8-2015

Success and Persistence of At-Risk Students in Summer Bridge Programs and Semester Developmental Courses

Patsy Jean Newborn
University of the Incarnate Word, pnewborn@uiwtx.edu

SUCCESS AND PERSISTENCE OF AT-RISK STUDENTS IN SUMMER BRIDGE PROGRAMS AND SEMESTER DEVELOPMENTAL COURSES

by

PATSY J. NEWBORN

A DISSERTATION

Presented to the Faculty of the University of the Incarnate Word
in partial fulfillment of the requirements
for the degree of

DOCTOR OF PHILOSOPHY

University of the Incarnate Word

August 2015

ACKNOWLEDGEMENTS

There are many people I would like to thank for their assistance and support in my doctoral studies and the completion of my dissertation. First, I would like to thank a colleague, Dr. Bill Shurter, for the kind of encouragement and support that can only come from someone who has so much to give and does not mind sharing. Additionally, I am grateful to Dr. Susan Hall, who spent several hours helping me with my dissertation and completing forms, and Dr. Renea Fike for suggesting helpful resources and guidance in my dissertation efforts.

I would like to extend a very special thank you to Dr. Judith Beauford, my Dissertation Committee chair, for guiding me through every step of my doctoral program, always there when I had questions and needed help filling out the right forms. Most importantly, I am grateful for her encouragement, patience, and support when things were especially tough. I hope that by having such an effective and successful mentor, I can make positive and significant contributions to others.

I would like to thank Sandy McMakin for believing in me and giving me permission to do research on this topic and being a consultant. A special thank you to Robin Logan and Rebecca Peñaloza (Ohnemus) for their many hours spent gathering the appropriate data for my research.

Last, but not least, I would like to thank my editor, Ilene W. Devlin, for her attention to detail and having patience as we went back and forth editing. Also I would like to thank Dr. Titus Haynes for encouraging me by being very supportive. A special thank you to my husband,

ACKNOWLEDGEMENTS—Continued

Jesse for his support and patience, as well as all of my family and friends who believed in me with encouraging words and maintained a positive attitude toward this venture.

Patsy J. Newborn

SUCCESS AND PERSISTENCE OF AT-RISK STUDENTS IN SUMMER BRIDGE PROGRAMS AND SEMESTER DEVELOPMENTAL COURSES

Patsy J. Newborn, PhD

University of the Incarnate Word, 2015

In today's society, many students are entering colleges and universities unprepared in mathematics for enrollment in college-level courses. The lack of sufficient preparation during high school years for taking college-level mathematics courses has created a problem for students and the institutions of higher education trying to serve them. Most colleges and universities have implemented developmental courses for students who have fallen short of the required skills for entering into college-level mathematics courses. Since developmental education is a comprehensive process focusing on intellectual, social, and educational growth for all students, interventions are provided to improve unprepared students' achievement and persistence in both the short-term, first semester, and in the longer term degree processes.

The purpose of this study is to investigate the differences in success rates and persistence to further mathematics courses between students who took the first developmental mathematics course in a summer bridge program and those who took the first course in a traditional program.

The students enrolled in the summer 2008 through fall 2009 were selected for this study. Their records of enrollment and passing rates were collected and analyzed using descriptive cross-tabulation. The results indicated students in the bridge mathematics programs were more persistent than the students in the traditional developmental mathematics courses, and the

students in the traditional developmental mathematics courses had a better passing rate than the students in the bridge mathematics programs.

TABLE OF CONTENTS

Table of Contents—Continued

Table of Contents—Continued

LIST OF TABLES

LIST OF FIGURES

Chapter One: At-Risk Student Programs

The world today is a very demanding place. With issues such as globalization, economic troubles, and the demand for knowledge concerning the use of technology, the average person is challenged more and more each day. As society becomes increasingly complex, there arises a need for citizens to obtain more education. Currently, our world has "failed to produce enough engineers, technicians, physicians, teachers, professors and scientists to meet the needs of their societies and their economies" (Boylan, 2008, p. 1). In the United States, the problem of not having enough citizens sufficiently educated to cope with the challenges of the 21st century has led to a demand for increased access to higher education. This increased access has been a great achievement for society to provide an opportunity for education to all.

Background

In recent decades, colleges and universities have been making education more available to previously underserved populations. According to Felner, Bolton, Seitsinger, Brand, and Burns (2008), education should be extended to all students who desire to improve their abilities. The United States has spent more than 40 years making higher educational opportunities available to all groups (Boylan, 2008). This process of opening higher education to a wide population also has political implications; U.S. students are learning at levels behind other nations. Their performance is endangering the United States' global competitiveness (Felner et al., 2008).

With the admission process at community colleges being open to all students, there are great challenges to meet the needs of students who have not developed the proper skills to be successful in courses offered by higher education institutions. The demand for educated citizens has left the current systems overtaxed and with many students underprepared. Brock (2010)

reported that even though research had shown great improvement in programs, and interventions could improve students' outcomes, the nation's higher educational system must do more to promote student success.

Higher education dropouts. College students' dropout rate is a great concern of decision makers and students. Students in their first year of college often leave without completing a two- or a four-year degree program (Tinto, 1993). Tinto (1993) provided reasons why students' college dropout rates were high, including due to demands with requirements or regulations. A Harvard study (Carlozo, 2012) reported that students were not prepared to cope with the demands of study, family, jobs, and expenses.

Persistence or departure reflects the individuals' actions that strongly rely on ability or willingness to complete successfully the tasks associated with college attendance. Cultural and financial circumstances may also influence what the individuals bring to bear on their investment in college education (Tinto, 1993).

A report from *The New York Times* on students entering college without needed preparation, indicated additional guidance required to get students equipped for college. The problem was not getting students to enroll in college, but to get them to finish. Trying to understand why Americans drop out of college at such disproportionate rates despite the promise of a high payoff was questionable (Porter, 2013).

Underprepared students. Since as early as 1971, many institutions of higher learning have experienced the "new college student." These students are defined as not having been considered previously for college. Many come to college with poor performance in high school and prolonged absences from the education arena. These students have often gone through their school years intimidated by mathematics and language arts and have therefore delayed or

avoided their enrollment in courses that would have equipped them with the skills necessary for college-level work. As a result, their scores on college entrance exams are often very poor (Boden, 2011; Bulger & Watson, 2006). Many underprepared students are lacking a solid academic foundation in mathematics, which proves to be a serious barrier to academic progress (Cohen & Brawer, 1989). These students have trouble deciding on a major and may take a long time to graduate, which causes financial problems (Hughes, Gibbons, & Mynatt, 2013).

Underprepared students share many demographic characteristics. A large proportion of the minority students enrolled in college need remediation (Boden, 2011; Bowen, Chingos, & McPherson, 2009; Bulger & Watson, 2006; Deil-Amen, 2011; Gallard, Albritton, & Morgan, 2010). Students who are economically disadvantaged are often underprepared for college (Bulger & Watson, 2006; Deil-Amen, 2011; Gallard et al., 2010, Texas Higher Education Coordinating Board [THECB], 2008). Students from single-parent families, first-generation college students, and young parents frequently face problems with the college environment (Boden, 2011; Bulger & Watson, 2006). Immigrants and others whose native language is different from English may also find college challenging (Boylan, 2008).

Developmental courses. Underprepared students are not denied a college education but are given access to remediation and extra resources. Many enroll in required developmental classes before enrollment in college level courses. Developmental mathematics, which includes courses and support services on college campuses, are provided in order to help students achieve their goals (Bonham & Boylan, 2011). The existence of remedial or developmental courses is evidence that many of today's high school graduates are not academically strong enough to be successful in completing college level work (Attewell, Lavin, Domina, & Levey, 2006).

Developmental courses are defined as courses in basic skills that are intended to help students reach some minimal level of proficiency necessary for success in college-level courses (Carriuolo, 1994). Developmental education may be understood as a gateway to postsecondary participation for many students. "The main objective of these [programs] is to help academically under-prepared students to integrate into a college or university and thereby increase student retention" (Lesik, 2007, p. 584). "Developmental strategies for underprepared students range from a single course offering to more comprehensive academic and social support services, such as tutorial support, counseling, and study skill seminars" (Davis & Palmer, 2010, p. 505).

Trends in developmental education programs. With the launch of "Closing the Gaps by 2015," the Texas Higher Education Coordinating Board (THECB) (2009) has challenged higher education to improve the academic preparedness of students enrolling in Texas colleges and universities. The goal is to increase the achievement of degrees and certificates by 50%. The report notes that 41% of the students enrolled in Texas higher education programs required some form of developmental education (THECB, 2008, 2010, 2012). Efforts to achieve the goals set for Closing the Gaps focus on high school records of graduates who are classified as students who are economically disadvantaged (as determined by receipt of free or reduced meals) and show that these students are both less prepared for college and less likely to attend than their nondisadvantaged counterparts. These economically disadvantaged students are twice as likely to enroll in 2-year institutions as 4-year universities because of lower tuition rates (THECB, 2008, 2010, 2012).

> The THECB's Strategic Plan for Texas Public Colleges calls for institutions to "Close the Gaps in Excellence" by obtaining national recognition for programs and services. The proposed developmental education plan encourages programs to seek state and national recognition for developmental education programs. In addition, developmental education programs need to ensure that all courses are aligned with the College and Career Readiness Standards. (THECB, 2009, p. 3)

Texas currently focuses on increasing the rates of post-secondary participation and completion. The enrollment in post-secondary education has increased and continues to grow at a consistent rate, with over 235,000 students participating since 2000. However, there still remain high rates of remediation as a result of inconsistency between what students need to know to succeed once in college and the relevance of what was learned in high school (THECB, 2008, 2010, 2012).

A low rate of student success in developmental mathematics and reading courses persists throughout the state (THECB, 2009). In 2012, THECB described its vision for developmental education in Texas:

> By fall 2017, Texas will significantly improve the success of underprepared students by addressing their individualized needs through reliable diagnostic assessment, comprehensive support services, and non-traditional interventions, to include modular, mainstreaming, non-course competency-based, technologically-based, and integrated instructional models. (p. 7)

Controversy over developmental education. Controversy over the importance of developmental education has a lengthy history. Thirty years ago, there was widespread sentiment to ignore the need for developmental education at the state and national levels (Boylan & Bonham, 2007; Mills, 1998). For example, state legislators argued for eliminating courses or relegating those courses to community colleges. Legislators, taxpayers, parents, policy makers, and students questioned what they were getting for their money. The question of paying and not getting progressive college credit toward their degrees is still a particular concern of students (Arendale, 2000). According to some research, developmental courses are a "good investment for society, as well as for colleges and universities" (Waycaster, 2001, p. 403). Mills (1998) stated that developmental services had been vital tools for disadvantaged students, low socio-economics status, and returning adults to complete their college careers.

Despite the controversy, there has been little formal evaluation of developmental education. Only a small percentage of 2-year and 4-year colleges and universities have conducted any systematic evaluation of their remedial or developmental programs (Lesik, 2007). The lack of research is surprising, given that developmental programs at public institutions have been plagued by controversy. However, the fears and challenges of the political world may help explain this lack of systematic research (Lesik, 2007). When institutions of higher learning admit that there is a problem with students arriving unprepared for college, they are pointing to failure at the high school level. When they admit that developmental programs are not producing results, they point to their own failures (Tierney & Garcia, 2007).

More conflict is seen regarding a central question about development education: Does it help students persist in college? There is no scholarly consensus that developmental programs are effective (Lesik, 2007). On one side, Lesik (2007) maintained that students enrolled in developmental courses tended to stay enrolled in college longer than students who did not participate in developmental courses. Yet, some colleges and universities question the effectiveness of these programs on their campuses. Nationwide studies have shown that the more semesters of developmental coursework students are required to take, the less likely they are to complete a college-level mathematics or English courses (Hern, 2012).

Developmental education and diversity. Developmental students include unprecedented numbers of minority, disadvantaged, and nontraditional (age 25 and over) students who are academically unprepared. Therefore, "developmental courses must be taught with diversity in mind" (Boylan, Bonham, & Tafari, 2005, p. 59). Policies and practices that teach educators how to cope with diversity, provide mentoring programs, promote community involvement, and improve the environment for all students have led to increased overall retention

(Boylan et al., 2005). Some scholars discuss the worth of developmental education in terms of how it contributes to campus diversity**.** Diversity has a positive impact on the social and intellectual growth of all college students in higher education (Boylan et al., 2005). Students in developmental courses make a great contribution to diversity on the entire campus.

Boylan et al. (2005) commented on diversity initiatives by suggesting that institutions that were truly prepared to educate a diverse population of students were also providing necessary skills and experiences for a successful and a productive society through improved learning for all students.

Statement of the Problem

Currently over 50% of Texas high school students entering college require developmental education before taking college-level courses (THECB, 2010). The problem is similar across the nation (Gallard et al., 2010). Many students get discouraged and never obtain a degree, which represents a waste of resources for them and for their institutions (Tinto, 1993). The Texas Higher Education Coordinating Board recommends that some funding should be allocated to find ways developmental education can be fundamentally changed to obtain the best results for both students and the state; these plans include summer bridge programs (THECB, 2009, 2010).

Summer bridge programs at institutions of higher education have been established to decrease the number of students needing developmental education and to increase student success. These courses are designed for underprepared students entering college or university to bridge the gap between high school and college work with remediation in those skills or concepts that are inadequately developed (McCurrie, 2009). The institutions establishing a summer bridge program are responsible for providing instruction and academic support in both English language arts and mathematics during a few-week period with the main focus on college success.

Research concerning summer bridge programs is inconclusive. A Texas analysis suggested intensive summer bridge programs decrease the need for developmental education (THECB, 2010). On the other hand, California research on summer bridge programs was less positive; in some years, participants in summer bridge programs were more successful than students in the control group, but in other years, there were no differences in academic achievement (Hansen, Evenbeck, & Williams, 2008).

Clearly, there is need for more research into the effectiveness of summer bridge programs. Experts in developmental education are hopeful about the promise of bridge programs.

Purpose of the Study

The purpose of this study was to investigate the differences in success rates and persistence to further mathematics courses between students who took the first developmental mathematics course in a summer bridge program and those who took the first course in a traditional program.

The bridge and traditional programs include two developmental mathematics courses. Data from students enrolled in the four-week (20 sessions) developmental courses/bridge courses and regular semester developmental classes were analyzed to determine factors that led to success.

Research Questions

1. Are passing rates (C or better) in the first developmental mathematics course independent of whether students took developmental courses in a summer bridge program or during the regular semester?

2. Is enrollment in the second developmental mathematics course independent of whether students took developmental courses in a summer bridge program or during the regular semester?
3. Are passing rates (C or better) in the second developmental mathematics course independent of whether students took developmental courses in a summer bridge program or during the regular semester?
4. Is enrollment in the first college-level mathematics course independent of whether students took developmental courses in a summer bridge program or during the regular semester?
5. Are the passing rates (C or better) in the first college-level mathematics course independent of whether students took developmental courses in a summer bridge program or during the regular semester?

Significance of the Study

This study traced the progress of two groups of developmental students at a private university in south Texas, those in the summer bridge programs and those in traditional stand-alone courses, over 2 years. Examining retention rates over 2 years might provide administrators information to develop appropriate programs to promote the long-term academic success of developmental students. Differences in academic achievement between the two groups after 2 years were used to assess the effectiveness of the summer bridge program.

Theoretical Framework

Two theoretical models for the underprepared students were considered for this study: Astin's (1991) model of students' assessment based on input, environment, and output (I-E-O); and Tinto's (1993) model of students' persistence in college.

The theory supporting Astin's I-E-O model suggested inputs and environments affecting outputs. Inputs were related to both outputs and environments, which meant the inputs could influence the relationship between environments and outputs. The design allowed for corrections or adjustments for input differences in order to obtain a less biased estimate of comparative effects of different environments on outputs (Astin, 1991). The model described how students developed during their college years based on (a) prior experiences, (b) environment the student experiences during college, and (c) knowledge gained as it related to attitudes and beliefs.

This study used Astin's I-E-O model as its theoretical framework. The relevant inputs included gender, ethnicity, Texas Assessment of Knowledge and Skills state test scores, Scholastic Assessment Test (SAT)/American College Testing (ACT) test scores, and high school grade point averages (GPAs) were used to show outputs. Astin (1991) explained "inputs as those personal qualities the student brings initially to the educational program (including the student's initial level of developed talent at the time of entry)" (p. 180). Factors such as gender, ethnicity, and Texas Assessment of Knowledge and Skills, SAT/ACT test scores, and high school GPAs have shown an association with student outcomes. The environment represented the experience of students in the programs and courses, in the two bridge programs, and in the standard developmental courses. The relevant outputs were grades in bridge, developmental courses, and subsequent academic courses (Astin, 1991).

Astin's I-E-O model was a useful theoretical framework for this study for three reasons. First, the I-E-O model was comprehensive. It included all the elements that educators needed to consider when evaluating how programs contributed to students' success. The model was a flowchart visually showing how the elements worked together. Second, the model recognized students' diversity entering into a college program. That was an increasingly important factor to

consider, since all students did not have the same educational backgrounds upon entering college. Third, the I-E-O model focused on the institutions' need to provide assistance in making programs effective for the students. The institutions attempted to power the students' success by implementing programs to meet their needs (Astin, 1991).

The second theoretical framework underlying this study built upon the model developed by Tinto of social and academic integration. The Tinto model discussed the reasons some college students persisted while others dropped out. Integration was used to explain how students adapted to the culture of the institution. As Tinto noted, the students' involvement both academically and socially enhanced success (as cited in Tanaka, 2002). "Not only can students improve their success in college through greater personal involvement, but the institution can take steps to enhance a student's talent development" (as cited in Tanaka, 2002, p. 263). The social variables that helped students assess college effectively were knowledgeable counselors and mentors who motivated the students to pursue degrees beyond high school. Students with college-educated parents might have more access to cultural capital, because they could share the experience that was not available to the first-generation collegians. "Students' social context impacts their perceptions of post-secondary opportunity and choice" (Reddick, Welton, Alsandor, & Platt, 2011, p. 596).

The lack of persistence and degree attainments are strongly connected to students from low income levels who will need developmental assistance before they are ready for college-level courses. "Previous research indicates that peer and parental encouragement, engagement in extracurricular activities, outreach programs, and assistance with financial aid are all factors increasing the chances of at-risk youth attending college" (Reddick et al., 2011, p. 595). The factors identified by social capital (family, peers, and a school's structure including the

personnel) affected the students' college enrollment decisions both positively and negatively. These at-risk students lacked access to resources, and their college aspirations were influenced by their environmental experiences (Reddick et al., 2011).

Limitations of the Study

The sample size was limited to the population of students of a private university in south central Texas who were enrolled in developmental courses during the 2-year period from 2008 to 2010. Results apply only to the sample population generalized to the university. The ethnicity was predominantly Hispanic.

Delimitations of the Study

In designing a dissertation, the researcher has to make choices about the design and content of the study in order to make it workable. First, this study examined students at only one university in Texas over a 2-year period. Those delimitations were necessary to design a study that was manageable for the time allotted to complete this dissertation. Second, while students in the bridge program took a reading/writing course as part of the developmental program, the researcher did not pursue the reading/writing results, because the study's primary focus was on mathematics achievement. Also, the researcher chose not to include composition studies in the literature review because of the study's concentration on mathematics. Finally, the researcher chose not to do interviews, because the students in the study had graduated and trying to locate them would have been difficult and time consuming.

Definitions

At-risk students—Students having low SAT/ACT test scores, low state-required tests for graduation (Texas Assessment of Knowledge and Skills), and low cumulative high school grade point average (Bulger & Watson, 2006, p. 26).

Developmental education—"A developmental education approach is a comprehensive process focusing on the intellectual, social and emotional growth and development of all learners. It includes, but is not limited to, tutoring, personal and career counseling, academic advisement and coursework" (Casazza, 1991, p. 5).

Developmental courses—Students take courses designed to address deficiencies in the target areas, such as mathematics. These courses do not carry graduation credit, but are required before students can enroll in college-level courses (Gallard et al., 2010).

Bridge program—"A short intense introduction to college courses designed to assist underprepared first-year students" (McCurrie, 2009, p. 28), extending into their freshman year (Michael, Dickson, Ryan, & Koefer, 2010).

Chapter Two: Literature Review

This chapter will provide a literature review in support of the study to compare success rates of bridge and standard developmental programs for at-risk students at a private university in south Texas. It will include a brief description of developmental bridge and traditional programs, with analyses of the benefits and challenges addressed in the literature, a section on developmental and at-risk students, and a description of the specific bridge program studied.

Developmental Education

Developmental education has gone through various stages of change since it was developed in 1977. For example, the *Journal of Development and Remedial Education* was changed to the *Journal of Developmental Education* in 1978. More than 30 years ago, the one and only professional association was known as the National Association for Remedial/Developmental Education in Postsecondary Education. In 1984, the organization became the National Association for Developmental Education. In the same year, the U.S. Department of Education acknowledged developmental education as focusing on the importance of remedial courses and including it in its research. The National Center for Education Statistics published three reports focusing on developmental education in the years 1990, 1996, and 2003 (Boylan & Bonham, 2007).

The year 1998 marked the establishment of the Kellogg Institute for the training and certification of developmental educators at Appalachian State University, sponsored by the National Center for Developmental Education, the nation's first professional development and certification program for developmental education. In 1983, the Learning Assistance Support of California State University–Long Beach was responsible for the Learning Assistance Professionals. This program was hosted by the Air Force Academy, University of Arizona, and

the University of Texas, Austin, where it is located today. In 1989, the first professional tutor training programs at colleges and universities in the United States and Canada were launched. In 1990, the first National Study of Developmental Education was initiated. The National Tutoring Association was founded in 1992 and served professional tutors in colleges, universities, schools, and adult education programs. In 1996, a certification program for individual tutors was offered and the National Center for Developmental Education held the second national conference on Research in Developmental Education. In 1999, the Technology Institute for Developmental Educators was established (Boylan & Bonham, 2007).

Developmental education is defined as courses and services to help underprepared college students to achieve their academic goals (Boylan & Bonham, 2007). The three main areas most often needing remediation are mathematics, reading, and writing (Tierney & Garcia, 2008). Test results often show that students are lacking in these three areas. About 70% of universities and 99% of community colleges offer developmental courses to meet the needs of these students; tutoring services are almost universal in higher education (Boylan & Bonham, 2007).

Recent criticisms of developmental education. Traditionally, scholars in the field of developmental education have maintained that students should not be allowed to enroll in gatekeeper courses without adequate preparation (Goudas & Boylan, 2012). Furthermore, they have suggested that meeting the academic needs of underprepared students affords them the best chance to begin their higher education.

During the last 5 years, several criticisms of developmental education have surfaced in the scholarly literature. Numerous organizations, such as the Lumina Foundation, the Bill and Melinda Gates Foundation, the Rockefeller Foundation, the Carnegie Foundation, and the Kresge

Foundation, have funded a variety of demonstrations and research projects. This scholarship has used varying methodologies and has sometimes reached conflicting conclusions. Goudas and Boylan (2012) summarized the most important criticisms of developmental education:

- Remedial courses were not effective, because the students who took those courses did not perform better than non-remedial students in subsequent comparison.
- Researchers believed that if developmental courses were effective, then students who took developmental courses should do better than students who did not need take a developmental course.
- Remediation acted as a barrier to some students, because they did not make it through their remedial sequences to enroll in gatekeeper courses or to graduate.
- Remediation costs community colleges anywhere from $1 billion to $3 billion a year. The implication was that too much money was spent for the meager results achieved.

The need for developmental education. Research continues to verify the need for developmental courses for incoming freshman at colleges and universities. According to Keim, McDermott, and Gerard (2010), many students arrived from local high schools unprepared for the demands of college. Those academic shortcomings hindered them from successfully completing their education (Tierney & Garcia, 2008). Most students have little experience in reading and writing lengthy or complicated texts. They have often resisted writing tasks, because of their feelings of inadequacy as readers and writers and discomfort with the conventions of academic discourse (Maloney, 2003). The need for developmental classes for these students is a priority for colleges and universities. A large majority of the students entering community colleges and universities are enrolled in developmental courses for both mathematics and English language arts (Waycaster, 2001). A review of four National Center for Education Statistics

studies reported that the percentage of entering college university students taking one or more developmental courses remained the same, 29%, between 1983 and 2000, indicating very little change over almost 30 years (Boylan & Bonham, 2007).

Purpose of developmental education. Developmental programs are devised to assist students who come to college unprepared to successfully complete college-level courses. Developmental courses are offered to the students with low high school grade point averages, and low SAT or ACT test scores upon entering college. These courses are offered with hope of bringing incoming students' skills up to meet the expectations of colleges and universities (Harwell, Medhanie, Dupuis, Post, & LeBeau, 2014).

The number of courses is growing at a fast rate at colleges and universities trying to prepare students lacking skills for required college-level courses (Bonham & Boylan, 2011). It has been observed that "developmental mathematics programs, including courses and related support services, exist on college campuses in order to help students achieve their goals" (p. 2). Most colleges and universities offer special courses for students who are unprepared in reading, writing, and mathematics skills and who have difficulty adjusting to college life (Gallard et al., 2010; Maloney, 2003; Tierney & Garcia, 2008). According to Mills (1998), remediation was one mechanism that gave real dimension to access and equal opportunity in higher education. Those courses often were referred to as remedial courses, but had been "preferred using the terms as developmental education, skills courses, or college preparation courses" (Attewell et al., 2006, p. 886).

According to "the National Center for Education Statistics (NCES), 78% of higher educational institutions that enrolled freshmen and 100% of public two-year institutional offered remedial courses" (Waycaster, 2001, p. 404). Tierney and Garcia (2008) reported that a higher

percentage of community college students than 4-year college students were assigned to remedial courses at the Remedial Education and Early Assessment Programs of California State University. Some community colleges and high school districts should develop partnerships to improve the quality of education by adopting higher standards to increase preparation of students for college experience (Hoyt, 1999). Retention and graduation rates at colleges speak to the real purpose of developmental programs in community colleges. Retention rates (for students in developmental courses) have been reported to be considerably higher than retention rates for students in nondevelopmental courses (Waycaster, 2001).

Models for Developmental Education

There are three primary models for delivering developmental education: the traditional stand-alone course, supplemental instruction, and bridge programs (Gallard et al., 2010; McCurrie, 2009; Wright, Wright, & Lamb, 2002).

Traditional developmental courses. In this model, students take courses designed to address academic deficiencies in the target areas such as mathematics. These courses do not carry graduation credit, but they are required before students can enroll in college-level courses. Placements of students are primarily determined by scores on the SAT, ACT, or other pre-assessment tests. According to research, the results showed ACT mathematics scores were related to developmental mathematics courses taken by students who began college with developmental mathematics requirements (Harwell et al., 2014).

In the traditional approach, a developmental educational program would often be enhanced with tutoring, academic advising, and counseling. To assure that students are provided the proper resources to help make the transitions to college life, a tutoring system may be established for mathematics, reading, and writing (Gallard et al., 2010). Tutoring programs may

be computerized (Waycaster, 2001) or utilize student tutors help (Gallard et al., 2010). Gallard et al. (2010) offered data showing that tutoring was a helpful component of developmental education. Students receiving tutoring were more successful than peers who did not receive tutoring; the passing rate in the developmental mathematics course was 78.1% versus 62.2% for students not receiving tutoring. Moreover, fall to spring re-enrollment rates for students receiving tutoring were 55% versus 30.3% for students not receiving tutoring.

Students in developmental education programs are often offered academic advising (Gallard et al., 2010). The students have an opportunity to receive personal and career counseling regarding coursework in mathematics, reading, and writing (Gallard et al., 2010). For monitoring the success rate of student participants, a computerized mentoring system is sometimes utilized (Gallard et al., 2010)**.** The computerized mentoring system allows communication between counselors and the academic success center, tutors, and faculty members, as well as up-to-date progress reports, including demographic breakdowns of the participants including gender, ethnicity, and academic advising (Gallard et al., 2010).

The Virginia Community College System lists three strategies to improve the effectiveness of the remedial education. The strategies are (a) colleges collaborating to share and replicate their best practices, (b) implementing a comprehensive program that goes beyond tutoring and skills development, and (c) incorporating technology to enhance the teaching-learning process (Waycaster, 2001).

Benefit of developmental programs. According to Waycaster (2001), a study was conducted revealing the effectiveness of developmental programs by preparing students for college-level work. A college in Virginia showed the effectiveness of developmental courses in preparing students for college-level work. The number of students passing developmental

mathematics courses and going on to pass college-level courses proved the success of the program. According to Tierney and Garcia (2008), developmental programs were a great benefit for incoming freshmen at colleges and universities in California. At a college in Florida, the overall increase in the developmental education completion rate was used to calculate the economic benefits from state allocations to the institution. A surprisingly large return on investments for both college and society was discovered. "Students advancing to degree completions generate additional economic benefit to the institution through the accumulation of student fees, funding allocations, and performance incentives" (Gallard et al., 2010, p. 14). Students of developmental education have benefited from tutoring services, intense instruction, and preparatory programs intended to help catch them up with academic skills and practices in which they were lacking (Tierney & Garcia, 2008).

Challenges of developmental programs. Bonham and Boylan (2011) reported that "developmental mathematics programs and related support services, ostensibly exist on colleges campuses to help students achieve their goals" (p. 2). In some instances, those courses "have become road blocks to students' success and barriers to their achievement" (p. 2). The number of remedial courses needed can increase the dropout rate. For example, in Florida, 64% to 72% of students requiring remedial education in three areas eventually dropped out of college. Students who had enrolled and completed several remedial courses might become discouraged and drop out of college (Hoyt, 1999). There are great concerns by administrators and faculties about student retention in developmental education. Students' withdrawal rates are related to social, economic, and educational problems. According to research, the focus is "on the following factors: (a) age, (b) gender, (c) parents' education, (d) grade point average (GPA), (e) academic

goal commitment, (f) institutional experience, (g) student academic integration, (h) placement grades, and (i) student performance" (Udoudo, Eddy, & Spaulding, 1994, p. 39).

Efforts to increase the success of students who need developmental education can result in a very costly venture. Developmental programs are very expensive for both institutions and the students. Institutions offering the programs must hire faculty, purchase technology, obtain classrooms, and support staff to include counselors, advisors, and tutors. The cost incurred, "approximately one billion dollars is spent nationally on developmental education programs each year" (Gallard et al., 2010, p. 10). Critics frequently point to the cost of a developmental education program as a hindrance to implementation. The additional expense of tuition, books, and time spent not earning a living can be seen as a burden for students, especially those from low-income families with limited support. Financial support is needed to assist these students. Similar efforts are found across the country (Brock, 2010; Hoyt, 1999).

Summary of developmental programs. Overall the success rate of developmental courses is showing a rapid increase (McCurrie, 2009). College and university campuses where programs exist show a positive benefit for the students with deficiencies in required subjects. Developmental classes made it possible for low performing students to gain the skills needed for college-level work. These courses are beneficial to the students' success, along with tutoring and counseling/advising components. The institution and society have benefitted from the investments in developmental program.

The challenges to developmental programs include cost and persistence. Summer bridge programs have been used to minimize these challenges.

Supplemental instruction. While developmental education has been studied and practiced for more than 30 years, supplemental instruction (SI) is a recent educational

innovation. SI is recommended by studies to be used in non-remedial settings with high risk, demanding courses. SI is an emerging effective method for both underprepared and fully prepared students based on the following essential characteristics of the approach:

- It is a form of group tutoring requiring an SI leader, usually a peer tutor, to work closely with the instructor and the students.
- It is designed to assist students with course content, competency in reading, critical thinking, and study skills.
- SI leaders are paid undergraduates with high grade point averages and who have shown exemplary performance in the course.
- SI leaders attend course lectures, take notes, and complete assignments as regular students.
- SI leaders conduct and schedule a minimum of two 50-minute SI sessions each week.
- Successful SI leaders are well trained in learning theories, methods of tutoring, and collaborative learning.

Supplemental Instruction is offered and overseen by the Academic Assistance and Resource Center at a southern state university with approximately 11,000 students. The students have access to student-led workshops, one-on-one appointment-based tutoring, and walk-in tutoring for mathematics, writing, and chemistry (Wright et al., 2002).

Bridge programs. According to Cabrera, Miner, and Milem (2013), many colleges and universities offer bridge programs to help high school students' transition from high school to college.

Historically, these programs are geared to assisting minority and low-income students academically and socially. Summer bridge programs are aimed at developing the students' study

skills, assisting with time management, and encouraging utilization of university services, while being exposed to college course work and environment (Cabrera et al., 2013). The 2006 Spellings Commission Report has encouraged institutions to re-examine the effectiveness of the bridge programs as they relate to increased access and retention in meeting the needs of the nation for the twenty-first century (McCurrie, 2009). Advisors encourage students to complete short-term goals and continue to build upon them as they earn higher levels of education (Hoyt, 1999; Keim et al., 2010). Underprepared students need to include remedial educational courses, as well as study skills courses or study periods (Keim et al., 2010).

Need for bridge programs. McCurrrie (2009) found that summer bridge programs were mechanisms for strengthening students both academically and socially in preparing them for their first year of college. The needs of students lacking social skills could be addressed in a more structured environment by incorporating bridge programs (Gallard et al., 2010).

The students needed to experience goal setting, establish good study habits, and manage time wisely during their college experience. As the students set goals for themselves, the increase of their study skills and self-esteem were what contributed to their success (Keim et al., 2010).

The need for bridge programs is seen more readily at some institutions than others. At a northwest college in Utah, students' attrition rates ranged from 54% to 64%. The college generally lost 30% to 35% of its students from fall to spring and nearly 60% of its students by the following fall. As the need for remedial areas increased for students at the college, their dropout rates consistently increased. Failure to meet the needs of those students could result in harm to students, the college, and society (Hoyt, 1999).

Bridge programs consist of developmental courses offered during the summer for underprepared students in mathematics and language arts. The time for the students to complete

course work is a shorter time period than a regular semester. During this period, the students usually attend classes 5 days a week for 4 weeks, with tutoring and study hall components incorporated. The students are advised and counseled as needed. Since the programs have a limited number of students, adjusting to college life is often easier. Students enrolled in summer bridge programs preceding the fall semester often find adjusting to college life is easy because of the small classes (McCurrie, 2009).

Interventions in bridge programs. Research supports the need for interventions that focus on the academic and affective needs of students. Summer bridge programs attempt to develop the whole student, with emphasis on affective issues related to motivation. Presentations made by the students in this safe environment can motivate them to continue with school and to get prepared for life challenges (Keim et al., 2010). Mills (1998) commented on the increased attention being given to relationships between cognitive and affective factors influencing students' success in developmental mathematics.

Purpose of bridge programs. The summer bridge program promotes self-esteem by giving students confidence as they pursue their educational dreams. The program also provides an opportunity for the students to gain a better understanding of college life and their academic coursework (McCurrie, 2009). Three goals of bridge programs are to (a) increase the retention and the number of students completing their degrees, (b) increase students' self-esteem and sense of self-efficacy, and (c) develop and increase academic skills, primarily writing (Keim et al., 2010).

Description of bridge programs. Many programs are designed to help students who have fallen short of their academic skills in mathematics and English language arts and are similar to developmental courses but have been identified as bridge courses. These courses share the same

needs but are offered during the summer in a shorter time period and at an intense fast pace. This is an opportunity for incoming freshmen to improve their social skills and to enhance their self-esteem (McCurrie, 2009).

A typical summer bridge program meets Monday through Friday for 90-minute mathematics and English language arts classes. In addition to the two class meetings, in the afternoon students are allowed to attend a lecture, visit a museum or a cultural venue, and participate in small-group discussions (McCurrie, 2009). The summer bridge programs promote student self-esteem and give the students confidence to pursue their educational dreams.

During the summer bridge program, there are often support services available to the students. The students have the opportunity to gain valuable information concerning their college careers with encouragement from advisors, tutors, and instructors. A ready availability of mentors, role models, and peer support is critical in motivating students and increasing academic persistence (Keim et al., 2010). As part of a comprehensive process, students are advised on intellectual, social, and educational matters. Advisors offer interventions to improve unprepared students' achievement and persistence in the short-term, first semester, and in the longer-term degree completion process (Gallard et al., 2010).

While involved in the summer program, students often learn college-level methods of taking lecture notes, actively reading text books, and preparing for tests/quizzes (Michael et al., 2010). During this period, time management, effective study skills, and other skills considered of importance to students to succeed in college are taught. The idea is to build social cohesion between students and making the subject meaningful to students by integrating the content in order to help students apply concepts across the courses (Brock, 2010).

According to Singh, Granville, and Dika (2002), motivation, achievement, and academic performance are all correlated and work together in students' success in mathematics and science. Motivation and academic engagement have reciprocal relationships: "Motivation affects engagement in academic tasks and engagement further enhances interest and motivation" (p. 324). Motivation enhances student engagement in academic tasks, which increases the likelihood of successful achievement. The students gained confidence and opportunities to read and write that deemed the curricula to be successful.

Students may create individual goals to accomplish during the first semester through a monitoring process by staff members. By setting achievement goals, the students find encouragement to express their thoughts and to ask for help when it is needed (Michael et al., 2010).

In the summer of 2009, developmental bridge programs were offered to recent high school graduates at eight institutions in Texas. Two of the institutions were 4-year, and the other six were community colleges. The students attended the programs for 3 to 6 hours during a 4 to 5 week period. One of the components of the programs was an accelerated instruction in math with the opportunity to earn a stipend of $400 (Barnett et al., 2012).

The evaluation consisted of an experimental design to measure the effects of the programs on enrollment and success. The program consisted of 793 students, which was 60% (268) of the students assigned to the bridge programs. The other 40% (525) were assigned to the control group, which allowed their participation in other college services. The program had an impact on first college-level course completion in math. There is no evidence that the programs impacted persistence. In terms of race and ethnicity, six of the institutions' populations consisted of more than 90% Hispanic students. At the other two institutions, fewer than half of students

were Hispanic, with the remainder comprised of White, African-American, and small numbers of Asian American students. All institutions had more females than males (Barnett et al., 2012).

Benefits of bridge programs. According to McCurrie (2009), Columbia College's data show that more students successfully completing the summer bridge programs continued their college career compared to those students who did not attend the summer bridge programs. A bridge program may lower the drop-out rate better than regular developmental courses, because it can provide the environment needed for first-time entering freshmen students to make adjustments to college in a small population setting.

By participating in a summer bridge program, the students are better able to understand the demands of college reading, writing, and the kinds of support they will need to be successful in college (McCurrie, 2009).

The work in bridge programs is not watered down. Students can be successful because the teacher is demanding and believes that they can do the work. When students have freedom in selecting what they write about, they take pride in their work (McCurrie, 2009). The teachers have reported that "the reflective writing enabled students to see the relevance of what they were studying and how the course [can] connect to their personal learning goals" (McCurrie, 2009, p. 37). Students benefit in the short term by experiencing success in college by connecting their own experiences to their studies and sharing their reflections.

Challenges of bridge programs. Not all bridge programs are successful. "While the Bridge English course was…constructed to introduce students to college level reading and writing, the way the course had been constructed by individual teachers and experienced by the students did not [always] reflect Columbia College's reading and writing goals" (McCurrie, 2009, p. 37). In a survey of Bridge English instructors, many expressed the belief that the

curriculum did offer students beneficial reading and writing experiences, but that the overall curriculum was not giving students the information and experiences needed to make wise choices beyond their Summer Bridge experience (McCurrie, 2009).

As those students moved beyond their first semester, retention diminished and their GPAs were lower than their non-bridge peers (McCurrie, 2009). The withdrawal rate for Summer Bridge students was also significantly higher than non-bridged peers in the second and third years. Columbia College's Summer Bridge students did not match the retention rate of non-bridge students from the first semester to the second semester, but their 61% retention rate was above the national average for similar institutions.

At a community in Florida, a large majority of the students who required remedial education eventually dropped out of the college (Hoyt, 1999). That was particularly true of students enrolled in several remedial courses.

Summary of bridge programs. **S**ummer bridge programs are similar to developmental programs. Both programs are designed to help unprepared students in mathematics and English language arts bring their academic levels up in order to meet college course requirements.

The summer bridge courses are short, intense, and designed to strengthen students both academically and socially. The tutoring and study skill components are added elements to enhance self-esteem and confidence. The knowledge of the availability of counseling services is made known to the students and is highly recommended. After students complete the summer bridge program, they are ready for the fall semester to continue successfully with required other remedial or college-level courses. The motivation level of the students is very high and encourages academic engagement.

Retention rates vary from institution to institution depending on the programs. The success rates are comparable to the developmental courses.

The Bridge Program in the Current Study

The bridge program was implemented at a private 4-year university in south central Texas as a developmental program for students lacking skills in mathematics and English language arts. The program was funded by a grant.

Based on their SAT/ACT test scores, high school state test results, high school grade point averages, and completion of an application expressing their interest in the summer program, the students were enrolled in both mathematics and English language arts courses to increase their skills for successfully completing the required college courses. Each class met 5 times a week for 4 weeks.

Attendance for all students was mandatory. A mandatory study hall was built into each day as part of the course requirement. A required tutoring component was implemented each day for approximately sixty minutes. During that time, speakers were invited to discuss study skills, library skills, and available resources for the students. Two tests were administered each week. A passing grade of a "C" or better was required for the students to move to the next course.

To experience real college life, the students were required to spend the 4 weeks on campus as a residential component, with weekend passes allowing the students to go home. Homework and study times were requirements, along with planned activities led by older students from the university.

Challenges of the bridge program. The fast pace of courses required the students to be completely focused for the 4 weeks. Testing every 2 to 3 days was very challenging for some of

the students; others did well under the pressure. The residential portion of the program was a big adjustment for most of the students.

During the summer session, there were not as many activities on campus as during a regular fall or spring session. Staying occupied after completing homework and studying did create problems for some of the students.

Summary of the bridge program. The 4-week intense summer bridge program consisted of mathematics, reading, and writing (language arts). Giving the students an opportunity to experience college life helped them socially, academically, and emotionally. The experiences helped with managing their time wisely with school work and leisure time by making their college classes a priority. It described how the students will develop during the college years: (a) prior experiences, (b) the environment the students experienced during college, and (c) the knowledge, attitudes, and beliefs of the students (Demetrious & Schmitz-Sciborski, 2011).

Chapter 3: Methodology

The purpose of this study was to investigate the differences in success rates and persistence to further mathematics courses between students who took the first developmental mathematics course in a summer bridge program and those who took the first course in the first-level developmental mathematics course in a summer bridge program and those who took the first-level developmental courses during a regular traditional semester. The chapter is divided into seven major areas: (a) research design, (b) population, (c) sampling procedures, (d) data collection procedures, (e) research questions, and (f) statistical analysis.

Research Design

This was a sequential explanatory research design with the quantitative portion consisting of descriptive analysis and tests of differences of at-risk students in the bridge programs and regular semester traditional developmental courses. Follow-up interviews were not used to support and explain results.

Population

This study compared the success rates of students enrolled in a summer bridge program during 2008–2010, with students in the following long semester developmental courses in mathematics, reading, and writing at a private university in south central Texas with an enrollment of about 6,000.

The university had a bridge program designed for at-risk students to take a 4-week developmental mathematics and language arts courses during the summer sessions.

Sampling Procedures

The study sample consisted of 77 entering first-year freshmen who participated in a 4-week precollege summer bridge program and 435 students in the regular semester developmental program designed to enhance their college readiness through developmental coursework.

Data Collection Procedures

For the purpose of this study, data was extracted from student records with full approval of the IRB committee. All information was confidential and used only for research purposes. Data included demographic information (gender, ethnicity), SAT/ACT scores, high school GPAs, state test results (Texas Assessment of Knowledge and Skills and State of Texas Assessments of Academic Readiness), socio-economics status, gender, first-generation status, need-based financial assistance, and the grades earned by the students in the summer bridge programs and the regular semesters. Data was coded and analyzed using SPSS. Descriptive and inferential analysis of the differences between the two groups was investigated.

Research Questions

1. Are passing rates (C or better) in the first developmental mathematics course independent of whether students took developmental courses in a summer bridge program or during the regular semester?
2. Is enrollment in the second developmental mathematics course independent of whether students took developmental courses in a summer bridge program or during the regular semester?
3. Are passing rates (C or better) in the second developmental mathematics course independent of whether students took developmental courses in a summer bridge program or during the regular semester?

4. Is enrollment in the first college-level mathematics course independent of whether students took developmental courses in a summer bridge program or during the regular semester?
5. Are the passing rates (C or better) in the first college-level mathematics course independent of whether students took developmental courses in a summer bridge program or during the regular semester?

Statistical Analysis

The dependent variable is the success rate of students enrolled in bridge and developmental programs in mathematics, writing, and reading. The independent variables are high school GPAs, SAT/ACT test scores, socio-economics status, gender, financial assistance, and grades earned in the BEGINNINGUIW programs (bridge) and the regular semesters.

Chapter 4: Results

The purpose of this study was to investigate the differences in success rates and persistence to further mathematics courses between students who took the first developmental mathematics course in a summer bridge program and those who took the first course in a traditional program. The bridge and traditional programs include two developmental mathematics courses.

The sample consisted of 512 students enrolled in both bridge programs and traditional courses. The data analysis for this study was accomplished from five major sections. The first section contained the gender, ethnicity, the relationship of gender to the success of course one, the success rate of the second course, and the persistence of college-level courses for the participants. The major hypotheses were examined for the investigation. The data was treated using descriptive statistics, cross tabulation, Chi-Square tests, and Cramer's V.

Demographic Profile of Participants in the Study

Gender. Table 1 and Figure 1 depict the comparison of the female students to males enrolled in the traditional courses and bridge programs. About one third of the students enrolled in each of the programs were males. The percentage of females to males was consistent between traditional courses and bridge programs.

Table 1

Frequency Distribution of Students Enrolled in Traditional Developmental and Bridge Mathematics Classes

	Traditional		Bridge	
Variable	*n*	%	*n*	%
Female	302	69	49	64
Male	133	31	28	36
Total	435	100	77	100

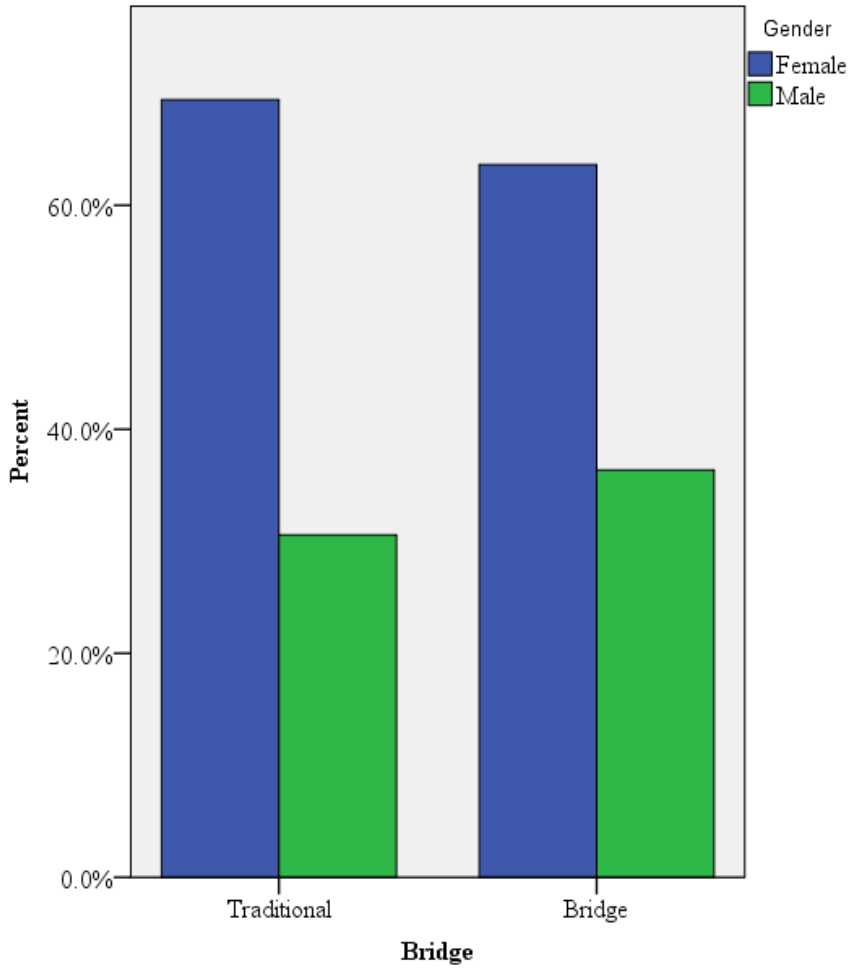

Figure 1. Percentage of males and females in traditional courses and bridge programs.

Ethnicity. The percentages of the groups by ethnicity were also consistent in traditional courses and bridge programs. Percentages between the groups differed by 1% to 3% for both traditional courses and bridge programs. Tables 1 and 2 show that percentages in gender and ethnicity were similar between traditional courses and bridge programs. (See Table 2 and Figure 2.)

Table 2

Frequency Distribution of Students by Ethnicity

	Traditional		Bridge	
Variable	*n*	%	*n*	%
Hispanic	274	63	47	61
White	71	16	15	19
Other	77	18	13	17
Nonresident	13	3	2	3
Total	435	100	77	100

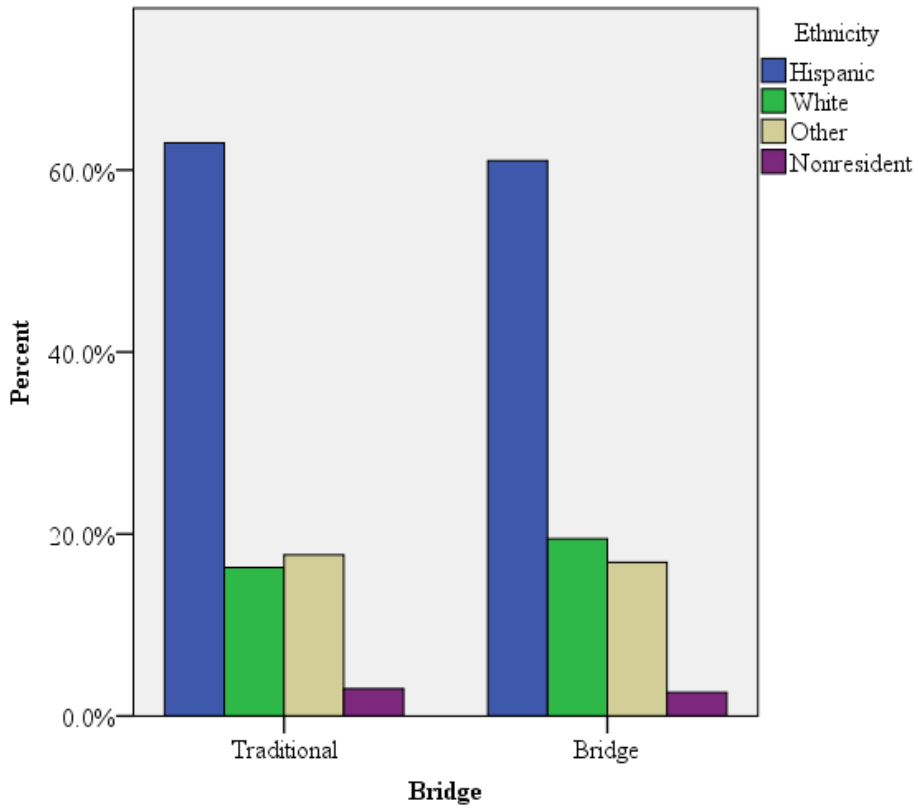

Figure 2. Percentages of Hispanics, Whites, others, and nonresidents enrolled in traditional courses and bridge programs.

Research Question 1

Are passing rates (C or better) in the first developmental mathematics course independent of whether students took developmental courses in a summer bridge program or during the regular semester?

Two hypotheses were tested.

Hypothesis 1: Passing rates (C or better) in the first developmental mathematics course are independent of whether students took developmental courses in a summer bridge program or during the regular semester.

Hypothesis 2: Passing rates (C or better) in the first developmental mathematics course are not independent of whether students took developmental courses in a summer bridge program or during the regular semester.

There is a relationship between students in traditional courses and students in bridge programs to passing the first developmental mathematics courses. Table 3 and Figure 3 show that students enrolled in bridge programs had a passing rate greater than students in traditional programs.

Table 3

Students Passing the First-Level Developmental Mathematics Courses

	Traditional		Bridge			
Variable	*n*	%	*n*	%	x^2	*p*
Passed	332	76	76	99	20.24	.000
Not Passed	103	24	1	1		
Total	435	100	77	100		

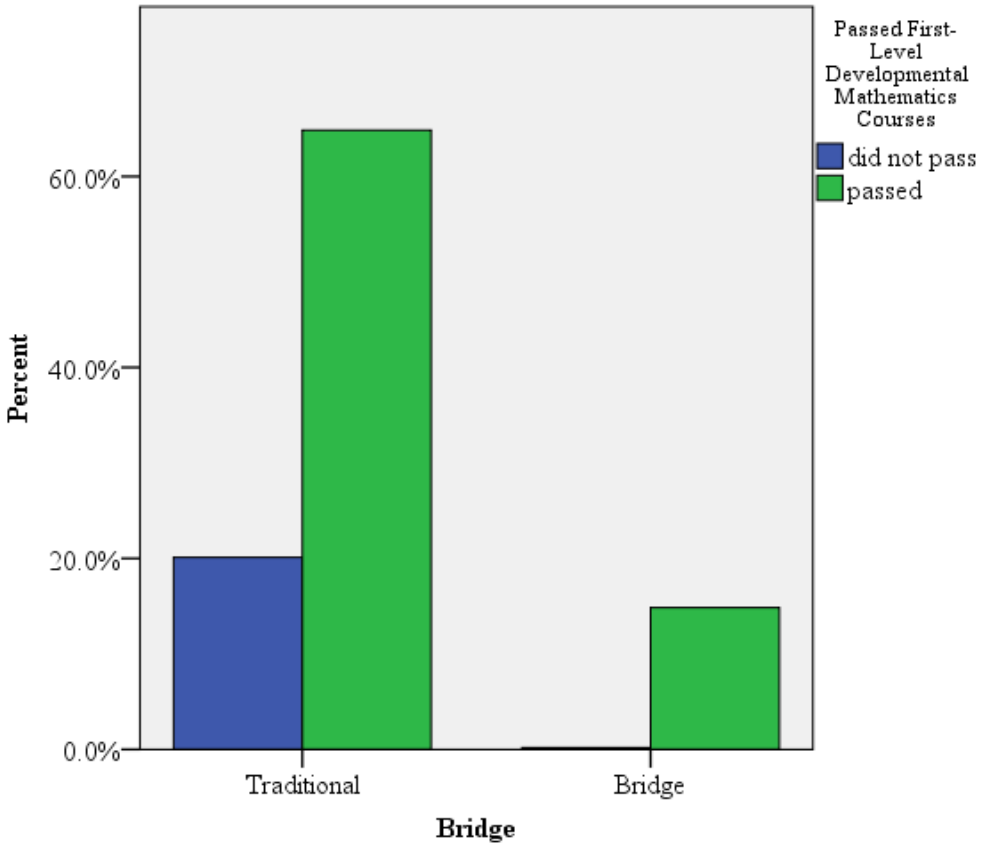

Figure 3. Percentages of students passing and not passing first-level mathematics courses in traditional courses and bridge programs.

Research Question 2

Is enrollment in the second developmental mathematics course independent of whether students took developmental courses in a summer bridge program or during the regular semester?

Two hypotheses were tested.

Hypothesis 1: Enrollment in the second developmental mathematics course is independent of whether students took developmental courses in a summer bridge program or during the regular semester.

Hypothesis 2: Enrollment in the second developmental mathematics course is not independent of whether students took developmental courses in a summer bridge program or during the regular semester.

There is a relationship between students in traditional courses and students in bridge programs to persist to the second developmental mathematics courses. Table 4 and Figure 4 show that the percentage of students enrolled in second developmental mathematics courses who had taken traditional courses was a lower persistence rate compared to those who were in bridge programs having a higher persistence rate.

Table 4

Persistence of Students in Traditional Courses and Bridge Programs in the Second-Level Development Mathematics Courses

	Traditional		Bridge			
Variable	*n*	%	*n*	%	x^2	*p*
Enrolled	167	38	45	58	10.84	.001
Not Enrolled	268	62	32	42		
Total	435	100	77	100		

Research Question 3

Are passing rates (C or better) in the second developmental mathematics course independent of whether students took developmental courses in a summer bridge program or during the regular semester?

Hypothesis 1: Passing rates (C or better) in the second developmental mathematics course are independent of whether students took developmental courses in a summer bridge program or during the regular semester.

Hypothesis 2: Passing rates (C or better) in the second developmental mathematics course are not independent of whether students took developmental courses in a summer bridge program or during the regular semester.

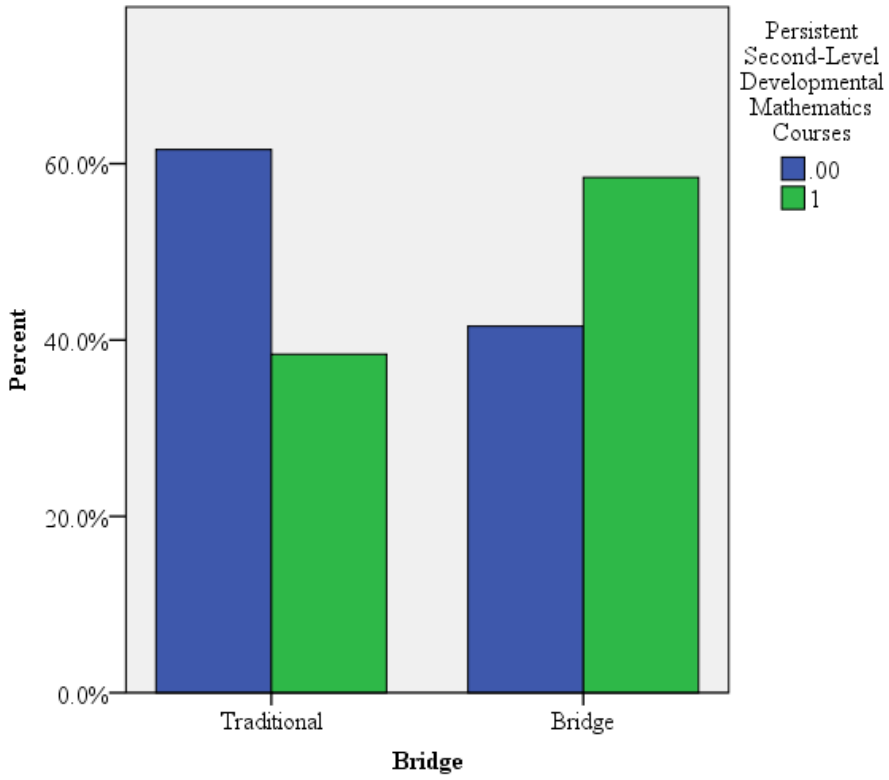

Figure 4. Percentages of students in traditional courses and bridge programs enrolled in the second-level developmental courses.

There is a relationship between students in traditional courses and students in bridge programs to passing the second level developmental mathematics courses. Table 5 and Figure 5 show that students passing traditional courses and bridge programs are dependent on enrollment in traditional courses or in bridge programs.

Table 5

Comparison of Students in Traditional Courses and Bridge Programs Passing the Second-Level Developmental Mathematics Courses

	Traditional		Bridge			
Variable	*n*	%	*n*	%	x^2	*p*
Passed	124	74	36	80	11.67	.003
Not Passed	43	26	9	20		
Total	167	100	45	100		

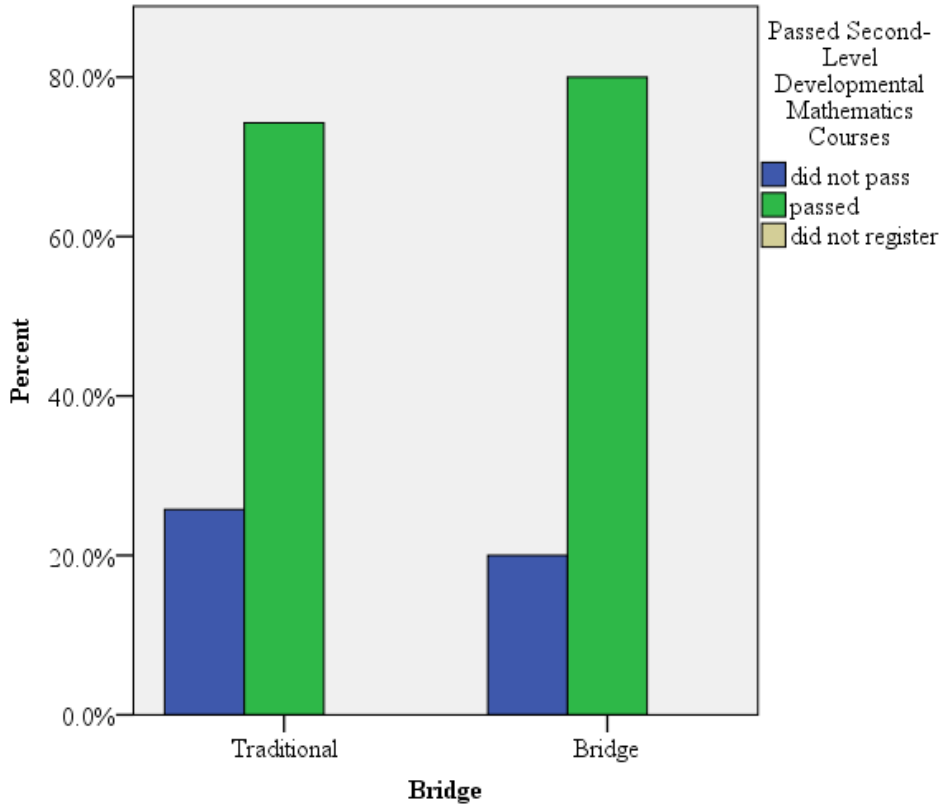

Figure 5. Percentages of students in traditional courses and bridge programs passing the second-level developmental mathematics courses.

Research Question 4

Is enrollment in the first college-level mathematics course independent of whether students took developmental courses in a summer bridge program or during the regular semester?

Two hypotheses were tested.

Hypothesis 1: Enrollment in the first college-level mathematics course is independent of whether students took developmental courses in a summer bridge program or during the regular semester.

Hypothesis 2: Enrollment in the first college-level mathematics course is not independent of whether students took developmental courses in a summer bridge program or during the regular semester.

There is a relationship between students in traditional developmental mathematics courses and bridge programs to persistence to college-level mathematics courses. The bridge students' persistence to college-level mathematics courses was greater than traditional students' persistence to college-level mathematics courses. (See Table 6 and Figure 6.)

Table 6

Students Enrolled in College-Level Mathematics Courses

	Traditional		Bridge			
Variable	*n*	%	*n*	%	x^2	*p*
Enrolled	89	20	25	32	5.45	.020
Not Enrolled	346	80	52	68		
Total	435	100	77	100		

Research Question 5

Are the passing rates (C or better) in the first college-level mathematics course independent of whether students took developmental courses in a summer bridge program or during the regular semester?

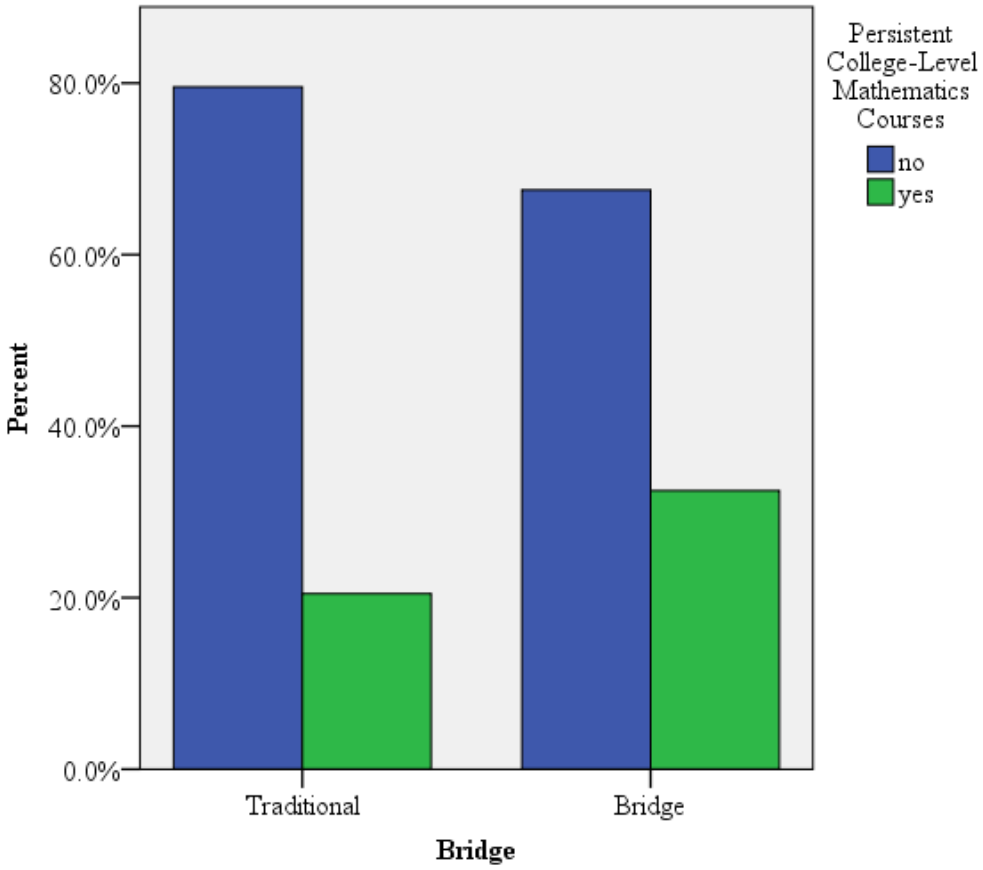

Figure. 6. Percentages of students' persistence of traditional courses and bridge programs to college-level mathematics courses.

Two hypotheses were tested.

Hypothesis 1: The passing rates (C or better) in the first college-level mathematics course are independent of whether students took developmental courses in a summer bridge program or during the regular semester.

Hypothesis 2: The passing rates (C or better) in the first college-level mathematics course are not independent of whether students took developmental courses in a summer bridge program or during the regular semester.

There is no relationship between students in traditional developmental mathematics courses and students in bridge programs to passing rates for first college-level mathematics. The results show that students enrolled in bridge programs had a lower passing rate compared to

those students in traditional courses with a 61% passing rate in college-level courses. (See Table 7 and Figure 7.)

Table 7

Students Passing College Level Mathematics Courses

	Traditional		Bridge			
Variable	*n*	%	*n*	%	x^2	*p*
Passed	54	61	10	40	3.39	.07
Not Passed	35	39	15	60		
Total	89	100	25	100		

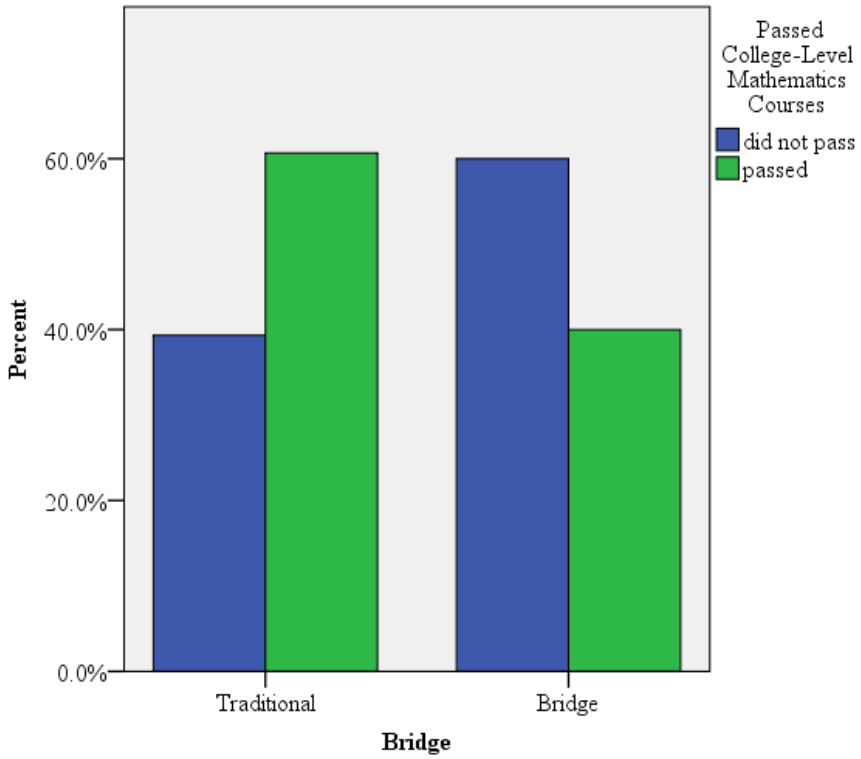

Figure 7. Percentages of students passing college-level mathematics courses.

Chapter 5: Discussion and Conclusions

The purpose of this study was to investigate the differences in success rates and persistence to further mathematics courses between students who took the first level developmental mathematics course in a summer bridge program and those who took the first level developmental mathematics course in a traditional program.

Percentages of students in developmental mathematics courses in both traditional courses and bridge programs were similar in population by gender and ethnicity. Bridge students showed greater persistence to the second level developmental mathematics course and college level mathematics course. Bridge students passed first level developmental mathematics courses and second level developmental mathematics courses at higher rates than traditional students. However, bridge students passed their first college-level classes at slightly lower rates, but with no statistically significant difference.

Persistence

One of the findings indicated that most of the students from bridge programs showed stronger persistence than those enrolled in traditional programs. Also, the persistence rate for bridge students was above the national average for similar institutions, which was consistent with the findings of Michael et al. (2010). However, these findings were not consistent with the findings of Barnett et al. (2012), Lesik (2007), and McCurrie (2009). Perhaps bridge programs can ease this problem.

Success Rate

The findings in the current study showed that students in bridge programs passed first and second level developmental mathematics courses at higher rates than traditional students. Bridge students passed their first college-level courses at slightly lower, but not statistically significantly

lower, rates than traditional students. The findings of Barnett et al. (2012) were consistent with this study for passing the first college-level course in bridge programs. But passing rates for college-level classes were 61% for students who took traditional courses and 40% for students who took courses in bridge programs for the current study. The current study findings were not consistent with Waycaster (2001), who found that the effectiveness of developmental programs in preparing students for college-level work was positive.

Implications

Underprepared students need developmental courses (Carriuolo, 1994) and bridge programs (Keim et al., 2010) to advance to college-level mathematics courses for their degree completion. It is evident that high schools are not adequately preparing students for college entrance based on their SAT/ACT scores, GPAs, and state placement tests results (Harwell et al, 2014).

Developmental courses and bridge programs try to give students the extra help needed for their success in college-level courses. The students in the bridge programs have mandatory tutoring, study hall, and advising. While traditional developmental courses offer tutoring, the individuals must decide to attend the walk-in tutoring sessions. Based on the study, the bridge program prepared students to persist to the next level of developmental mathematics courses, as well as successfully complete them. For bridge students, 32% persisted to college-level courses, compared to 20% of students in traditional courses. However, the percentages of students who took the first developmental course and subsequently passed the college-level course were very similar: bridge students (13%) and traditional students (12%).

In this study, a higher percentage of bridge students persisted to college mathematics courses than did students in traditional developmental courses. Although traditional courses and

bridge programs do not grant college credit for passing developmental courses, the sequence is necessary to advance to college-level courses. Educators are concerned that students might become burned out with taking the required developmental courses. Parents and students view this as being costly without seeing the true value. Future research will show whether these students will drop out of college at a higher rate.

Recommendations

When bridge programs are not feasible, traditional courses include some of the extras that were offered in the bridge programs. Mandatory tutoring in traditional developmental mathematics courses should be required. A study hall component should be offered. Introduction to university support services should be provided.

Future Research

Interviews should be added as a research project in order to access how students felt about traditional mathematic courses offered during the semester and the bridge programs offered in a 4-week course during the summer. Comparison of a residential bridge program and nonresidential bridge program should be added to the interviews. Students' high school records to include low high school GPAs, SAT scores, ACT scores, age, and socio-economics status could be added to better determine equivalence of students' samples.

Future research should conduct a follow-up of students who were in bridge programs and traditional courses to find out how many actually graduated from college. Also, research should determine how many students completed their degrees and what contributions they have made to society.

A similar study would be beneficial in the developmental English language arts courses in both traditional courses and bridge programs as they relate to persistence and success of

college-level courses. A comparison of the persistence and success rates of bridge students, traditional developmental students, and students who did not need developmental work would further add to the assessment of the efficacy of developmental courses.

References

Arendale, D. (2000). Strategic planning of the National Association for Developmental Education. *Journal of Developmental Education*, *23*(3), 2-10.

Astin, A. W. (1991). Assessment for excellence: The philosophy and practice of assessment and evaluation in higher education. A conceptual model for assessment. New York, NY: Macmillan.

Attewell, P., Lavin, D., Domina, T., & Levey, T. (2006). New evidence on college remediation. *The Journal of Higher Education, 77*(5), 886–924.

Barnett, E. A., Bork, R. H., Mayer, A. K., Pretlow, J., Wathington, H. D., & Weiss, M. J. (2012). Bridging the gap: An impact of eight developmental summer bridge programs in Texas, Columbia Academic Commons. New York: Community Research Center, Teachers College, Columbia University. doi:10.7916/D8BK19FX

Boden, K. (2011). Perceived academic preparedness of first-generation Latino college students. *Journal of Hispanic Higher Education, 10,* 96–106. doi:10.1177/1538192711402211

Bonham, B. S., & Boylan. H. R. (2011). Developmental mathematics: Challenges, promising practices, and recent initiatives. *Journal of Developmental Education*, *34*(3), 2–26.

Bowen, W. C., Chingos, M. M., & McPherson, M. S. (2009). *Crossing The Finish Line (Completing College at America's Public Universities)*. Princeton, NJ: Princeton University.

Boylan, H. R. (2008). How research contributes to access and opportunity around the world. *Journal of Developmental Education, 32*(1), 2–3.

Boylan, H. R., & Bonham, B. S. (2007). 30 years of developmental education: A retrospective. *Journal of Developmental Education, 30*(3), 1–4.

Boylan, H. R., Bonham, B. S., & Tafari, G. N. (2005). Evaluating the outcomes of developmental education. *New Directions for Institutional Research, 125,* 59–72.

Brock, T. (2010). Young adults and higher education: Barriers and breakthroughs to success. *Future of Children*, *20*(1), 109–132.

Bulger, S., & Watson, D. (2006). Broadening the definition of at-risk students. *The Community College Enterprise, 12*(2), 23–32.

Cabrera, N. L., Miner, D. D., & Milem, J. F. (2013). Can a summer bridge program impact first-year persistence and performance?: A case study of the New Start Summer Program. *Resource in Higher Education, 54,* 481–498. doi:10.1007/s11162-013-9286-7

Carlozo, L. (2012, March 27). Why college students stop short of a degree. *Reuters Edition*. Retrieved from http://www.reuters.com/article/2012/03/27/us-attn-andrea-education-dropouts-idUSBRE82Q0Y120120327

Carriuolo, N. (1994). Why developmental education is such a hot potato. *The Chronicle of Higher Education, 48*(32), B1–B2.

Casazza, M. E. (1991). Who are we and where did we come from? *Journal of Developmental Education, 23*(1), 2–6. Retrieved from http://www.ncde.appstate.edu

Cohen, A. M., & Brawer, F. B. (1989). Enhancing literacy and basic skills. *The American Community College* (pp. 253–282). San Francisco, CA: Jossey-Bass.

Davis, R. J., & Palmer, R. T. (2010). The role of postsecondary remediation for African American students: A review of research. *Journal of Negro Education, 79*(4), 503–520.

Deil-Amen, R. (2011). Beyond remedial dichotomies: Are "underprepared" college students a marginalized majority? *New Directions for Community College, 155,* 59–71. doi:10.1002/cc.458

Demetrious, C., & Schmitz-Sciborski, A. (2011). Integration, motivation, strengths and optimism: Retention theories past, present, and future. In R. Hayes (Ed.), *Proceedings of the 7th National Symposium on Student Retention, 2011, Charleston,* (pp. 300–312). The University of Oklahoma. Retrieved from http://studentsuccess.unc.edu/files/2012/11/Demetriou-and-Schmitz-Sciborski.pdf

Felner, R. D., Bolton, N., Seitsinger, A. M., Brand, S., & Burns, A. (2008). Creating a statewide educational data system for accountability and improvement: A comprehensive information assessment system for making evidence-based change at school, district, and policy levels. *Psychology in the Schools, 45*(3), 235–256. doi:10.1002/pits.20294

Gallard, A. J., Albritton, F., & Morgan, M. W. (2010). A comprehensive cost/benefit model: Developmental student success impact. *Journal of Developmental Education, 34*(1), 10–25.

Goudas, A. M., & Boylan, H. R. (2012). Addressing flawed research in developmental education. *Journal of Developmental Education, 36*(1), 2–13.

Hansen, M. J., Evenbeck, S. E., & Williams, G. A. (2008). The influence of a summer bridge program on college adjustment and success: The importance of early intervention and creating a sense of community. Retrieved from osdae.iupui.edu/Research-and-Publications/Publications

Harwell, M., Medhanie, A., Dupuis, D., Post, T. R., & LeBeau, B. (2014). A multisite study of high school mathematics curricula and the impact of taking a developmental mathematics course in college. *Educational Research Quarterly, 37*(3), 1–21. http://eric.ed.gov/?q=source%3a%22Educational+Research+Quarterly%22&id=EJ1061925

Hern, K. (2012). Acceleration across California: Shorter pathways in developmental English and math. *Change: The Magazine of Higher Learning, 44*(3) 60–68.

Hoyt, J. E. (1999). Remedial education and student attrition. *Community College Review*, *27*(2), 51–72.

Hughes, A. N., Gibbons, M. M., & Mynatt, B. (2013). Using narrative career counseling with the underprepared college student. *The Career Development Quarterly, 61,* 40–49. doi:10.1002/J.2161-0045.2013.00024.X

Keim, J., McDermott, J. C., & Gerard, M. R. (2010). A community college bridge program: Utilizing a group format to promote transitions for Hispanic students. *Community College Journal of Research and Practice, 34,* 769–783. doi:10.1080/10668920802319104

Lesik, S. (2007). Do developmental mathematics programs have a causul impact on student retention? An application of discrete-time survival and regression-discontinuity analysis. *Research in Higher Education, 48*(2), 583. doi:10.1007/s11162-006-9036-1

Maloney, W. H. (2003). Connecting the tests of their lives to academic literacy: Creating success for at-risk first-year college students. *Journal of Adolescent & Adult Literacy, 46*(8), 664–673.

McCurrie, M. K. (2009). Measuring success in summer bridge programs: Retention efforts and basic writing. *Journal of Basic Writing*, *28*(2), 28–49.

Michael, A. E., Dickson, J., Ryan, B., & Koefer, A. (2010). College prep blueprint for bridging and scaffolding incoming freshmen: Practices that work. *College Student Journal, 44*(4), 969–978. doi:10.1177/193220

Mills, M. (1998). From coordinating board to campus: Implementation of a policy mandate on remedial education. *The Journal of Higher Education, 69*(6), 672–697.

Porter, E. (2013, June 26). Dropping out of college, and paying the price. *New York Times, B1*. Retrieved from http://www.nytimes.com/2013/06/26/business/economy/dropping-out-of-college-and-pay

Reddick, R. J., Welton, A. D., Alsandor, D. J., & Platt, C. S. (2011). Stories of success: High minority, high poverty public school graduate narratives on accessing higher education. *Journal of Advanced Academics, 22*(4), 594–618. doi:10.1177/1932202X11414133

Singh, K., Granville, M., & Dika, S. (2002). Mathematics and science achievement: Effects of motivation, interest, and academic engagement. *The Journal of Educational Research, 95*(6), 323–332.

Tanaka, G. (2002). Higher education's self-reflexive turn: Toward an intercultural theory of student development. *The Journal of Higher Education, 73*(2), 262–296.

Texas Higher Education Coordinating Board. (2008). *2008 Progress Report*. Retrieved from Texas Higher Education Coordinating Board website http://www.thecb.state.tx.us/reports/DocFetch.cfm?DocID=1555&Format=PDF

Texas Higher Education Coordinating Board. (2009). *Biennium Funding Request Summary* (2010–2011), 1–6. Retrieved from Texas Higher Education Coordinating Board website http://www.thecb.state.tx.us/reports/PDF/1719.PDF?CFID=27311985&CFTOKEN=91797749

Texas Higher Education Coordinating Board. (2010). *The Challenge*. Retrieved from Texas Higher Education Coordinating Board website http://www.thecb.state.tx.us/download.cfm?downloadfile=E50254DD

Texas Higher Education Coordinating Board. (2012). Lamar state colleges' and Texas state technical colleges' accountability measures and definitions. Austin, TX: Definition for Developmental Education. Retrieved from Texas Higher Education Coordinating Board website http://www.txhighereddata.org/Interactive/Accountability/Measures.cfm

Tierney, W. G., & Garcia, L. D. (2007). Preparing underprepared students for college: Remedial education and early assessment programs. *The Journal of At-Risk Issues, 14*(2), 1–7.

Tinto, V. (1993). *Leaving college: Rethinking the causes and cures of student attrition.* The University of Chicago Press.

Udoudo, J. U., Eddy, J., & Spaulding, D. J. (1994). Factors related to student retention in community college developmental education mathematics. *Community College Review, 22*(2), 37–42.

Waycaster, P. (2001). Factors impacting success in community college developmental mathematics course and subsequent courses. *Community College Journal of Research and Practices, 25*(5-6), 403–416.

Wright, G. I., Wright, R. R., & Lamb, C. E. (2002). Developmental mathematics education and supplemental instruction: Pondering the potential. *Journal of Developmental Education, 26*(1), 30–35.

Appendices

Appendix A

IRB Application

University of the Incarnate Word
IRB Approved
Application No. 14-09-004

Application for Institutional Review Board Approval
University of the Incarnate Word

Title of Study: A Comparison of Success Rates of At-Risk Students Enrolled in Summer Programs and Semester Developmental Courses at a Private University in South Texas

College/School or Division/Discipline: Dreeben School of Education

INVESTIGATORS			
Principal Investigator - A UIW PI must be designated for all projects in which UIW is engaged in research.			
Name: Patsy Newborn	Phone #: 210-313-5463	E-mail: pnewborn@uiwtx.edu	Address: 23602 Northwood Lane San Antonio, Tx. 78259
Co-Investigator(s) – List all co-investigators and provide contact information (list each on a separate line)			
Name:	Phone #:	E-mail:	Address:
Faculty Supervisor of Student Project, Thesis, or Dissertation			
Name: Dr. Judith Beauford	Phone #: 210-829-3171	E-mail: beauford@uiwtx.edu	Address: Gorman Building
CITI TRAINING			
☒ All investigators (including faculty supervisors) have completed CITI training and are currently certified			

RESEARCH INFORMATION		
Research Category: ☒Exempt ☐Expedited Review ☐Full Board Review		
Number of Subjects: 1,367	Number of Controls: 1,220	Duration of Study: One year
Does this research involve any of the following (check all that apply): ☐ Inmates of penal institutions ☐ Institutionalized intellectually handicapped ☐ Institutionalized mentally disabled ☐ Committed patients ☐ Intellectually handicapped outpatient ☐ Mentally disabled outpatient ☐ Pregnant women ☐ Fetus in utero ☐ Viable fetus ☐ Nonviable fetus ☐ Dead fetus ☐ In Vitro fertilization ☐ Minors (under 18)		

FUNDING DISCLOSURES
Funding source: ☒None ☐Internal ☐External ☐Pending
List all external funding sources (pending and awarded):

Click here to enter text.
The funding provides for (select all that apply): ☐ **Investigator release time or compensation** ☐ **Research materials** ☐ **Graduate assistants, student workers, or other project employees** ☐ **Travel** ☐ **Other:** Click here to enter text.
Financial Conflict of Interest
Please describe any financial interest in the funding organization or any similar organization (stocks, board membership, etc): Click here to enter text.

SIGNATURES		
Original Signatures are required. This application will not be processed until all signatures are obtained. Ensure the document is finalized BEFORE collecting signatures. Any subsequent edits will remove signature verification and require the collection to begin again.		
Signature of the Principal Investigator **The undersigned accepts responsibility for the study, including adherence to DHHS, FDA, and UIW policies regarding protections of the rights and welfare of human subjects participating in the study. In the case of student protocols, the faculty supervisor and the student share responsibility for adherence to policies.**		
Name:	**Signature:**	**Date:**
Patsy Newborn	DocuSigned by: Pat Newborn 3044D9E7B4044B9...	9/13/2014
Signature of Faculty Research Supervisor – Required for student investigators **By signing this form, the faculty research supervisor attests that he/she has read the attached protocol submitted for IRB review, and agrees to provide appropriate education and supervision of the student investigator above.**		
Name:	**Signature:**	**Date:**
Judith Beauford	DocuSigned by: JBeauford 166E9D6A21874B4...	9/15/2014

APPROVAL SIGNATURE(S)		
Signature of the IRB College/School Representative:		
Name:	**Signature:**	**Date:**
Kevin B. Vichcales	DocuSigned by: Kevin B. Vichcales 7B0628B8F6F7473...	9/15/2014
Signature of the IRB Chair (if needed)		
Name:	**Signature:**	**Date:**

RESEARCH PROTOCOL

Section 1: Purpose Help

The purpose of this study is to compare the success rates of students in a summer 4-week program with students in the regular semester-long developmental course. Data from students enrolled in the four-week (twenty sessions) developmental courses and regular semester (16-weeks) developmental courses will be analyzed to determine factors that lead to success.

Section 2: Background and Significance Help

More diverse students are enrolling in college and many of them are less academically prepared for college-level classes. Bonham and Boylan (2011) report that developmental mathematics programs, "have become road blocks to students' success. Courses which were originally designed to promote students' academic achievement, now often serve as barriers to their achievement" (p. 2). The number of remedial courses needed increased the dropout rate. Students who had enrolled and completed several remedial courses may become discouraged and drop out of college (Hoyt, 1999).

Boylan and Bonham (2007) referred to developmental education as a broad range of courses, services delivered in a manner to help student retention while ensuring successful completion of postsecondary education goals. According to the National Center for Education Statistics, a large percentage of colleges and universities offer some form of developmental education.

This study will compare the success rates of students enrolled in developmental mathematics courses during 2008-2009 and 2009-2010 academic years at a private, HSI university in South Central Texas with an enrollment of about 6000.

The results of this study may give institutions of higher education insight into how to structure developmental courses effectively.

Section 3: Location, Facility and Equipment to Be Used Help

Data will be collected from the University of the Incarnate Word's Department of Institutional Research. Analysis will occur at UIW and at the researcher's home office. The researcher will utilize a personal computer and SPSS for analysis.

Section 4: Subjects and Informed Consent Help

The subjects of this study are 1,367 University of the Incarnate Word students enrolled in Mathematics 0318 and 0319 during the 2008-2009 and 2009-2010 academic years (summer, fall, spring):

	Summer 4-week	Standard 16-week
Math 0318	81	762
Math 0319	33	458
	147	**1220**

The data set will provide students' grades and demographic information, but will be de-identified prior to the investigator's receipt of the data set. Because many of the subjects have graduated, informed consent will not be sought.

Section 5: Subject Compensation Help

No compensation will be provided to subjects.

Section 6: Duration Help

The investigator will require one year to complete the study activities. Organization and analysis of data will require 6 months; compilation and descriptive analysis will require 6 months.

Section 7: Research Design (Description of the Experiment, Data Collection and Analysis) Help

This research will compare the effectiveness of two approaches of developmental education, 4-week summer programs and standard 16-week courses. The study will examine the grades subjects made in these two types of developmental mathematics courses as well as grades in college-level mathematics courses taken later.

The data analyzed will include:

1. Developmental mathematics grades of the developmental mathematics cohort (2008-2009 and 2009-2010 academic years):
    a. Summer 2008
    b. Fall 2008
    c. Spring 2009
    d. Summer 2009
    e. Fall 2009
    f. Spring 2010
2. Demographic information on the developmental mathematics cohort:
    a. Gender
    b. Ethnicity (Hispanic, White, all minority/unknown, international/non-resident alien)
    c. SAT/ACT scores (SAT math score, ACT math score converted to SAT equivalent)
    d. High school GPA
    e. First-generation status (self-declared on application, FAFSA)
    f. Financial assistance (PELL eligibility)
    g. Age (traditional, under 23 and adult, over 23)
3. 1000-level mathematics coursework of the developmental mathematics cohort:
    a. College Algebra 1304
    b. College Geometry 1306
    c. Introduction to Probability and Statistics 1310 or 2303
    d. Other 1000-level mathematics courses
4. Cumulative mathematics GPA (by 4-point-scale GPA)

Once the data are organized, statistical tests will be run and results compiled. The investigator will use a sequential explanatory research design with descriptive analysis comparison of at-risk students [defined by low SAT/ACT scores (below 500), low-income, first-generation status, or low math SAT/ACT score] in the two types of developmental courses.

Data will be analyzed by comparing grades obtained from the developmental courses and the college-level mathematics courses. Persistence will be measured between the types of developmental courses (4-week summer programs and standard 16-week courses) as completion of the mathematics course series. Data on series completion will be limited to students who completed the series before the current academic year.

Section 8: Risk Analysis Help

Possible risk for subjects is a breach of their confidential academic information. The risk to subjects is minimal due to the deidentification of the data. Data will be provided using demographic groupings to prevent identification.

Section 9: Confidentiality Help

The academic and personal information for each subject will remain confidential. The confidentiality will be protected by storing information on a password protected computer in my home office. I am the only person with access to my home office. A back-up copy will be stored on a password-protected flash drive.

The aggregated data will be used for a doctoral dissertation and perhaps an academic publication or presentation.

Section 10: Literature Cited Help

Bonham, B. S., & Boylan. H. R. (2011). Developmental mathematics: Challenges, promising practices, and recent initiatives. *Journal Developmental Education*, *34(3)*, 2-26.

Boylan, H. R. & Bonham, B. S. (2007). 30 years of developmental education: A retrospective. *Journal of Developmental Education, 30(3)*, 1-4.

Hoyt, J. E. (1999). Remedial education and student attrition. *Community College Review*, *27(2),* 51-72.

Appendix B

IRB Approval Letter

9/15/2014

Patsy Newborn
4301 Broadway, CPO 311
San Antonio, Texas 78209

Dear Patsy:

Your request to conduct the study titled *A Comparison of Success Rates of At-Risk Students Enrolled in Summer Bridge Programs and Semester Developmental Courses at a Private University in South Texas* was approved as an exempt study on 9/15/2014. Your IRB number is 14-09-004. Any written communication with potential subjects or subjects must be approved and include the IRB approval number. Electronic surveys or electronic consent forms, or other material delivered electronically to subjects must have the IRB approval number inserted into the survey or documents before they are used.

Please keep in mind these additional IRB requirements:

- This approval is for one year from the date of the IRB approval.
- Request for continuing review must be completed for projects extending past one year. Use the **IRB Continuation/Completion form**.
- Any desired changes in proposal procedures must be approved by the UIW IRB prior to implementation except when necessary to eliminate apparent immediate hazards to the subjects. Use the **Protocol Revision and Amendment form**.
- Prompt reporting to the UIW IRB of any unanticipated problems involving risks to subjects or others.
- IRBs are filed by their number. Please refer to this number when communicating about the IRB.

Suspension or termination of approval may be done if there is evidence of any serious or continuing noncompliance with Federal Regulations or any aberrations from the original application.

Congratulations and best wishes for successful completion of your research. If you need any assistance, please contact the UIW IRB representative for your college/school or the Office of Research Development.

Sincerely,

Rebecca Ohnemus, MAA, CRA

Rebecca Ohnemus, MAA, CRA
Research Officer
University of the Incarnate Word IRB