearly twice the odds of not succeeding than succeeding, when compared to the students who complied in the treatment section.

In Math 1703, when comparing those students who attended at least three hours of tutoring with a course assistant to the control section, as displayed in Table 6, there appears to be a 16% greater chance of passing in the treatment section.

Table 6

Math 1703 Control versus Students that Complied in Treatment Section

			Success		
			Fail	Pass	Total
Section	Control	Count	13	25	38
		% within Section	34.2%	65.8%	100.0%
	Treatment: At least 3 hours of tutoring	Count	2	9	11
		% within Section	18.2%	81.8%	100.0%
Total		Count	15	34	49
		% within Section	30.6%	69.4%	100.0%

However, the Fisher Exact test shows a 0.464 significance that there is no difference between the control and students who completed at least three hours of tutoring in the treatment group. In this case, the odds ratio indicates that there is no difference between the groups.

Learning and Study Strategies Inventory

Does supplemental lessons, tutoring, and peer mentoring, increase a student's time management skills, use of study aids, or motivation? The Univariate Analysis of Variance model is used to analyze the effects of whether treatment resulted in higher LASSI scores. Table 7 shows the breakdown of students who completed LASSI and their success in the courses that they were enrolled in.

Table 7

Students who Completed LASSI

			Success		Total
			Fail	Pass	
Section	Control	Count	4	18	22
		% within Section	18.2%	81.8%	100.0%
	Treatment	Count	9	60	69
		% within Section	13.0%	87.0%	100.0%
Total		Count	13	78	91
		% within Section	14.3%	85.7%	100.0%

Time Management Skills

Did treatment improve skills for those students based on success? Table 8, Time Management Skills and Success, shows that there was no significance between sections, success, or the combination of selection and success to improve time management skills. Figure 1 shows that although there is no significant difference in time management skills for students enrolled in either section, students who achieved success had greater improvement in time management skills over all other students in this study.

Table 8

Time Management Skills and Success

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Section	100.185	1	100.185	.199	.657
Success	209.245	1	209.245	.415	.521
Section * Success	668.668	1	668.668	1.325	.253
Error	43901.656	87	504.617		
Total	45466.000	91			

Note: Dependent Variable is Difference in Time Management Skills a R^2 = .034 (Adjusted R^2 = .001)

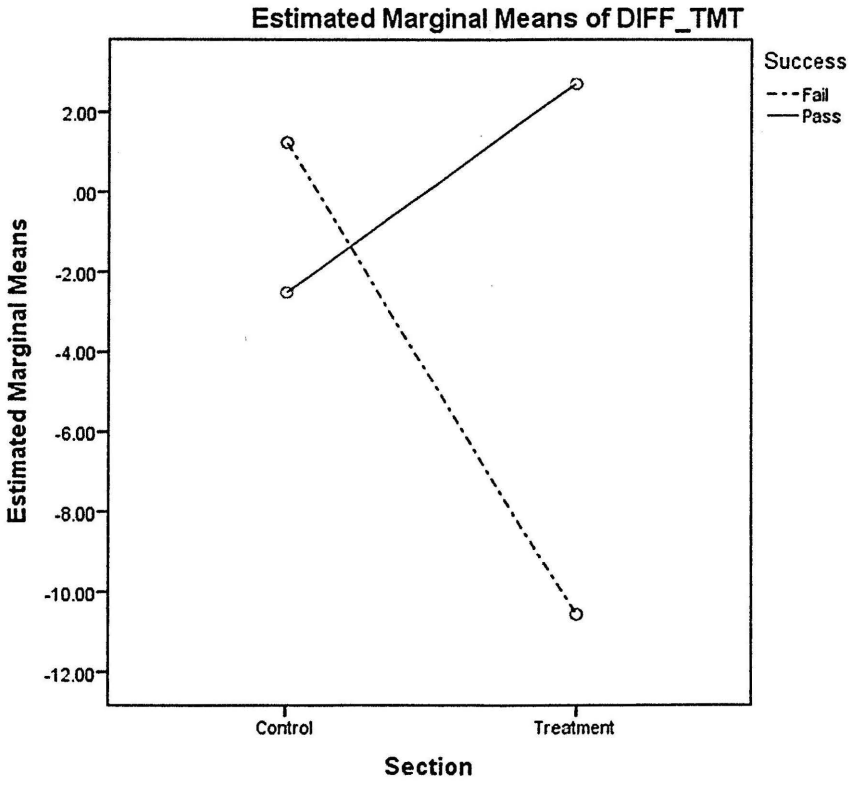

Figure 1. Time management skills mean differences between course sections

Use of Study Aids

Did treatment improve skills for those student based on success? According to Table 9, there was no significance between the two sections, success, or the combination of section and success. Figure 2 shows that although there is no significance between section and success, that students in the treatment section had greater use of study aids by the end of the semester.

Table 9

Use of Study Aids and Success

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Section	.060	1	.060	.000	.993
Success	1011.778	1	1011.778	1.279	.261
Section * Success	44.339	1	44.339	.056	.813
Error	68829.350	87	791.142		
Total	71426.000	91			

Note: Dependent Variable is Difference in Use of Study Aids. a. R^2 =.022 (Adjusted R^2 = -.012)

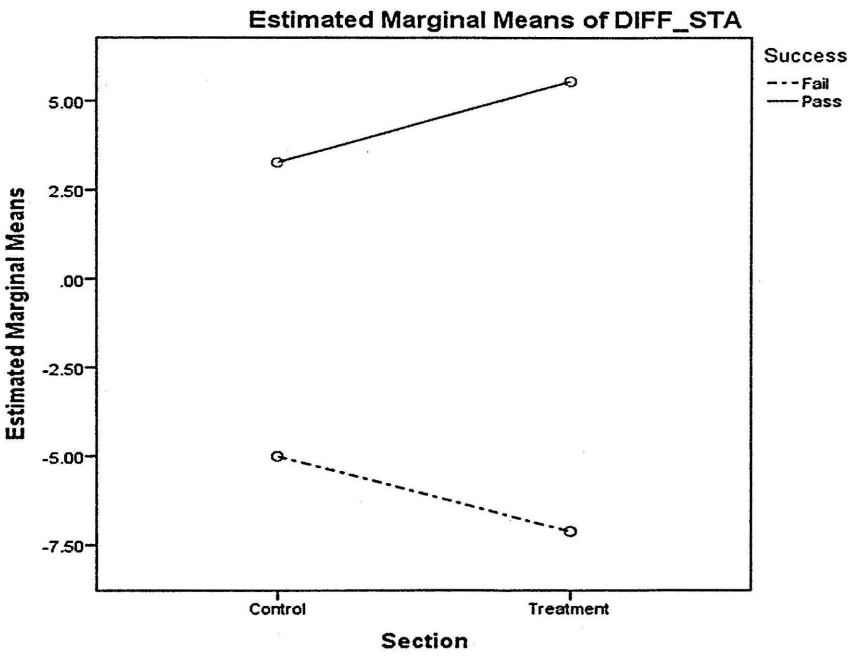

Figure 2. Use of study aids mean differences between course sections

Motivation

Does receiving supplemental lessons, tutoring, and peer mentoring based on success improve motivation? Table 10, Motivation and Success, shows that there are significance differences among motivation when a student succeeds in a course. Although it's not significant, there appears to be a difference between motivation based on section enrolled and success. Figure 3, Motivation Mean Differences between Course Sections, shows that motivation in the treatment section is consistent for students regardless of success when compared to the control section.

Table 10

Motivation and Success

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Section	918.467	1	918.467	1.253	.266
Success	2505.467	1	2505.467	3.418	.068
Section * Success	1751.544	1	1751.544	2.390	.126
Error	63763.850	87	732.918		
Total	67653.000	91			

Note: Dependent Variable is Difference in Motivation a. $R^2 = .046$ (Adjusted $R^2 = .013$)

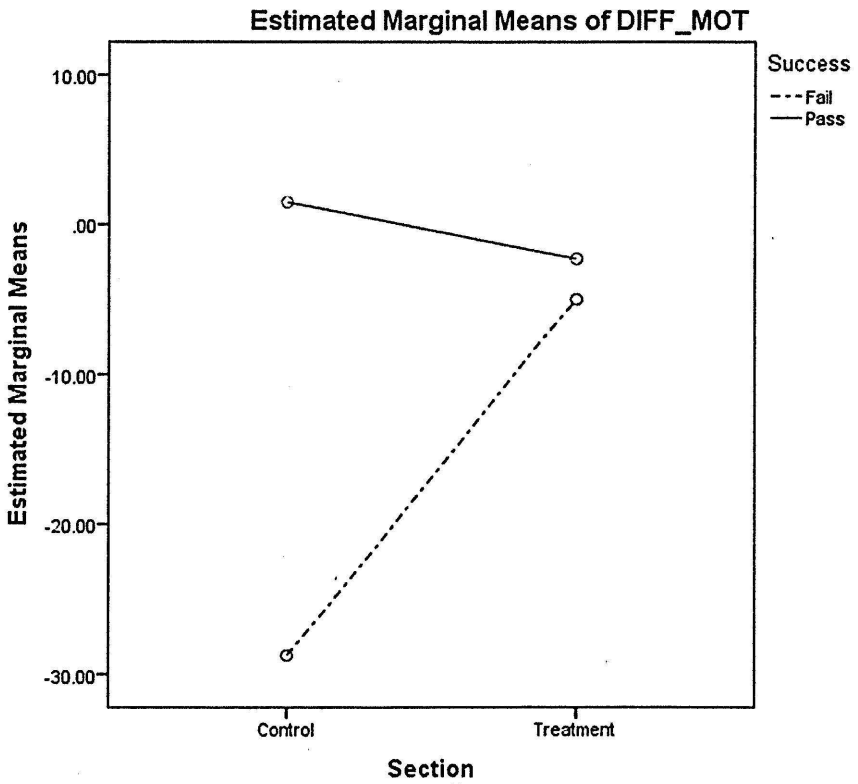

Figure 3. Motivation mean differences between course sections

Classification

How did treatment affect the results based on classification when compared to the control course? By providing peer mentoring, supplemental lessons, and tutoring in an entry-level mathematics course, improvements in success, time management skills, use of study aids, and motivation for lower level classmen are expected.

Treatment versus Three Year Data

For Math 1303, data indicates that juniors had greater academic success in the treatment section than the control sections (see Appendix D). According to the Fisher Exact test shows that the difference in success among juniors is significant at the 0.179 significance level due to interventions such as supplemental lessons, tutoring, and peer mentoring. The odds ratio indicates that juniors were 2.4 times more likely to fail the course when enrolled in the control sections.

For Math 1703, the greatest improvement of academic success was for the juniors in the treatment section when compared to the control section. Results show that juniors had the greater academic success in the control section at a 0.180 significance level (see Appendix E). However, the odds ratio indicates that there is significance between the sections. Juniors were 3.5 times more likely to fail the course when enrolled in the sections without interventions such as supplemental lessons, tutoring, and peer mentoring.

Learning and Study Strategies Inventory

Did providing peer mentoring, supplemental lessons, and tutoring improve students' time management skills, use of study aids, or motivation based on classification? Using the TWU CSSP data, Table 11 shows the breakdown of student classification enrolled in the study's sections.

Table 11

Classification in Course Section

			Section		
			Control	Treatment	Total
Classification	FR	Count	10	28	38
		% within Section	45.5%	40.6%	41.8%
	SO	Count	8	22	30
		% within Section	36.4%	31.9%	33.0%
	JR	Count	3	15	18
		% within Section	13.6%	21.7%	19.8%
	SR	Count	1	4	5
		% within Section	4.5%	5.8%	5.5%
Total		Count	22	69	91
		% within Section	100.0%	100.0%	100.0%

Time management skills. Does receiving additional support and student classification predict improved time management skills by the end of the semester when compared to the beginning of the semester? Table 12, Time Management Skills and Classification, shows that there is no significance based on the treatment received, classification or combination of treatment and classification. Although there are no

significant differences in time management skills among the section students were enrolled, Figure 4 shows that juniors benefited the most from treatment.

Table 12

Time Management Skills and Classification

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Section	177.701	1	177.701	.361	.550
Classification	2349.544	3	783.181	1.589	.198
Section * Classification	2086.649	3	695.550	1.411	.245
Error	40907.968	83	492.867		
Total	45466.000	91			

Note: Dependent Variable is Difference in TMT. a. R^2 =.100 (Adjusted R^2 =.024). b. Using alpha =.05.

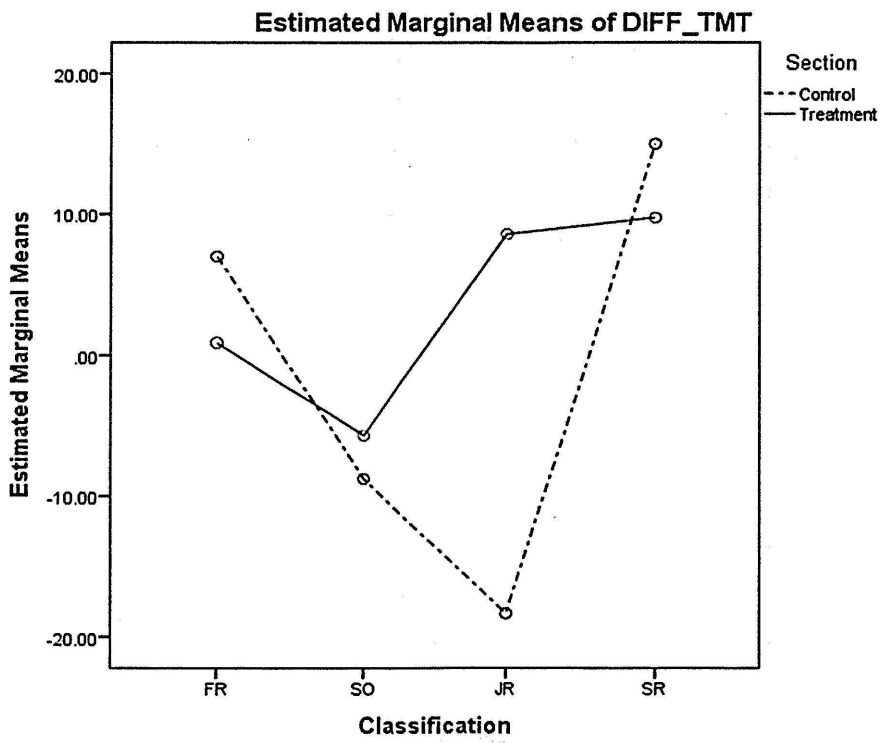

Figure 4. Time management skills mean differences between classifications

Use of study aids. Does receiving treatment and student classification predict improved use of study aids by the end of the semester when compared to the beginning of the semester? Table 13, Use of Study Aids and Classification, shows that there is no significance upon the treatment received, classification or combination of treatment and classification. Figure 5 shows that student uses of study aids were more consistent among the treatment section.

Table 13

Use of Study Aids and Classification

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Section	21.577	1	21.577	.027	.871
Classification	2844.574	3	948.191	1.167	.327
Section * Classification	944.632	3	314.877	.387	.762
Error	67445.130	83	812.592		
Total	71426.000	91			

Note: Dependent Variable is Difference in Use of Study Aids a. $R^2 = .042$ (Adjusted $R^2 = -.039$)

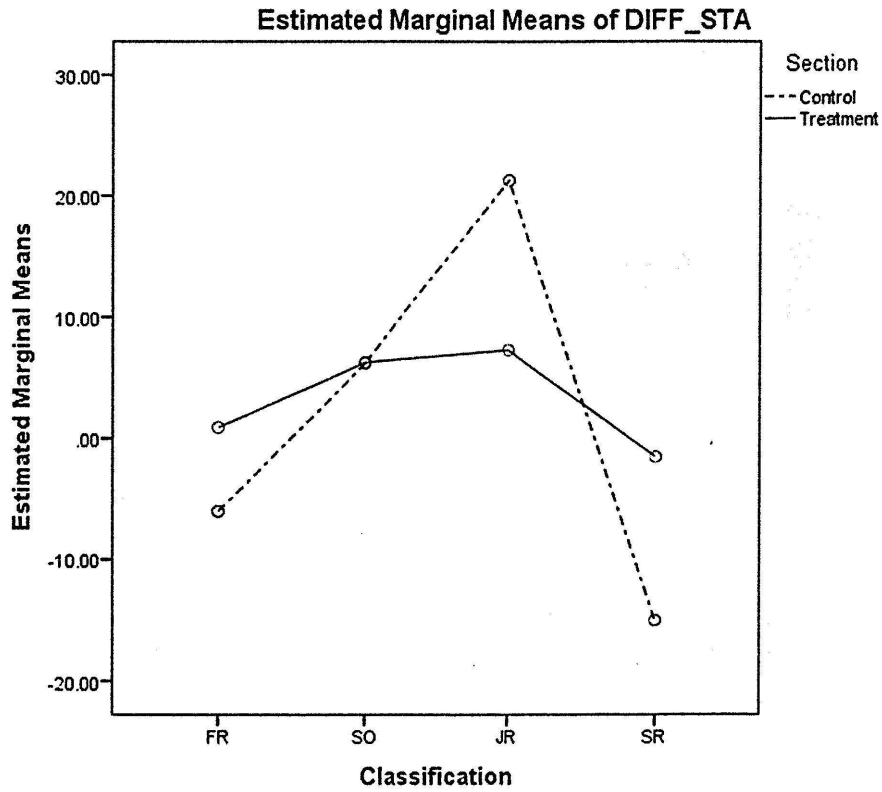

Figure 5. Use of study aids mean differences and classifications

Motivation. Do students who receive supplemental lessons, tutoring, and peer mentoring have a significance difference in motivation among classifications? According to Table 14, there is a significant difference between control and treatment levels, regardless of classification. Figure 6 shows that motivation remained stable between classifications in the treatment section.

Table 14

Motivation and Classification

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Section	43.476	1	43.476	.056	.814
Classification	1540.924	3	513.641	.658	.580
Section * Classification	1059.534	3	353.178	.452	.716
Error	64829.355	83	781.077		
Total	67653.000	91			

Note: Dependent Variable is Difference in Motivation a. $R^2 = .030$ (Adjusted $R^2 = -.052$)

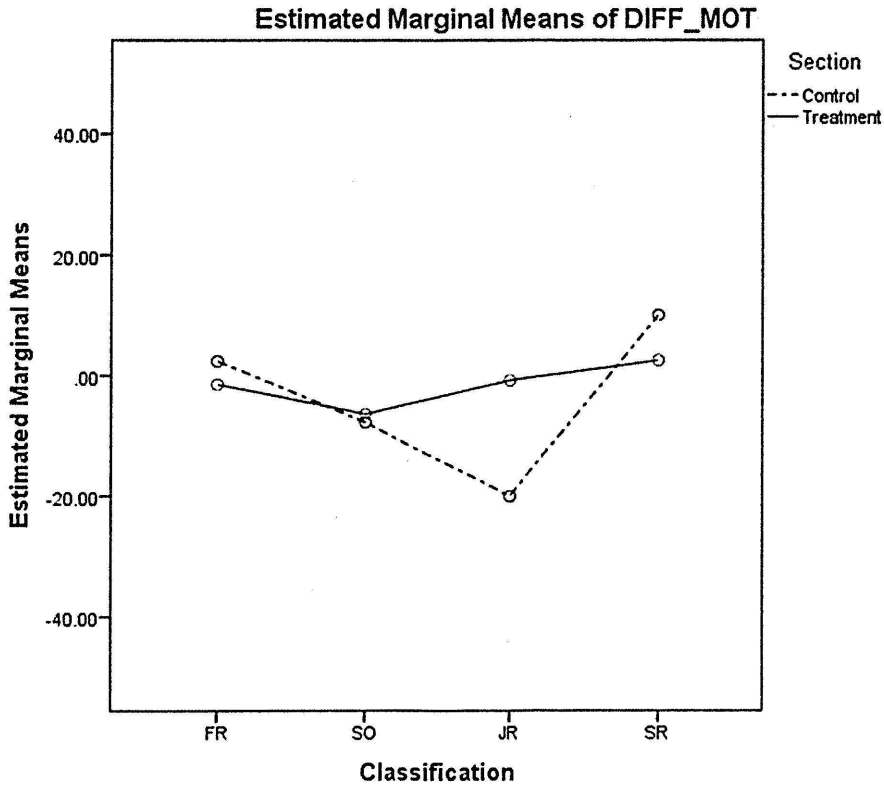

Figure 6. Motivation mean differences and classifications

CHAPTER V

DISCUSSION

The purpose of this study was to determine and evaluate whether the introduction of mandatory supplemental lessons, tutoring, and peer mentoring to high failure or withdrawal rate entry-level mathematics courses increases the success rate among students or improves skills such as time management, use of study aids, or motivation.

Although no significant differences in success rates were found between students who participated in the treatment section and those taking traditionally taught mathematics courses, there was improvement in success when comparing those in the treatment group who completed tutoring to students who did not complete tutoring. In addition, student skills were positively affected by the additional interventions provided, of which juniors benefitted the most.

Summary of Study's Findings

By Treatment

Although the results suggest that there were no significant findings that the treatment sections were more successful than the control sections, the students enrolled in the treatment sections performed better than those in the control sections. There was a 10 percent increase in success for the Math 1303 treatment section, in which students attended both supplemental lessons and tutoring, compared to a six percent increase in success for Math 1703, where students only attended tutoring. These findings should not

be overlooked because the significance was not less than the 0.05 level. Considering that this program was in the second semester of the study, a significance of 0.181 for the implementation of supplemental lessons and tutoring, compared to a significance of 0.381 for tutoring only, suggests that improvements were achieved and that perhaps there is more room for improvement and training of course assistants for future courses, leading to greater significance.

Results indicate that students in Math 1303 who completed supplemental lessons and tutoring had significant result differences in success compared to those students who did not complete the interventions. Students in Math 1703 did not have similar results, as there was no significance in success between control and treatment sections. However, these differences could be a result of students not attending supplemental lessons in Math 1703. Regardless of supplemental lessons, results indicate that students who attended only tutoring sessions had a 12 percent increase in success when compared to those students who did not complete the minimum tutoring sessions in Math 1703.

The results of this test suggest that supplemental lessons may provide more benefits when combined with tutoring, than with tutoring alone. The introduction of material provided by a course assistant, in a different teaching style, may help students who did not comprehend the lesson when introduced originally by the instructor.

Students who took advantage of tutoring and supplemental lessons had a 16 percent increase in success when compared to those students who were not offered additional support by course assistants. For those students who took advantage of

tutoring only, they had a 13 percent increase in success when compared to those students not offered support by course assistants. Although the increase in success was found not to be significant, improvements are apparent and should not be overlooked.

Effects on Academic Skills

Students in the control sections, regardless of success, had similar results in changes in time management skills from the beginning to the end of the semester. The treatment section had the greatest mean spread of time management skills between the students who succeeded and those who did not. Students enrolled in the treatment section that passed the course had the greatest increase in time management skills over all other students; those students that failed in the treatment section had the poorest results. A possible explanation for the difference in spread in the treatment section could be that the students at risk of failing who passed the course improved their time management skills when compared to those students who did not succeed.

The use of study aids is a helpful tool for student success. Results show that students who pass, regardless of section, used study aids more throughout the semester than those students who failed. Like the time management results, the use of study aids in the treatment sections had a wider mean spread than those students enrolled in the control section. The students who passed in the treatment had the best performance in use of study aids over all other students; and the students who failed, in the treatment section, decreased the use of study aids throughout the semester. The results of this study were expected. Students who do not succeed do not tend to use study aids to help them

in successfully passing a course. However, when students are provided additional study aids, such as course assistants, and utilize them, then the use of study aids will increase throughout the semester.

Student motivation is the difference between a student's effort to keep trying or just giving up. Students who succeeded in the course, regardless of the section, maintained a similar motivation level throughout the semester. The difference in motivation was apparent in those students who did not succeed. The students enrolled in the control section experienced a greater loss in motivation by the end of the semester, while those enrolled in the treatment section had motivation levels comparable to the students who successfully completed their courses. This study suggests that additional support and peer mentoring provide those students at risk of failure a higher level of motivation when compared to students who are not provided the additional support.

By Classification

Lower-level classifications, freshmen and sophomores, made up approximately 70 percent of the courses' population while the remaining 30 percent came from juniors, at 22 percent, and seniors, at 8 percent. Although efforts were geared toward lower-level classmen, juniors enrolled in Math 1303 had a significant higher success rates at the 0.18 level; all other classifications in the treatment section had a higher success percentage than the control sections. Upper-level classmen enrolled in Math 1703, although not significant, also had the greatest improvement in the treatment section compared to the control section. Although not significant, sophomores in the control section of Math

1703 were the only classification that outperformed the treatment section. Since only tutoring was offered in Math 1703, results did not match results in Math 1303, and further tests should be performed.

Juniors, enrolled in the treatment section, had the greatest improvement in time management skills, utilization of study skills, and motivation. For time management, all other classifications were comparable to each other regardless of section enrolled. The use of study aids varied in the control sections among the classifications; however, in the treatment section, study aids were utilized on a more consistent basis. Motivation, regardless of success, was similar among all other classifications regardless of section enrolled.

Conclusion

Although the results from this study vary between courses, it is apparent that students who utilized additional support will have greater success and that those students who succeed will have increased academic skills such as time management and use of study aids. For all students, regardless of success, motivation will increase if additional support is provided. Even though the targeted lower-level classifications did not significantly increase their success, the interventions did provide results that should be tested further.

Future Research

Although there was significant result in success for the treatment section in Math 1303 but no significance in Math 1703, additional studies should be conducted. While in

Math 1303, the students utilized the course assistants for both supplemental lessons and tutoring sessions, in Math 1703, the students requested and attended only tutoring sessions. As a result, the outcome was not the same for both courses, and further testing should be done to determine if supplemental lessons play a larger factor than tutoring alone. In addition, the variable of instructor should also be considered and evaluated. For Math 1703, the control and treatment sections were taught by the same instructor, while in Math 1303, two different instructors taught the course.

In the summer of 2013, the TWU CSSP grant was renewed and expanded for the 2013-2014 school year. Further studies could include an additional year of data for Math 1303, Math 1703, chemistry, and a new course, microbiology.

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APPENDIX A

IRB Approval Letter

TWU
TEXAS WOMAN'S UNIVERSITY
DENTON DALLAS HOUSTON

Institutional Review Board
Office of Research and Sponsored Programs
P.O. Box 425619, Denton, TX 76204-5619
940-898-3378 FAX 940-898-4416
e-mail: IRB@twu.edu

July 1, 2013

Ms. Christina Acosta

Dear Ms. Acosta:

Re: Making the Grade: A Study of Academic Success (Protocol #: 17389)

The above referenced study has been reviewed by the TWU Institutional Review Board (IRB) and was determined to be exempt from further review.

If applicable, agency approval letters must be submitted to the IRB upon receipt PRIOR to any data collection at that agency. Because a signed consent form is not required for exempt studies, the filing of signatures of participants with the TWU IRB is not necessary.

Any modifications to this study must be submitted for review to the IRB using the Modification Request Form. Additionally, the IRB must be notified immediately of any unanticipated incidents. If you have any questions, please contact the TWU IRB.

Sincerely,

Vicki Zeigler

Dr. Vicki Zeigler, Co-Chair
Institutional Review Board - Denton

cc. Dr. Don Edwards, Department of Mathematics & Computer Science
Graduate School

APPENDIX B

TWU Three Year Data

DATA KEY

Term	
11/SP	Spring 2011
12/SP	Spring 2012
13/SP	Spring 2013

Gender	
F	Female
M	Male

Classification	
FR	Freshman
SO	Sophomore
JR	Junior
SR	Senior

Ethnicity	
AI/AN	American Indian or Alaska Native
AS/PI	Asian
BL	Black
HIS	Hispanic
FOR	Foreign or International
WH	White
UNK	Unknown

STUDENT	COURSE	SEC	GRADE	TERM	GENDER	AGE	CLASS	Ethnicity
3638819	MATH*1303	C	A	11/SP	F	20	FR	WH
3664742	MATH*1303	C	B	11/SP	F	19	FR	AS/PI
3678299	MATH*1303	C	C	11/SP	F	18	FR	BL
3681662	MATH*1303	C	F	11/SP	F	18	FR	HIS
3691674	MATH*1303	C	C	11/SP	F	19	FR	BL
3692047	MATH*1303	C	A	11/SP	F	19	FR	WH
3696224	MATH*1303	C	B	11/SP	F	19	FR	HIS
3696350	MATH*1303	C	F	11/SP	F	19	FR	HIS
3698962	MATH*1303	C	F	11/SP	F	19	FR	HIS
3704632	MATH*1303	C	D	11/SP	M	18	FR	HIS
3712684	MATH*1303	C	C	11/SP	F	19	FR	WH
3713221	MATH*1303	C	D	11/SP	F	19	FR	HIS
3715785	MATH*1303	C	F	11/SP	F	18	FR	HIS
3715929	MATH*1303	C	F	11/SP	F	19	FR	HIS
3716194	MATH*1303	C	F	11/SP	F	19	FR	HIS
3725463	MATH*1303	C	W	11/SP	F	18	FR	WH
3731740	MATH*1303	C	C	11/SP	F	20	FR	HIS
3740310	MATH*1303	C	B	11/SP	F	19	FR	HIS
3666258	MATH*1703	C	A	11/SP	F	31	FR	HIS
3676584	MATH*1703	C	A	11/SP	F	19	FR	HIS
3677023	MATH*1703	C	A	11/SP	F	19	FR	BL
3680106	MATH*1703	C	C	11/SP	F	20	FR	WH
3689931	MATH*1703	C	B	11/SP	F	19	FR	HIS
3696625	MATH*1703	C	D	11/SP	F	19	FR	BL
3697418	MATH*1703	C	A	11/SP	F	19	FR	WH
3699070	MATH*1703	C	A	11/SP	F	19	FR	WH
3699658	MATH*1703	C	A	11/SP	F	18	FR	WH
3699957	MATH*1703	C	A	11/SP	F	19	FR	WH
3700060	MATH*1703	C	A	11/SP	F	18	FR	FOR
3703829	MATH*1703	C	B	11/SP	F	19	FR	BL
3705357	MATH*1703	C	A	11/SP	F	19	FR	WH
3705481	MATH*1703	C	A	11/SP	F	18	FR	AS/PI
3705793	MATH*1703	C	B	11/SP	F	19	FR	WH
3707315	MATH*1703	C	A	11/SP	F	19	FR	HIS

APPENDIX C

Comprehensive Student Success Program Data

DATA KEY

LASSI	Learning and Study Strategies Inventory
MOT	Motivation
STA	Study Aids
TMT	Time Management

Gender	
F	Female
M	Male

Classification	
FR	Freshman
SO	Sophomore
JR	Junior
SR	Senior

Ethnicity	
AI/AN	American Indian or Alaska Native
AS/PI	Asian
BL	Black
HIS	Hispanic
FOR	Foreign or International
WH	White
UNK	Unknown

Spring 2013				BY COURSE ASSISTANTS						PRE LASSI			POST LASSI			DEMOGRAPHICS		
Student ID	Math Course	Sec	Final Grade	# of SI	Hours of SI	# of Tutoring sessions	Hours of Tutoring	Total # of SI and Tutoring	Total hours of SI and Tutoring	MOT	STA	TMT	MOT	STA	TMT	Class	GENDER	ETHNICITY
1000	1303	T	B	4	4	0	0	4	4	45	5	40	20	20	5	FR	F	HIS
1010	1303	T	F	0	0	0	0	0	0							FR	F	BL
1013	1303	T	B	4	4.5	0	0	4	4.5	30	55	25	45	55	55	FR	F	WH
1018	1303	T	B	3	3	0	0	3	3	25	20	10	5	25	5	FR	F	HIS
1020	1303	T	B	5	5.5	0	0	5	5.5	99	80	90	80	65	85	FR	F	BL
1023	1303	T	C	4	6	1	1	5	7	35	65	15	30	90	40	FR	F	WH
1026	1303	T	A	4	4	0	0	4	4	99	10	10	90	45	1	FR	F	HIS
1041	1303	T	B	1	1	0	0	1	1	99	90	75	70	65	20	FR	F	HIS
1042	1303	T	C	9	9	0	0	9	9	95	75	40	90	20	5	FR	F	BL
1047	1303	T	B	4	5.75	1	0.25	5	6							FR	M	WH
1070	1303	T	A	4	4	0	0	4	4	60	20	30	50	30	35	FR	F	WH
1076	1303	T	A	3	3.25	0	0	3	3.25							FR	M	BL
1087	1303	T	D	2	2	0	0	2	2	70	85	80	65	80	70	FR	F	BL
1094	1303	T	A	3	3	0	0	3	3	90	40	70	95	55	85	FR	F	HIS
1096	1303	T	C	13	12.75	0	0	13	12.75	10	30	45	80	65	70	FR	F	UNK
1100	1303	T	C	10	12	0	0	10	12	20	25	35	25	55	45	FR	F	HIS
1101	1303	T	A	3	3	0	0	3	3	70	20	55	90	1	60	FR	F	WH
1121	1303	T	B	5	4.75	0	0	5	4.75	10	1	1	80	55	15	FR	F	WH
1124	1303	T	D	10	10	0	0	10	10	10	20	25	10	40	45	FR	F	AI/AN
1127	1303	T	D	6	11	2	2	8	13	85	80	85	35	55	75	FR	F	AS/PI
1141	1303	T	B	3	3	0	0	3	3	65	55	65	99	65	75	FR	F	WH
1157	1303	T	C	4	4	0	0	4	4	60	15	30	50	55	40	FR	F	WH
1158	1303	T	F	1	1	0	0	1	1							FR	F	BL
1166	1303	T	C	2	2	0	0	2	2	85	75	10	35	30	35	FR	F	WH
1173	1303	T	D	12	11.75	0	0	12	11.75	95	99	85	85	95	70	FR	F	BL
1021	1303	T	A	3	3	0	0	3	3	25	10	35	10	10	30	JR	M	AI/AN
1036	1303	T	C	3	3	0	0	3	3	60	40	5	5	20	10	JR	F	HIS
1080	1303	T	B	3	3.25	0	0	3	3.25	90	60	70	70	60	70	JR	F	BL
1106	1303	T	D	3	3	0	0	3	3							JR	F	WH
1107	1303	T	B	3	3	0	0	3	3	50	65	70	99	90	99	JR	F	BL
1130	1303	T	A	3	4	0	0	3	4	70	75	85	65	80	75	JR	F	WH
1136	1303	T	A	4	4	0	0	4	4	80	80	75	65	80	65	JR	F	WH
1142	1303	T	B	3	3	0	0	3	3	60	40	60	50	55	45	JR	F	WH
1149	1303	T	C	13	16.5	0	0	13	16.5	25	5	95	65	55	95	JR	F	WH
1156	1303	T	W	2	1.75	0	0	2	1.75							JR	F	BL
1016	1303	T	C	3	2.75	0	0	3	2.75	95	45	95	60	20	85	SO	F	WH
1017	1303	T	B	4	4	0	0	4	4	95	80	80	45	75	45	SO	F	HIS
1019	1303	T	C	6	7	0		6	7	99	60	75	95	85	70	SO	F	BL
1030	1303	T	B	0	1	1	1	1	2	60	40	35	15	25	40	SO	F	UNK
1038	1303	T	W		0	0	0		0							SO	F	WH
1045	1303	T	A	3	3	0	0	3	3	99	95	95	99	95	90	SO	F	WH
1046	1303	T	C	1	1	0	0	1	1	25	20	15	30	80	35	SO	M	AS/PI
1061	1303	T	W	0	0	0	0	0	0							SO	F	HIS
1077	1303	T	A	4	4	0	0	4	4	95	65	70	50	55	85	SO	M	AS/PI
1090	1303	T	D	4	4	0	0	4	4	35	65	40	65	65	35	SO	F	WH
1099	1303	T	W	1	1	0	0	1	1							SO	F	BL
1109	1303	T	A	4	4	0	0	4	4	35	60	75	65	55	80	SO	F	AS/PI
1135	1303	T	C	4	4	0	0	4	4							SO	M	AS/PI
1143	1303	T	B	5	5	0	0	5	5	15	20	25	20	45	10	SO	F	BL
1148	1303	T	A	3	3.25	1	0.25	4	3.5	60	1	35	35	20	15	SO	F	WH
1159	1303	T	D	6	6.5	0	0	6	6.5							SO	F	WH
1175	1303	T	D	0	0	0	0	0	0	20	5	15	25	15	10	SO	F	HIS
1011	1303	T	A	3	3	0	0	3	3	85	80	55	50	85	60	SR	F	WH
1053	1303	T	B	7	7	0	0	7	7	20	55	1	35	90	25	SR	F	HIS
1003	1303	C	B	0	0	0	0	0	0	50	75	40	65	65	55	FR	F	WH
1008	1303	C	A	0	0	0	0	0	0							FR	F	BL
1025	1303	C	F	0	0	0	0	0	0	80	95	40	65	95	80	FR	F	BL
1032	1303	C	D	0	0	0	0	0	0	20	45	25	10	40	10	FR	F	BL
1049	1303	C	B	0	0	0	0	0	0							FR	F	WH
1050	1303	C	B	0	0	0	0	0	0							FR	F	AS/PI
1054	1303	C	A	0	0	0	0	0	0							FR	F	AS/PI
1056	1303	C	F	0	0	0	0	0	0							FR	F	BL
1064	1303	C	B	0	0	0	0	0	0	60	80	25	45	45	5	FR	F	AS/PI
1065	1303	C	C	0	0	0	0	0	0							FR	F	BL

APPENDIX D

Classification Results: Three Year Data for Math 1303

CLASSIFICATION				Success		Total
				Fail	Pass	
FR	Section	Control	Count	27	77	104
			% within Treatment	26.0%	74.0%	100.0%
		Treatment	Count	6	20	26
			% within Treatment	23.1%	76.9%	100.0%
SO	Section	Control	Count	32	44	76
			% within Treatment	42.1%	57.9%	100.0%
		Treatment	Count	5	9	14
			% within Treatment	35.7%	64.3%	100.0%
JR	Section	Control	Count	25	32	57
			% within Treatment	43.9%	56.1%	100.0%
		Treatment	Count	2	9	11
			% within Treatment	18.2%	81.8%	100.0%
SR	Section	Control	Count	8	15	23
			% within Treatment	34.8%	65.2%	100.0%
		Treatment	Count	1	2	3
			% within Treatment	33.3%	66.7%	100.0%
Total	Section	Control	Count	92	168	260
			% within Treatment	35.4%	64.6%	100.0%
		Treatment	Count	14	40	54
			% within Treatment	25.9%	74.1%	100.0%
	Total		Count	106	208	314
			% within Treatment	33.8%	66.2%	100.0%

Chi-Square Tests

CLASSIFICATION		Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
FR	Pearson Chi-Square	.091[c]	1	.762		
	Fisher's Exact Test				1.000	.490
	N of Valid Cases	130				
SO	Pearson Chi-Square	.199[d]	1	.655		
	Fisher's Exact Test				.772	.445
	N of Valid Cases	90				
JR	Pearson Chi-Square	2.539[e]	1	.111		
	Fisher's Exact Test				.179	.102
	N of Valid Cases	68				
SR	Pearson Chi-Square	.002[f]	1	.960		
	Fisher's Exact Test				1.000	.732
	N of Valid Cases	26				
Total	Pearson Chi-Square	1.789[a]	1	.181		
	Fisher's Exact Test				.208	.118
	N of Valid Cases	314				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 18.23.

b. Computed only for a 2x2 table

c. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 6.60.

d. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 5.76.

e. 1 cells (25.0%) have expected count less than 5. The minimum expected count is 4.37.

f. 2 cells (50.0%) have expected count less than 5. The minimum expected count is 1.04.

APPENDIX E

Classification Results: Three Year Data for Math 1703

CLASSIFICATION				Success		Total
				Fail	Pass	
FR	Section	Control	Count	149	210	359
			% within Treatment	41.5%	58.5%	100.0%
		Treatment	Count	4	8	12
			% within Treatment	33.3%	66.7%	100.0%
SO	Section	Control	Count	102	244	346
			% within Treatment	29.5%	70.5%	100.0%
		Treatment	Count	8	13	21
			% within Treatment	38.1%	61.9%	100.0%
JR	Section	Control	Count	65	143	208
			% within Treatment	31.3%	68.8%	100.0%
		Treatment	Count	1	10	11
			% within Treatment	9.1%	90.9%	100.0%
SR	Section	Control	Count	29	57	86
			% within Treatment	33.7%	66.3%	100.0%
		Treatment	Count	0	2	2
			% within Treatment	0.0%	100.0%	100.0%
Total	Section	Control	Count	345	654	999
			% within Treatment	34.5%	65.5%	100.0%
		Treatment	Count	13	33	46
			% within Treatment	28.3%	71.7%	100.0%
	Total		Count	358	687	1045
			% within Treatment	34.3%	65.7%	100.0%

Chi-Square Tests

CLASSIFICATION		Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
FR	Pearson Chi-Square	.320[c]	1	.572		
	Fisher's Exact Test				.768	.401
	N of Valid Cases	371				
SO	Pearson Chi-Square	.700[d]	1	.403		
	Fisher's Exact Test				.463	.271
	N of Valid Cases	367				
JR	Pearson Chi-Square	2.437[e]	1	.119		
	Fisher's Exact Test				.180	.105
	N of Valid Cases	219				
SR	Pearson Chi-Square	1.006[f]	1	.316		
	Fisher's Exact Test				1.000	.447
	N of Valid Cases	88				
Total	Pearson Chi-Square	.768[a]	1	.381		
	Fisher's Exact Test				.430	.239
	N of Valid Cases	1045				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 15.76.

b. Computed only for a 2x2 table

c. 1 cells (25.0%) have expected count less than 5. The minimum expected count is 4.95.

d. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 6.29.

e. 1 cells (25.0%) have expected count less than 5. The minimum expected count is 3.32.

f. 2 cells (50.0%) have expected count less than 5. The minimum expected count is .66.