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# The Impact of Community College Developmental Education Programs on Student Success

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by

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Declaration of Originality

I do hereby declare and attest to the fact that this is an original study based solely upon my own scholarly work here at Lindenwood University and that I have not submitted it for any other college or university course or degree here or elsewhere.

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Abstract

With more people enrolling in college today, community colleges face a higher percentage of students who do not have college-level skills. To meet the needs of the underprepared student, colleges established developmental education programs. This study examined the success of developmental programs through examination of secondary data using a z-Test for difference in means, Chi-Square test for Independence, Pearson Product Moment Correlation Coefficient, and ANOVA. Through use of these statistical tests, the researcher analyzed the differences between the data and compared the variables from each institution to determine areas of strength and weakness in student outcomes to link with use of strategies within the developmental program. The variables examined included ratio of student-to-teacher in remedial courses, remedial course completion, GPA, retention rate for developmental students, and average enrollment in remedial courses. For this study, three community colleges in the midwest region of the United States agreed to provide data. Each offered its students a developmental education program.

After employing statistical tests to determine which community college developmental program, among three institutions of higher learning, showed success, the researcher found that not one college showed success across all areas. In examining retention rates among the three institutions, Brown College showed a statistical difference with higher retention rates. When comparing retention rates to course withdrawal, the researcher did not find a relationship. However, completion rates for developmental courses were the highest at Green College. Further analysis of completion rates and withdrawal rates showed Brown College's completion rates were related to course

withdrawals. After analyzing the dependent variables GPA, teacher-to-student ratio, and type of developmental program attended, the researcher found no statistical relationship to exist with student success.

Since community colleges continue to struggle with meeting the needs of underprepared students, this research study may provide valuable insights on effective changes for program success. Further research into developmental education programs at the institutions yielding statistical differences could provide strategies for improvement at other midwest community colleges. Developing partnerships with area high schools to address and align expectations may improve students' skills for college-ready level courses.

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## Chapter One: Introduction

George Washington Carver (n.d.) believed "education is the key to unlock the golden door of freedom" (para. 1). Carver's quote marks the beginning of an era of changes in educational opportunity resulting in increasing civil rights throughout the United States (Cohen & Kisker, 2010). Since Carver spoke these words, the door to educational opportunity opened to new populations. Individuals previously denied access began pursuing higher education degrees in increasing numbers from 1890 to 2011 (Sass, 2011).

Earning a post-secondary degree in the past created a new educational opportunity. Kamenetz (2010) reported enrollment in college continues to increase as more students attend college. The opportunity for participation in higher education opened to a more diverse student population. Some students enrolled in college to gain new skills for the job market. Kirsch, Braun, Yamamoto, and Sum (2007) claimed the workforce skill set is changing, and jobs require more knowledge and skills to meet global competition. Existing jobs will require different job skills employing complex thinking processes using higher order thinking skills. This change means more students are entering college to learn and to be more skilled in the workforce. As McCabe (2003) reported, foreign competition has taken jobs where Americans are under skilled. Community colleges offer the chance for workers to earn a degree or training in workforce skills.

In 1965, the Junior College Act created the community college system as a separate entity from the common school system (Lach, 1998). The Illinois General Assembly started the Illinois Community College Board (ICCB) in 1965 to administer

the structure of the public community colleges across the state. The principles and mission of ICCB set the precedence of the community college mission statement of open access. Open access permits students to pursue college even though the students are underprepared. According to Visher et al. (2008), community colleges' mission of open admissions, lower price, and accessibility provided an avenue for students with different racial, cultural, and academic backgrounds. The diverse population served by community colleges includes minorities, recent high school graduates, adults needing new skills, high school dropouts with a GED, and low income.

The difficulty faced by community colleges then became supporting academically underprepared students so they can achieve academic success. Furthermore, Zeidenberg (2008) indicated many community college mission statements focused on meeting the needs of all students, but particularly addressed the challenge of underprepared students. Still, Russell (2008) and Levin and Calcagno (2008) reported many states discourage public four-year institutions from providing developmental coursework, leaving the burden to two-year colleges. Community colleges designed developmental programs for helping students to learn skills through courses and access to academic and nonacademic supports for progressing their education.

**Problem**

Some high school students graduate with plans to attend college only to find their dream deferred. Most colleges and universities require entering students to take a placement test in the academic areas of math, English, and reading to determine academic college readiness. After taking the college placement tests, about 66% of the students discover they are missing skills necessary for college-level courses (Strong American

Schools, 2008). In this case, before taking college-level courses students must complete one or more semesters developmental coursework first.

The views surrounding developmental education are mixed. Those opposed to developmental education believe colleges should not offer programs for students missing skills that should have been taught in high school (Alliance for Excellent Education, 2006; Russell, 2008). The basic skills a high school student possesses for reading, writing, and math should be sufficient for college-level course work; although, not all students are recent high school graduates but are considered non-traditional because they have been out of high school for several years. Some non-traditional students return to college to gain workforce skills or obtain a degree. All students enrolling must take the college placement test, which showed most students are lacking in one or more area, requiring the missing skills to be remediated. Legislation does not support the opposing view against developmental education but instead believes in providing an educational opportunity (Parker, 2007; Russell, 2008). Community colleges support educational opportunity through their open admissions, programs, and services. As a result, some form of developmental education becomes the way to resolve the difficult challenges some students face.

Regarding developmental education, most opponents' objections concentrated on eliminating these programs for the underprepared student (Parker, 2007). Developmental coursework does not count as credit toward degree completion, which is devastating to the student. Students pay for courses that does not earn credit toward their degree and cannot take college level courses without completing the developmental courses. For those students enrolled in the developmental courses, Zeidenberg (2008) found those

students leave college early because of time, money, and postponement of earning credit toward a degree. Along with the challenge to assist the underprepared, higher education institutions continued to meet objections from politicians about offering developmental education courses. Additionally, Russell (2008) stated an argument from politicians surrounding remediation because politicians feel developmental courses cost the taxpayers twice because the skills were taught in high school. Furthermore, Parker (2007) declared some stakeholders against developmental education feel remediation is expensive.

However, opponents disagree and believe developmental education programs serve a purpose in helping students attain academic access. In essence, Wilmer (2008) believed remediation assisted students in their pursuit of a higher education leading to economic and social success. Community colleges postulated the need to serve the underprepared population through the mission statement by providing developmental education services to citizens in the community. Without developmental courses teaching the missing skills, students without college-level skills would fail the college-level courses limiting their opportunity to earn a degree or workforce skills for obtaining employment. Moreover, Bettinger and Long (2009) reported the cost to the community for lack of remediation might be high due to "higher incidence of unemployment, government dependency, and incarceration" (p. 761) because students may drop out or refuse to take the developmental courses, therefore, never enrolling. Providing developmental courses would give students the option to earn a college degree or workforce skills, whereas, without the developmental courses, these students would be denied the opportunity to take degree-earning courses and further improvement in skills.

Of course, Attewell, Lavin, Domina, and Levey (2006) contended the expectations in academics and study skills for high school and higher education do not align; therefore, students were not prepared for college, which is where developmental education assists.

A diverse student population desired the possibility to improve their lifestyle, and college provided the opportunity. Although developmental coursework does not earn degree credit, the benefit of developmental coursework moved students toward success. However, Bettinger and Long (2007) reported developing a plan for students to progress through developmental programs at a faster pace, eliminating the higher incidence related to crime, unemployment, and dropping out when compared to students with less education.

**Definition of Terms**

The following defined terms found throughout the study will assist the reader in clarity:

**Best practices.** "In education, those instructional, assessment and administrative practices that are considered to be the most effective in serving students and ensuring their success" (Lizotte, Merisotis, & Phipps, 1998, p. 37).

**College admission.** According to the catalogs from the institutions in the study, each college determines the requirements needed to enroll. Colleges look at high school transcripts, ACT and SAT scores, and college placement test scores to determine in which classes a student can enroll. Students not meeting the required placement test scores must enroll and earn a "C" in developmental courses before taking college-level courses.

**College-level courses**. "Courses that are degree-applicable or meet college level graduation requirements…courses transferable to a four-year institution" (Boroch et al., 2010, p. 3)

**Community college.** "An educational institution offering and focusing on several elements for meeting the needs of the student including transfer education, career education, developmental education, continuing education and workforce training" (Glossary of United States Educational Terminology, 2010, para. 26). Each college in the study is a public institution with open admission criteria.

**Completion rate.** For this annually recorded value, the institution "collects number of degrees and other formal awards (certificates) conferred. These data are reported by level (associate's, bachelor's, master's, doctor's, and first-professional), as well as by length of program for some" (Integrated Postsecondary Education Data System Glossary, n.d., section C, para. 40).

**Course completion.** "Percentage of credit hours completed out of those attempted by entering degree or certificate-seeking undergraduate students, by semester and annually" (ICCB, 2010).

**Cut off score.** An established score on a college placement test set by institution for determining placement in college-level and developmental courses (Callan, 2006).

**Developmental education.** "A continuum of courses and services ranging from tutoring and advising to remedial coursework on college and university campuses" (Boylan, Bonham, Clark-Keefe, Drewes, & Saxon, 2004, p. 7).

**Developmental education model.** "Any organized collection of courses and services designed to help underprepared students succeed" in college (Boylan, 2002, p. 3).

**Grade point average (GPA).** A student's GPA is based on "a four point scale where the "average of grades earned in all courses taken during a term divided by the number of credits" (Assefa, 2010, para. 62) and based on enrollment in high school or college.

**Graduation credit.** "Credit given by an educational institution that counts toward graduation in a particular program of study" (Lizotte, Merisotis, & Phipps, 1998, p. 37) and may count toward transferring to another institution.

**Graduation rate.** Two-year college students who complete a certificate or degree within 150% of normal program time (Integrated Postsecondary Education Data System [IPEDS], n.d.a, section G, para. 14).

**Institutional credit.** "Credit given by an educational institution that does not count toward graduation in a particular course of study, but may be used for financial aid or other purposes" (Lizotte et al., 1998, p. 37).

**Remedial courses.** This term is often synonymous with developmental. "Instructional courses designed for students deficient in the general competencies necessary for a regular postsecondary curriculum and educational setting" (IPEDS, n.d.a, section R, para. 8).

**Retention rate.** "A measure of the rate at which students persist in their educational program at an institution, expressed as a percentage" (IPEDS, n.d.a, section R, para. 20).

**Student success.** For this study, a student earning a grade of C or better in a course equated to student success and counted toward measured course completion and retention rates measures student success.

**Student support services.** "All those services that serve students outside the classroom, including advising and counseling services" (Lizotte et al., 1998, p. 38).

**Transfer rates.** "Total number of students who are known to have transferred out of the reporting institution" (IPEDS, n.d.a, section T, para. 15).

**Under-prepared student.** "Any student who needs to develop their cognitive or affective abilities in order to succeed in post secondary education experience" (Boylan, 2002, p. 3).

**Withdrawal.** "Formal process of leaving an institution before (and without) completing a degree" (Assefa, 2010, para. 150). Students may withdrawal from a course not earning a grade or credit.

## Purpose of the Study

The purpose of this study was to determine student success by comparing the developmental education model at three community colleges. A quantitative methodology examined student success through the following variables: GPA, course completion, retention, withdrawals from courses, and teacher to student ratio. Through the analysis of secondary data gathered from each community college, the researcher analyzed the differences between the institutions' student achievement and compared the existing remediation models at each institution to determine the relationships between achievement and the types of support offered. Each college participant employs a form of developmental education as described in the Description of Colleges in this Study.

The results may lead to identifying successful services and best practices for remediation, leading to changes in programming for improvement in student success, as well as promote further study in the area of developmental education at the community college level.

**Research Questions**

The questions considered in this study:

1. What community college developmental education program efforts have a significant effect on course completion and retention?
2. What relationship, if any, exists between student withdrawal from a developmental course and course completion and retention?
3. Which of the following measured categories have the greatest effect on student success: teacher to student ratio in developmental education classes, course completion rate for developmental coursework, retention rate for developmental students, and average enrollment in developmental courses?

**Hypotheses Statements**

**Null Hypothesis 1**. There will be no difference between developmentally enrolled student cumulative grade point average and non-developmentally enrolled.

**Null Hypothesis 2.** The developmental education program offered at the community college attended will be independent of the teacher-to-student ratio in developmental education classes.

**Null Hypothesis 3.** The remediation model offered at the community college attended will be independent of the course completion following developmental work.

**Null Hypothesis 4.** The developmental education model offered at the community college attended will be independent of the retention rate.

**Null Hypothesis 5.** The remediation model offered at the community college attended will be independent of enrollment in developmental courses.

**Null Hypothesis 6.** There will be no relationship between student withdrawal and course completion.

**Null Hypothesis 7.** There will be no relationship between student withdrawal and retention.

**Null Hypothesis 8.** There will be no difference between average values in retention rate when comparing data between each of the three study institutions.

**Null Hypothesis 9.** There will be no difference between average values in completion rate when comparing data between each of the three study institutions.

**Null Hypothesis 10.** There will be no difference between average values in the number of enrollments in developmental courses when comparing data between each of the three study institutions.

**Description of Colleges in Study**

Within five years of the inception of ICCB, each of the study institutions was established. Community colleges adopted open admission policies; therefore, the community college sector accepted more students needing access to developmental coursework. This research study focuses on developmental education services at three community colleges. For this study, students with documented disabilities are not included in the developmental education group but fall under another category. The students in the study could be recent high school graduates, returning adults, or have

general education development (GED) certificates. Due to the anonymity of subjects within the study, the researcher did not know which students fell into any of these categories. The colleges in the study were all state, public institutions. Each of the three colleges offered some form of developmental education program to serve underprepared students.

The students at each institution commuted to the college. Each college in the study offered dual credit partnerships with local high schools within the district. Typically, the dual credit courses were tied to honors level courses and must meet the cutoff scores required on the placement test. With dual credits earned, these students enrolling in the colleges in the study did not count as new students; therefore, the new student enrollment numbers appeared low.

A pseudonym identified each community college participating in the study. In the descriptions, information gathered came from each college's catalog or website, Illinois Higher Education Board, and ICCB. More information pertaining to each college can be found in Chapter Three.

**Green College.** Green College has many satellite locations across seven counties within the District. The college's enrollment for the fall 2009 term was 8,169. Green College's student population represented a high percentage of Caucasian students with only 22.7% representing minority subgroups. Green College offered transfer degrees, career programs, and several partnerships for Baccalaureate degrees with four-year universities. The mission statement stressed empowering students.

***Developmental education program.*** The program definition comes from personal communication with the Director of Student Development and Counseling (DSDC) at the

institution. The administration at Green College adopted the decentralized developmental education program model, meaning deans from each academic area supervised the courses (DSDC, personal communication, February 14, 2011). Each dean hired a program coordinator to monitor, teach, and supervise the courses. These coordinators staffed and developed curriculum with the dean and instructors. In the math department, most full time math faculty taught both transfer level and developmental education math courses; however, adjunct instructors sometimes taught developmental and college-level because of financial issues related to staffing. The developmental coordinator for reading and English worked with the program coordinator for English and literature for staffing and developing curriculum (DSDC, personal communication, February 14, 2011). Two full time English faculty members plus the developmental coordinator taught the English courses. One full time faculty and several adjunct instructors taught all developmental reading courses. All developmental courses had a full time faculty member assigned with the instructor for assessment purposes. Every five years a review of the developmental program occurred (DSDC, personal communication, February 14, 2011). A student success center housed in the library offered tutoring services in the areas of math, reading, and writing under a different program and director (DSDC, personal communication, February 14, 2011). In 2009, the developmental education program ranked number four as one of the top undergraduate programs offered at the college based on enrollment (IPEDS, n.d.b).

**Brown College.** The college serves nine counties in its district. Brown College's enrollment for the fall 2009 term was 5,337 students. In terms of offerings, Brown College supported 29 associate degree career programs and 74 certificate programs. The

student population for 2009 delineated a high percentage of Caucasian students with only 8.3% represented minority subgroups. The mission statement of Brown College supported a commitment to lifelong student learning.

***Developmental education program***. The program definition comes from personal communication with Assistant to the President for Planning and Institutional Improvement (APPII) at the institution. Brown College changed the name from developmental education to transitional education program. The transitional program did not stand alone but was part of the math and English departments and monitored within these departments by the deans (APPII, personal communication, February 2, 2011). Full time faculty members taught the transitional courses, but some adjunct faculty members taught the courses as needed. Tutoring services were available at the Success Center (APPII, personal communication, February 2, 2011). Brown College received a Title III grant; of which one component involved revision of the curriculum in the transitional program, placement test scores, and test piloting revisions (APPII, personal communication, February 2, 2011). A special tutoring lab/classroom enabled by the Title III grant provided priority tutoring to the transitional studies students (APPII, February 2, 2011).

**Gray College.** This college comprises all or part of 15 counties in central and central southern Illinois covering 4,115 square miles. Gray College's enrollment for the fall 2009 term was 7,677 students. Gray College's student population was characterized by a high percentage of Caucasian students with only 10.4% represented minority subgroups. Gray College did offer educational services at regional education centers

through the college district. The mission for Gray College focused on quality, accessibility, and affordability for individuals within the community.

***Developmental education program.*** The program definition comes from personal communication with the Dean of Arts and Humanities (DAH) and the Dean of Math and Science (DMS) at the institution. Gray College offered developmental curriculum in three areas: composition, two levels of reading, and mathematics. For the developmental composition courses, three full-time tenure track faculty members taught the courses. For reading, the college considered adding a third level for basic literacy but has not. For this new course, the faculty placed a minimum score to more accurately place students based on their needs (DAH, personal communication, March 3, 2011). For the reading courses, the students are retested using the Nelson-Denny during the first week of classes to confirm the accuracy of their placement (DAH, personal communication, March 3, 2011). From the new results, a student moved to a different section or was released from the developmental reading course (DAH, personal communication, March 3, 2011). The college employed two full-time tenure track faculty members to teach developmental reading. For math, the developmental courses earned two hours of credit, met for two hours twice a week, and lasted 12 weeks (DAH, personal communication, June 16, 2011). One developmental math course, geometry, was listed for three credit hours. The developmental math courses were taught by both full-time and part-time faculty. Additionally, the College had other services that were available to students. The college offered one-on-one instruction and tutoring in the Learning Lab, Writing Center, and Math Center (DAH, personal communication, March 3, 2011). The Math Center offered early evening hours (DAH, personal communication, March 3, 2011).

## Limitations of the Study

This study has several limitations. The study participants represented a self-selected sample representing one state, Illinois. One institution provided the researcher with an incomplete, summarized data set while the other two institutions provided raw data. The researcher's methods examined relationships to provide support for recommendations for program changes and future research, but did not establish causation.

**Limited participants.** The number of colleges participating limited the scope of this study. There were 48 community colleges in the state of Illinois. The researcher contacted six community colleges initially, and three community colleges chose to participate. Thus, the researcher used a self-selected sample. The researcher examined three community colleges and did not utilize data from four-year institutions in the state.

**Location.** The community colleges selected were in the state of Illinois. Each college was different in admission criteria, placement test cut off scores, and developmental education services offered. Results from this study may vary if applied across states and types of colleges.

**Incomplete set of data.** One of the institutions provided a summarized data set. Raw data for this institution was unavailable for some of the statistical tests in the study design. Data collected from one institution was not in proper format for use in some comparisons for the formulation of results. Brown College's data represented several semesters of fall students placed in a cohort; whereas, both Green and Gray College provided raw data for the whole group of students in the developmental category. Students could transfer to another college or to one of the colleges in the study affecting

the retention rate. The researcher did not know if any members of the samples left one college in the study and went to another college participating in the study. Therefore, a student could be included in the data multiple times, if they attended more than one of the colleges in the study.

**Placement test.** Each institution employed a placement test system for evaluation of student skills before entrance. The institutions did not all use the same placement test, and the qualifying cut off scores determined for developmental coursework varied by institution.

Limitations listed within this study lend to motivation for further research in the field. Participation in a future study could provide positive opportunities for students in more community colleges and four-year institutions in the state. Future research may benefit from a collection data across multiple states for analysis. The results gathered in this study support recommendations for changes to make programs more effective and for the replication of similar results in other programs.

**Summary**

This research study encompasses five chapters. Chapter One begins with the problem faced by colleges. The purpose of the study examines the models of developmental education at three community colleges to examine the impact on student retention, course completion, and academic success.

Chapter Two reviews the literature on community college developmental courses. The literature review examines postsecondary education, past and future, through legislation and history. Components of developmental education and policy are examined. Since the study evaluated developmental education models, Chapter Two

explains how programs and support services assisted in student success. The chapter concludes with evaluation of programs for assessing success of students.

## Chapter Two: Review of Literature

Entering college with developed college-level skills enables students to progress to obtaining workforce skills or a degree with success; however, 66% of students entering college today fail to possess the prerequisite skills. For individuals previously denied college entrance, legislation, such as the Morrill Acts, the GI Bill, the Civil Rights Acts, and the Higher Education Act passed by the United States government created opportunity, yet, conceived a new challenge for community colleges. As enrollment at institutions increased, so did the number of underprepared students, which created a new challenge. From the results of low student placement tests scores, higher education devised a solution, developmental education programs, for confronting the deficiencies and preparing the student for college success.

This chapter reviews different aspects of the literature on higher education and developmental education. First, the review starts with the history of post-secondary education and explains how college access afforded individuals an opportunity for higher education. This new opportunity presented a challenge to higher education; therefore, colleges began developing policies. Community colleges articulated their role by establishing open access mission statements; whereas, four-year institutions used selective criteria for admission. Fewer students enrolled in developmental courses at four-year institutions than community colleges. Each institution determined and designed program delivery and support services offered. Institutions founded programs and services that assisted students in completion of developmental courses. Success requires more than just having programs and services; therefore, institutions must develop an evaluation process to effectively measure this success. Finally, the review of

literature ended with discussion of conducting evaluations on programs and research-based practices to determine whether a program or practice was successful.

**History and Legislation in Higher Education**

The need for developmental education was not a new problem facing colleges and universities. Batzer (1997) traced developmental courses to Yale University as early as 1828 because students entered the university without the necessary skills. Likewise, Casazza (1999) reported during the 19th century the founder of Cornell questioned the admissions process because so many of the applicants were unsuccessful in earning admittance to the university due to the lack of skills required by the college entrance exam. The response from the professors surrounding the issue of the underprepared student differed significantly from Cornell president's view because the professors did not believe they should teach missing skills (Casazza, 1999). Harvard's president realized freshmen entering were ill-prepared for academic coursework leading the university to provide courses to prepare students for college-level success.

The problem with denying students from entering college was that this costs the college money. Colleges had to figure out a way not to lose money from rejected students who were missing college-level skills. Selective colleges felt they admitted enough college ready students into the programs; therefore, these colleges simply did not accept underprepared students not meeting their admission requirements. Some four-year institutions did not offer remediation courses because institutional policy prohibited developmental coursework on campus (Parker, 2007). In some instances, institutions offering remedial coursework sometimes denied the existence of students needing this type of coursework or reported lower numbers. Most often, the selective colleges

rejected underprepared students; conversely, the non-selective community college accepted this student.

For some individuals in the United States, the latter part of the 19th century brought about new opportunity due to two landmark events: the Civil War and the Morrill Acts. Before both events, higher education institutions only accepted wealthy white males who studied Latin (Thelin, 2004). During the Civil War, the higher education population depleted, but the war prompted new higher education initiatives. Thelin (2004) believed the government's political opportunity influenced education through legislation, hence, the creation of the Morrill Acts. In the "Morrill Act of 1862, the legislation granted each state 30,000 acres to establish colleges for the purpose of agriculture and mechanical arts" (Ryan & Cooper, 2010, p. 346). Congress enacted a second Morrill Act in 1890 "forbidding granting money to any land-grant college with discriminating admission policies" (Ryan & Cooper, 2010, p. 346). The Morrill Acts created a partnership amid the government and postsecondary institutions. The Morrill Acts served to improve production through education; therefore, the door was open to those individuals previously discriminated against in higher education but certain groups still remained separated (Cervantes et al., 2005).

At the beginning of the 20th century, the United States Government did not create any new federal initiatives related to postsecondary education. Moving into the middle of the 20th century, the government's legislation passed with the intention to ameliorate the inequality in the higher education system. For example, the GI Bill of Rights of 1944 gave military personnel the opportunity for a post-secondary education, which at the time was a privilege reserved only for the wealthy, helping to give the opportunity to a lower social class (United States Department of Veterans Affairs, 2009). *Brown v. The Board*

*of Education* was a turning point for the K-12 sector in which the Supreme Court ruled separate was not equal (Cervantes, et al., 2005; Essex, 2008; Ryan &Cooper, 2010). With the court's decision, *Brown* helped to open the door wider to gaining equal access to education for minorities. Furthermore, a social change began with the Civil Rights Act. The start of separate is not equal affected all facets of minorities' and women's lives.

Before the 1960s, Brock (2010) found society's existing norms and a lacking federal role in education also served to keep postsecondary education for the elite. Zhao (2009) believed the launching of *Sputnik* caused fear in America, leading to the creation of the National Defense Education Act of 1958, which included loan support for higher education. At the beginning of the 1960s, Wilmer (2008) considered the Civil Rights Movement a push to increasing access to higher education. The goal of the Civil Rights Movement was to level the playing field by providing rights and opportunities to those denied before (Brock, 2010). The Civil Rights Movement of the 1960s focused on individuals in poverty as well as minorities. The passing of the Elementary and Secondary Education Act assisted schools with high concentrations of poverty segueing the passing of the Higher Education Act (HEA) in 1965.

For higher education, the passing of HEA in1965, and the subsequent reauthorization every five years continued to provide access and financial assistance to help disadvantaged students (Cervantes et al., 2005). HEA launched the federal government as a major participant in constructing higher education policy, laying the foundation for the chance of an equal opportunity to attend college. From 1965 to present, alterations in legislation and societal expectations continue to increase the federal government in higher education (Cervantes et al., 2005). The federal government

continues to provide limited funding by setting policies, which dictates the path higher education must follow (Achieve, 2009).

**Open Access**

With all the legislation from the past, the prospect of open access to college has become a reality. Brock (2010) explained how in 1970 the City University of New York allowed, "all high school graduates to pursue degrees regardless of academic preparation and community colleges adopted similar policies" (p. 112). Calcagno and Long (2008) reported community colleges began to embrace open admission policies to accept everyone. However, the colleges also sought to employ developmental classes to raise skill levels so students could effectively take college-level coursework and graduate. This equated to great needs for developmental education. As Roman (2007) pointed out, the community colleges' open access policy created an "open door to employment and higher paying jobs, [it] helps build the tax base, and develops people who contribute to the political and local community" (p. 19).

Higher education has become part of the mission in recent education reform. Both Kamenetz (2010) and Shear (2010) illuminated President Obama's education plan to multiply the number of college graduates. The organization, Achieve (2009), reported President Obama's education plan—Race to the Top—promotes developing college readiness, improving high school graduation rates, and increasing college enrollment. The plan for Race to the Top was to reform education so more students start postsecondary education with the skills to succeed, consequently needing less remediation saving both money and time.

As Adamy (2010) cited the "old-line manual-skills jobs like manufacturing are disappearing while white collar job growth remains strong" (para. 3). Hence, Shear (2010) reported eight of 10 new jobs require workforce training or higher education. Studies by Adamy (2010) and Hecker (2005), as well as Shear (2010) pointed to people needing the skills from postsecondary education to obtain employment. In order to help individuals attain higher education, postsecondary education must be affordable and accessible. As Kamenetz (2010) reported regarding a statement from the deputy undersecretary of education stating "increasing access means reaching the kids of who are hard to reach—the low income and underrepresented minorities who are not completing college at the same rates" (p. 25). As the United States continues to lift itself out of economic crisis, Pascarella and Terenzini (2005) believed a college education reaps economic benefits for the nation and the individual.

While higher education policy makers continue to debate over whether two-year or four-year institutions should offer developmental education, most community colleges serve the need for remediation based on a universal consensus in their mission statements (Oudenhoven, 2002). For instance, at Massachusetts Bay Community College, the mission stated the college "offers open access to high quality, affordable academic programs with having a primary responsibility for offering developmental programs for individuals who seek to develop the skills needed to pursue college-level studies" ("The Challenges of," 2006, para. 2). Similarly, the Normandale Community College's mission included an appeal to all people to improve their lives by partaking in higher education ("The Challenges of," 2006). At Normandale, the college placed value on all learners realizing individuals enter college with assorted life experiences and backgrounds leading

to varying levels of skill readiness ("The Challenges of," 2006). The mission statements mentioned share similarities with all community college mission statements, meaning the institutions were not denying underprepared students because of the open access admission policies. The two-year community college was offering students an opportunity to education, whereas, the four-year university might deny admission (National Center for Public Policy and Higher Education, Southern Regional Education Board [SREB], 2010).

Currently, colleges and universities have encountered students who bring diverse backgrounds to college. Thanks to legislation, the opportunity for open access to higher education was available, but some in the public believe colleges should be selective, therefore, limiting who can attend (Brothen & Wambach, 2004). Students planning to attend college choose from highly selective, less selective, and non-selective postsecondary institutions. Each higher education institution requires a high school diploma. A highly selective institution necessitated students possess high grade point averages and test scores and participated in college preparatory curriculum and extracurricular activities (National Center for Public Policy and Higher Education, SREB, 2010). The difference in acceptance between a highly selective and less selective institution was the extras in which the student participated such as organizations, clubs, volunteer work, and scholarly awards. While selective colleges offer remedial courses, enrollment showed smaller numbers of students in the courses because many selective institutions push students who need developmental education services to the two-year non-selective institutions within the state. While the selective college saw the

underprepared student as a threat to excellence, community colleges existed to ensure the opportunity for the student to reach excellence.

A qualitative study by Parker (2007) about California State University and City University of New York found no universal agreement about college readiness and no support that community colleges were more effective at remediation than four-year institutions. In fact, Cohen and Kisker (2010) reported an increase from four-year institutions pushing developmental education courses to the community college and predicted this change would continue. Under prepared students more likely enrolled in the non-selective, two-year institution since open access institutions only required a high school diploma (National Center for Public Policy and Higher Education, SREB, 2010). The community college enrolled more than half of the college population because admission criteria were more open to diverse ethnic and academic backgrounds. Students often chose the non-selective community college because of assured admittance and cheaper cost.

**Opposition to Developmental Education**

Opponents of developmental education expressed difficulty understanding how students graduate from high school and are ill prepared for college-level work. Higher education institutions, especially community colleges, sought to rectify the problem through developmental education programs; however, the opposition believed this approach caused wasteful spending.

Government officials in the United States raised the question as to why students even considered college if they were underprepared for college. Perhaps students experienced difficulty finding a job without more education. Some students entered

college because they needed to stay on their parents' health insurance plan. Developmental education closed the gap through coursework and supports specific to deficiencies in skills. However, Attewell et al. (2006) stated political officials in the United States viewed remedial courses as proof that a multitude of college students were not academically ready, meaning high schools did not adequately prepare students. In some states, selective institutions denied underprepared students and delegated developmental education to the community college sector. Continuing the political perspective, Attewell et al. examined the perspective of the political officials; the continuation of remediation implied that institutions had decreased their standards for admissions but community colleges accepted everyone. Still, Perin (2005) raised concerns about the discrepancy of entering students' skill levels compared to college-level skills. In fact, Bettinger and Long (2009) found many students without the developmental education services dropped out of college or did not attend at all leading to "higher incidence of unemployment, government dependency, and incarceration" (p. 761) leading to high costs to the community. If students had limited access to educational services, students were less likely to attend and required government assistance—welfare.

Examining American high school seniors, Kamenetz (2010) found nine out of 10 seniors planned to attend college. The National Center for Education Statistics (2010) found many colleges, especially at the community college level, experienced enrollments rising. Zeidenberg (2008) explained community colleges enrolled half the college students; thus, the college must figure out how to solve challenge of underprepared students, financial burden, and retaining students. Conversely, students dropped out due

to many different obstacles: more time, extra money, and the stigma associated with developmental education courses. Over the last decade, Kamenetz (2010) pointed to an increase of 53% for students enrolled in some kind of education beyond high school. With this influx in enrollment, the institutions did not receive government funding for developmental education, and the cost fell to the institution or student. For instance, Russell (2008) found the state of Florida had a law in place that allowed only community colleges and one four-year university to offer remedial coursework. By limiting the institutions that can offer developmental education, the institutions did not receive government funding for developmental education, and the cost fell to the institution or student. Russell (2008) reported in 1999 that California State University System instituted a one-year policy for finishing developmental coursework. Unsuccessful completion of developmental coursework resulted in removal and recommendation to a community college. The City of New York raised admission standards at their four-year institutions, phased out remedial coursework, and established policies requiring students to complete remedial coursework at a two-year college if they score low on placement tests. The National Center for Public Policy and Higher Education and SREB (2010) revealed these policies limited access and educational opportunity, therefore, sending more students to the community colleges.

As more students begin enrolling in college, Bailey (2009) stated developmental education was one of the most challenging issues facing community colleges. Some states pushed developmental education to the community college whose open admission policy accepted students regardless of their academic background and provided services to improve skills. The need for developmental education continued to exist because more

students enrolled without the necessary skills for completing college-level work, thus a larger percentage of the community college population lacked these skills. Moreover, Levin and Calcagno (2008) found about two thirds of students lacked skills in reading, writing, and math, yet, were coming to college with a high school diploma. The challenge for community colleges was improving the skill level for deficient students. Strong American Schools (2008) found for the two-year college, just fewer than one million students enrolled in remedial classes in one year.

After graduating and earning high school diplomas, many students planned to enter college because this was the next step toward a better job. Spielman (2010) quoted Chicago's Mayor Daley asking the question, "How can you take someone who has an eighth grade reading level into a college?" (para. 3); Stuart (2009) found students graduating from high school with a grade point average of 3.5 did not meet the necessary scores on placement tests, indicating the need for developmental courses. Strong American Schools (2008) reported many high school students lacked exposure to rigorous coursework at the high school level and expected to receive passing grades for mediocre work. The placement test results showed a discrepancy in skills between the high school courses and college-level courses. Strong American Schools (2008) discovered newly high school graduates most likely passed through high school taking difficult classes and working hard to maintain their 3.5 GPA; however, the students took the placement tests and discovered skill discrepancies. The rigor, demand, and expectations of high school courses differ significantly from college-level courses. Two types of students appeared to be missing skills. One student followed the college preparation track that was missing rigor and demand, and the other student struggled and

followed a non-college preparation track. To sum up, neither student had the required skills for college-level work. The selective institutions used the placement test as a screening measure to keep out the underprepared student. For some students, the only choice for college fell to a non-selective institution.

Based on the research of the topic of developmental education, some opponents questioned whether developmental education actually assisted students in attaining degree or workforce training. Bahr (2007) made the analogy to the "Matthew Effect: those who have the greatest need were least likely to remediate successfully, while students who require the least remediation were most likely to remediate successfully" (p. 696). Students who needed more remedial classes and scored low on the placement test fell under the label of seriously deficient, and McCabe (2000) found students labeled as seriously deficient had a 20% chance of success. Bahr (2007), Brock (2010), and Levin and Calcagno (2008) discerned negative aspects associated with developmental education included stigma, cost, likelihood to dropout, and paying twice the money and time for skills. Each aspect affected students' success in college and may lead to students' withdrawal from college.

When students entered college, most planned to start a program and complete a degree. Unfortunately, Bettinger and Long (2009) discovered some students may have felt stigmatized because they were perceived by faculty and peers as poor performers. In addition to the stigma, students could not enroll in upper-division courses forcing the student to complete the developmental coursework first. With remediation, students were grouped and tracked into specific classes with other lower-ability students in the same course. In fact, Bettinger and Long (2009) noticed grouping students in this manner

increased the chance for students to have negative peer effects on each other. Deil-Amen and Rosenbaum (2002) conducted a study using a stigma-free approach because the authors believed community colleges encouraged students to recognize academic weaknesses and lower their goals associating a stigma with developmental education. To help eliminate the stigma and change the approach, Deli-Amen and Rosenbaum gathered data using a qualitative method from two community colleges and found misperceptions among most students because they do not understand the ramifications of developmental coursework. In the end, the stigma might have caused the student to withdrawal or drop the classes.

**Advocacy for Developmental Education**

In advocating for developmental education programs, Wilmer (2008) argued, "without remediation the students would not achieve academic success" (p. 5). Over one million students began the enrollment process and found they were deficient in college-level skills. As a result, Visher et al. (2008) found the problem at higher education institutions became how to assist the increasing numbers of students academically underprepared for success in college. To address the issue of providing support for underprepared students, postsecondary institutions established developmental education programs. Half of the students entering developmental courses found the rigor of the coursework to be difficult; therefore, Visher et al. stated the majority who planned to earn a certificate, a degree, or transfer dropped out relating back to Bahr's (2007) discussion of the Matthew Effect.

Much like society, higher education adapted to meet the needs of the student population it serves. While the needs and demographics of college student changed over

the years, colleges proceeded to adapt as well. Examining the past of education, Brock (2010) stated how legislation passed increased access to postsecondary education for all individuals, not just the elite. Some research even indicated that students were going to need more than a diploma to meet the workforce demands in order to compete globally (Hecker, 2005; McCabe, 2003; Strong American Schools, 2008). Colleges worked to assist students who came to college underprepared to complete college-level work by offering interventions for success, which included various forms of developmental education. For this reason, Bailey (2009) stated community colleges were using developmental education to adapt to the student so the student could continue on to meet his or her educational goal.

In the 1980s, a high school graduate could support his or her family with a job so less than half of high school graduates enrolled in higher education. Zeidenberg (2008) reported the difficulty of sufficiently supporting a family on a high school diploma. Additionally, Strong American Schools (2008) declared society expects students who employ a wide range of skills and knowledge, which places pressure on students to pursue some type of postsecondary education. With the changing job market and global competition, students need skills to compete in the workforce. In fact, the National Center for Education Statistics (2010) projected student enrollment in postsecondary education in fall of 2009 to raise to 19.6 million; whereas, Brock (2010) pointed out that enrollment in 1965 was 5.9 million. The postsecondary education enrollment quadrupled, raising the demand to meet the varying needs of a diverse population. Given these points, Bettinger and Long (2009) professed students enter with diverse needs; colleges received more students needing developmental courses in order to complete

college-level work to compete in the workforce.

Defining the underprepared student became the new challenge, and developmental education programs worked to meet the demand. Accordingly, Barr and Schuetz (2008) defined underprepared as many "factors that together indicate that a student is not yet emotionally, socially, or academically prepared for college level work" (p. 8). Further, Calcagno and Long (2008) discussed alleviating the unpreparedness by colleges developing programs with interventions to assist students with becoming successful by using the terms remedial or developmental education, and defined "as coursework below college-level offered at a postsecondary institution" (p. 1). Equally as important, Higbee, Arendale, and Lundell (2005) believed focusing on the underprepared student encompassed more than just missing academic skills, but it also focused on the emotional and social features such as attitudes, self-concept, and independence. Moreover, the National Center for Developmental Education (2010) and Wilmer (2008) extended the focus on the whole student by providing non-academic support through counseling, orientation, advising, and tutoring. Research from Barr and Schuetz (2008) and Boylan (2002) affirmed success for the whole student not just the academic. Without the focus on the whole student, results ended with students refusing, withdrawing, or failing courses and never completing any postsecondary education with reliance on the high school diploma.

In order to assist the student population, almost all community colleges implemented some form of developmental education. As reported by the National Center for Education Statistics Table 330 (2009), the percentage of public two-year degree granting institutions offering developmental services in 2008-2009 was 99.6 %. In 2008,

Strong American Schools stated approximately 43% of community college student populations took at least one remedial course. Although, Vandal (2010) reported this percentage did not include students who might have slipped through the gap and completed college-level coursework without enrolling in remedial classes, or the students who were required to enroll in developmental coursework, did not, and never came back to college. In addition, Zeidenberg (2008) discussed the missions of community colleges and their slight difference in wording, but they all share one core mission, which was to provide the opportunity for low-income and academically weak students to continue their education and obtain useful skills for the job market.

The opportunity to earn postsecondary education skills created an improvement to the economy as supported Zhao's (2009) link to a country's economic prosperity. In 2006, the Alliance for Excellent Education reported the nation suffered an economic loss of more than $2.3 billion when developmental education students dropped out without a certificate or degree. By offering developmental education programs, postsecondary institutions of higher education could help students persist toward a degree and increase benefit to society by reducing reliance on government assistance. From the research presented, staying in school seemed easier but getting students to draw this conclusion could be a challenge.

Kirsch et al. (2007) reported for the last two decades employers demanded college-educated and highly literate workers. To sustain a highly skilled workforce, the educational system must change to assist students with gaining the skills necessary for heading into the global economy. To emphasize the change, Kirsch et al. detailed a survey about the changes in manufacturing in the United States from the manufacturing

industries total employment from 33.1% in 1950 to 10.7% in 2003. From Hecker's (2005) research regarding employment, he predicted close to 80% of careers would demand some form of higher education by 2014 meaning enrollment in higher education institutions continued to climb. As the United States headed into the latter part of the 20th century, the country must invest in the people by continuing to offer education opportunities in order to close in on the global demands in the world (Kirsch et al., 2007). Remediation gives the underprepared student the opportunity to earn a degree or improve workforce skills. Bettinger and Long's (2009) results suggested without remediation courses, underprepared students' chances of dropping out increased leading to "a higher incidence of unemployment, government dependency, and incarceration leading to high costs" (p. 761). Further, Phipps' (1998) study reported contributions from earning a college education improved the community by "increasing tax revenues, greater productivity, reduced crime rates, and increased quality of civic life" (p. 18).

**Policy**

The debate over tackling the formidable challenge of serving academically underprepared students in college continues with forming policies. With implemented policies, Boroch et al. (2010) stated many factors affected students' success in the college environment, with the chief issue being lack of college-level preparedness. Colleges addressed this issue by accepting the students but did not institute clear policy regarding the handling of programs. Therefore, Boroch et al. stressed institutional commitment to setting policies and effective practices became the sources aiding the students on the path to achievement. As stated by Boylan (2002), developmental education will not work if ignored; instead, a developmental education program must follow a coordinated plan of

action to attain success. For policy to succeed, Wilmer (2008) found developmental education students needed various supports to complete coursework.

Course completion rates become a variable institutions measure of student success. Course completion means the student completed the course earning college credit. Vandal (2010) reported completion rates were validated predictors of a college's success in academia; yet, students enrolled in developmental courses showed a lower completion rate. From Table 1, the completion rates from Bettinger and Long (2005), Calcagno and Long (2008), and the Illinois Community College Board (2011) showed similar results although math differed according to the Calcagno and Long results.

Table 1

*Research Data on Developmental Education Course Completion Rates*

| Study | Completion rate for developmental courses | | Research Design | Population | Data Collected |
|---|---|---|---|---|---|
| Bettinger and Long (2005) | 66% | | Regression analysis | Ohio public two and four-year colleges | Longitudinal data 13,000 over five years |
| Calcagno and Long (2008) | Math<br>30% | Reading<br>64% | Regression and instrument variable | Florida public two-year colleges | State data warehouse 3 years |
| ICCB Report (FY 2010) | 65.3% | | Comparison using a averages | Illinois public two-year community colleges | FY10 730,335 students |

Critics of developmental education argued for changes in policies, deletion of services, or selective admissions. The argument against developmental education pointed to limits for opportunity. When highly selective criteria determined admission, Brothen and Wamback (2004) believed the chance to improve skills preempted forward movement. The community college did not define excellence as exclusion and instead focused on excellent services to many. Retention rates focus on student's persistence semester to semester. In Waycaster's (2001) comparison of retention rates, she found in examining six consecutive semester retention rates for developmental students to be between 61.9% and 80.6% while for non-developmental students the rate was between 42.1% and 61.9% yielding result of higher rates of success for developmental education students. Collins (2009) and Erisman and Gao (2006) ascertained that instituted policies made through legislation and internally in institutions of higher education took shape to design a plan for tackling this formidable challenge.

While policies existed, the problem heightened because of the variance in policies for all colleges, even with colleges in the same states (Collins, 2008). Higher education institutions justified their prudence and autonomy in setting policies for admitting students because each college faced different circumstances regarding the student population. Each college determined developmental education services needed and established specific criteria such as acceptable and minimum test scores and grade point average for enrollment. For instance, students accepted at one college faced denial and the requirement to take a remedial class at another college due to a minimum score on a placement test (Collins, 2008). Another differing factor existed in the arbitrary predetermined cutoff score on college placement tests because each institution sets the

score on the placement tests for identifying developmental education students allowing for variance amongst institutions (Oudenhoven, 2002). From the history of higher education, open access policies continued to fall into many of the mission statements of many community colleges so setting state policies would assist community colleges in defining uniform policies. When applying to college, the easy part for students was gaining access; the hard part was being academically prepared for the college coursework (Callan, Finney, Kirst, Usdan, & Venezia, 2006).

After graduating from high schools, students made plans to move to higher education; however, Venezia, Callan, Finney, Kirst, and Usdan (2005) found a theme between secondary and higher education concerning the gap in the two systems creating a division for students to cross in order to acquire education and training beyond high school. In addition, Mazzeo (2000) and Levin and Calcagno (2008) insisted politicians see developmental education as the high school's responsibility, not the college's. Moreover, Parker (2007) reported politicians feel the students did not learn these skills in high school, and politicians argue the skills were paid for twice. The quandary Russell (2008) claimed revolved around primary and secondary education systems not preparing students for higher education, therefore, collaboration between higher education and K-12 must happen through the formation of K-16 committees. Critical to this point, Venezia et al. maintained K-12 and higher education committees came together working to produce a bridge between both structures, which directly affected the student. With this in mind, K-12 did accept responsibility to teach college readiness standards; however, both systems must work collaboratively on developing college readiness standards of a comprehensive nature.

As reported by Collins (2009), Conley (2006), and Russell (2008) the problem of underprepared students pointed to a poor alignment of skills between high schools and colleges when examining developmental education and the number of students who need it. The organization, Achieve (2010) stressed the need for standards to communicate core knowledge and skills to stakeholders. The Common Core Standards movement developed standards to meet the skill level students need for college and workforce training. Likewise, Conley (2006) discussed how state standards linked to statewide assessments required by No Child Left Behind did not correlate with college standards nor did passing the state assessment lead to college success. Furthermore, Zeidenberg (2008) explained how the two separate education entities lacked communication and operated independently of each other; whereas, coordination could have helped students prepare for transition to college. Alliance for Excellent Education (2006) stated that for students to compete in the 21st century, high schools must prepare successful students; high schools and colleges must align their content knowledge to skills needed for today. Of course, Callan et al. (2006) recommended starting the coordinating process between high school and higher education by focusing on quality and level of coursework, best instructional practices, and alignment with postsecondary expectations as three areas of reform.

Looking at state accountability systems, Erisman and Gao (2006) studied whether this type of system worked to improve performance and drive policies. Callan et al. (2006) recommended states can use the state wide database for setting priorities in relation to passing or setting legislation. In another instance, Jenkins and Boswell (2002) conveyed how some states require institutions to input certain data allowing studies to be

conducted for examining the effect of remediation on completion and persistence rates. However, the National Center for Public Policy and Higher Education and Southern Regional Education Board (2010) reported not all states hold institutions accountable for completion and persistence rates knowing the data measures would hold the higher education institution to a higher standard. Additionally, Kazis (2009) suggested a shared, collaborative approach focusing on utilizing data related to effective interventions and strategies to increase persistence and completion rates. Fulton (2010) illustrated data's aid to "evaluate and revise policy decisions, and strategies, delivery approaches and funding priorities" (p. 3). The focus and results the of data should consider solutions not the failures with a developmental education program and a more effective program delivery.

**Program Delivery**

To examine the implementation of developmental education program models, Boroch et al. (2010), and Boylan, Bliss, and Bonham (1997) studied the two common means for delivery: centralization and mainstreaming. Some institutions took the two approaches and combined pieces of each to create their own approach. Research from Boylan et al. (1997) supported the move to centralized developmental programs, whereas, In fact, Perrin and Charron (2006) addressed the need for community colleges to create a productive learning environment serving the academically underprepared student to reach successful outcomes, and each college must make the decision for which model would work in their environment.

The centralized model falls under one administrative unit, meaning all the programs are housed in one department and focused only on remedial and developmental education (Boylan et al., 1997). Perin and Charron (2006) believed the organization of

the remedial classes—as a centralized program—kept the instructors and focus of the courses together, while another academic area might see teaching a developmental course as a burden. The centralized model separated developmental courses from college-level courses creating a developmental program functioning as a separate entity. Boylan et al. (1997) discovered 52% of institutions followed the centralization model.

The colleges in this research study followed a decentralized or mainstreaming approach. Perin and Charron (2006) found some individuals assigned to teach developmental coursework held an expertise in a specific academic area related to remedial skills, while other faculty members were only teaching developmental coursework and may not know the standards and expectations for college-level coursework. With a centralized approach, Boroch et al. (2010) believed students needed to know the expectations for the next level of coursework and found it difficult with this approach because faculty may not know the expectations as students move forward to college-level work.

Another approach employed by other institutions was a mainstream or decentralized model. In this model, courses and services are tied to individual academic programs. Within this model, Perrin and Charron (2006) explained how each academic area fell into its corresponding academic department; faculty teaching in the specified academic areas anticipated the skills needed for the next level of coursework and focused on those skills. Instructors' concerns dwelled on feeling unable to meet the needs of the developmental education student in their department. Consequently, Boroch et al. (2010) maintained with mainstreaming, the stigma of developmental education was reduced

because the courses were housed in associated academic departments; conversely, a centralized program is a separate department, which can make the stigma more obvious.

For program effectiveness, the delivery of services in programs was key to evaluating success. Boylan et al. (1997) pointed out the pros and cons to centralized and mainstreamed models may be the coordination of courses and services not the model. Despite this fact, Boroch et al. (2010) supported the centralized approach stating it includes more "accessible, highly integrated support services and more motivated, highly qualified faculty teaching the developmental courses" (p. 21). Whereas, Perin (2005) believed the mainstream model was a benefit, but departments did not hire instructors with developmental education experience. Ultimately, Perin (2005) stressed factors that may influence the choice of models included institutional policies surrounding developmental education and academic department sizes.

**Support Services**

Transitioning to postsecondary education, Boroch et al. (2010) found complications for students because the students possessed limited academic tools and emotional maturity, therefore, making it difficult to meet the new expectations of the college setting. Boroch et al. considered anxiety, apprehension, and complex educational issues to dictate the type of support services necessary to meet individual student needs. Each community college needed to design an active model focused on the success and retention of developmental students. Boroch et al. and Wilmer (2008) concurred on several model elements—college orientation, advising and counseling, early warning alert systems, and tutoring—leading to effective practices in the developmental program for colleges to ensure success.

Entering college for the first time, students found the new environment overwhelming and claimed colleges could help students through the experience by offering an orientation or student success course (Wilmer, 2008). For instance, Boroch et al. (2010) reported the Florida Community College System offered Student Life Skills, a course focusing on teaching test taking strategies, time management skills, and study skills. Hence, Wilmer expanded the definition of the orientation course to include orienting students to understanding "academic policies, communication skills, campus resources, relationship-building skills, stress-reduction skills, time and financial management, decision-making skills, and goal-setting skills" (p. 15). A more comprehensive approach—implementing non-cognitive tests for assessing the whole student—helped students recognize their learning styles, personality traits, and abilities. In the Florida system, Boroch et al. reported students taking Student Life Skills were "17% more likely to succeed academically" (p. 96). The orientation course built a bond to the institution and provided knowledge to students about the first semester of college. Furthermore, Zeidenberg (2008) explained many students entering college needed help with adjusting to college academics, so orientation courses show positive results. Nevertheless, Zeidenberg further contended, "most community colleges lack the incentive to provide the course due to state funding, which focuses on total enrollment not retention or completion rates" (p. 57).

Another support service deemed necessary, advising and counseling, supported students in successfully planning their college experiences. For student retention, Wilmer (2008) found proper advising as one of the most important services. In addition, Brock (2010) stated most students needed guidance to "figure out which courses to take,

how to add or drop courses, apply for financial aid, and what resources are available" (p. 119). While Brock pointed out services for new enrollments, students needed services continued as they progressed through the college process with assistance in attaining prerequisites for graduation, major requirements, and transfer criteria. While advising was important, the high ratio of student to advisor, one to 1,000, made advising difficult for meeting the demands of students. Going one step further, Wilmer suggested advisors and counselors take an active role by following up with the students throughout the semester by monitoring grades and communicating about progress and student concerns or difficulties. Wilmer and Levin and Calcagno (2008) acknowledged counseling as a way of taking care of the whole student, leading to a proactive component in the developmental program. Moreover, Boroch et al. (2010) believed the counseling arrangements needed to be unrelenting because waiting and seeing did not work; the relationships students develop between advisors and counselors solidified the college connection, which in turn led to "improved first-term grade point average (GPA) and success" (p. 40).

Early alert systems offered an approach to catch students from failing so they could access support services. Boroch et al. (2010) described the early alert warning systems as "a proactive approach for academic and student service personnel to collaborate and identify students who need help and encouraging the students to seek assistance" (p. 43). As a proactive tactic, Wilmer (2008) described the early warning system as helping students and engaging advisors to assist before the situation became unmanageable, resulting in the student failing or withdrawing from classes. With the early warning system, the instructors would inform the advisor of problems with

attendance, grades, or other concerns. In turn, the advisor would compile the information received from instructors to plan a meeting with the student. The early warning system opened the door for additional opportunities for communication and support between the advisor, the faculty, and the student. Consequently, Boroch et al. reported students were more likely to finish the course with higher persistence rates when using the early warning system; furthermore, advisors helped "build relationships with students and assist the students with maintaining their educational goals" (p. 90).

Another support colleges offered was various academic supports or assistance with the learning process through tutoring services. The different tutoring services offered ranged from writing centers, math centers, study skills, computer labs, professional tutors, or peer tutors. As Wilmer (2008) pointed out, tutoring provided students the chance to ask questions or see the material explained differently, aiding in supporting different learning styles. However, Boroch et al. (2010) defined one problem with tutoring services revolve around students not accessing the services because some students see the support as stigmatizing; although, tutoring could be an effective tool as it reinforces social learning through collaboration during the learning process. Furthermore, Wilmer (2008) believed peer tutors who have taken the same classes could serve as a mentor and role model for students helping the developmental student toward success.

**Instructional Practices**

As the college instituted instructional practices for students, the practices designed must meet demands of the students. Examining the foundation, Boroch et al. (2010) and Boylan (2002) believed when building a developmental model, the

implementation of learning theory should use a cognitive model to support a comprehensive approach for effective development. In addition, Brock (2010) asserted developmental education in the past strongly used a behaviorist approach of memorization and repetition and should now incorporate a cognitive and motivational model. With the models, Boroch et al. explained the theories as connecting new concepts with prior knowledge encouraging the learner to contribute in constructing meaning and comprehension, helping the learner takes control of his or her learning, and working toward meeting goals. The cognitive and motivation theories help empower the student in his or her learning process.

After reading the research on theory in connection to adult learning, Boroch et al. (2010) and Boylan (2002) felt using theory for developing the program would solidify the foundation and support the practices. To do so, Brock (2010) clearly illustrated the need for change by some developmental coursework instructors who must transition from traditional methods that focus on repetition and memorization to more research-based methods. In fact, Perin (2005) identified different ways colleges changed the teaching format of developmental education, shifting away from the teaching of past courses.

When examining instructional practices, the amount of time spent in developmental education course time may influence student success. Sheldon and Durdella (2010) conducted a study on the relationship between course length and student success and delineated between compressed courses conducted during a shorter timeframe compared to the traditional 16-week course. However, Perin (2005) warned accelerating the course might decrease dropouts because some of the skills may not be taught, still leaving students without the necessary skills; however, Brock's (2010)

solution for students who fell just below college-level was to take the accelerated courses. Placement score results examined more closely might be a benefit to students who were close to the cutoff score because they could take a compressed course.

In a quantitative study conducted by Sheldon and Durdella (2010), data examined from a large community college compared students who took five to six week courses, eight to nine week courses, and 15 to 18 week courses. English and reading courses found the biggest increase in completion rates, but math showed a smaller increase. Students in the compressed courses were more likely to succeed meaning a decrease in student withdrawal. Furthermore, Perin (2005) found prerequisites for classes often slowed the student because certain courses must be completed before enrolling in the course, and accelerated courses or removal of the prerequisites helped students travel through chosen academic programs promptly. However, Sheldon and Durdella summarized a key aspect for understanding time relevance to mastering by offering different format options.

Innovative delivery approaches encourage change within many institutions; Boylan (1999) concluded combining innovation with traditional methods yielded greater student success. When designing instruction, Boroch et al. (2010) and Boylan (1999) stressed the importance of including critical thinking and problem solving skills to the developmental program. Remediation coursework centered on repetitive practice and not application of skills; therefore, students did not develop critical thinking skills. In addition, Boylan and Boroch et al. emphasized not teaching the critical thinking and problem solving skills in isolation, instead, using the more effective approach by embedding the skills into the academic areas. Similarly, Elder and Paul (2008)

highlighted the importance of teaching students how to take ownership of what they were learning and encourage teachers to devise instruction where students decipher the content. Clearly, Boylan (1999) believed critical thinking in beginning developmental courses assisted students in gaining more from the course, consequently, reducing the amount of time spent in developmental coursework.

Boroch et al. (2010) discussed specific curriculum and pedagogical tactics needed to encompass research-based best practices for developmental learners. Pearson Publishing Company developed several innovative tools for reading and math. The tools offered by this publisher gave students the chance to work and practice on deficits outside of the classroom. Instructors might require the tools for the class; however, the publisher charged a fee for a pass code the student needed to use the services. Following the cognitive and motivation theories, the technology tools allowed the student to take charge of his or her own learning. However, Boroch et al. (2010) and Boylan (2002) warned against relying on just technology for teaching; he suggested using the technology for tutoring and supplementing instruction.

Typically, students took developmental coursework in reading, writing, or math. Some students take courses in one subject area while others in multiple areas. Boroch et al. (2010) suggested combining reading and writing into an embedded curriculum because many students lack both skills. Some institutions implemented a technology tool called MyReadingLab. With math, Boroch et al. indicated several approaches for mathematics instruction "using technology, active and interactive learning, making connections, and using multiple strategies" (p. 63). Pearson Publishing offered a similar technology tool—MyMathLab—for math as a way for the student to practice skills on his

or her own time. The math suggestions by Boroch et al. focused on a student-centered atmosphere engaging the students in the activities. Likewise, Bailey (2009) emphasized linking the concepts and skills into meaningful applications across the curriculum, while Boroch et al. also believed students would see connections between the pieces of the curriculum, strengthening the knowledge base.

Paired classes, an interdisciplinary approach, connected a content-based course where students apply the skills from their developmental course to the content course. With paired courses, the two instructors for each course worked together on the content so the content was mutually supportive. In paired courses, Wilmer (2008) maintained students see the relevance of developmental coursework and "make progress toward earning credit toward their degree" (p. 16). Consequently, Boylan (1999) pointed out pairing courses could eliminate the amount of time a student spends in developmental coursework.

Boroch et al. (2010), Visher et al. (2008), and Zeidenberg (2008) articulated creating a learning community as another strategy that could improve the effectiveness of developmental education. Zeidenberg defined learning communities as a collaborative group taking courses together. Boroch et al. asserted in the learning community approach, students no longer felt isolated in classes or detached from other students; instead, the students shared an experience through collaborative interactions. Through collaboration, students established an active learning in learning. As with cooperative learning, Millis and Cottell (1998) explained collaboration continues to build peer support and connection aiding the learning process. Within learning communities, Visher et al. (2008) found improvement in gaining knowledge and "cross-curricular connections,

thereby, deepening learning and promoting higher-order thinking skills" (p. 8). Instituting a learning community approach forced student involvement in the learning process.

**Bridging the Gap Between High School and College**

In the United States, a large portion of high school graduates aspired to attend and graduate from college. As reported in Strong American Schools (2008), 43% of enrolled students needed to register for a developmental course. In particular, Vandal (2010) illustrated "the education system was failing students by inadequately preparing students for postsecondary education" (p. 4) which translated into high participation rates in developmental coursework in college, which often led to low completion rates. For this reason, Conley (2006) accentuated the implementation of programs for targeting the underprepared student in high school may reduce the need for developmental coursework.

Some colleges and high schools collaborate to form partnerships offering college courses at high schools. One type of program offered Credit-Based Transition Programs (CBTPs). Mechur-Karp and Hughes (2008b) defined CBTPs where "students to take college-level classes and earn college credit while still in high school… include Tech Prep, dual or concurrent enrollment, Advanced Placement (AP), International Baccalaureate (IB), and middle and early college high schools" (p. 839). Prior to the partnerships, Zeidenberg (2008) reported only top honor students took the AP courses but now with CBTP and dual enrollment all students can take classes counting for college credit. In addition, Mecher-Karp and Hughes (2008a) believed CBTPs account for positive outcomes such as raising academic standards, low achieving students reaching

higher standards, increased academic opportunity, and reducing the cost of college. Moreover, Berger, Adelman, and Cole (2010) reported dual credit can be positive, but students often do not take advantage of the availability of the dual credit courses. Hoffman, Vargas, and Santos (2009) affirmed dual enrollment programs opened the door wider to a broader range of students.

Early High School College Initiative posed another alternative to increasing students' preparedness and successful completion of postsecondary education. The purpose of Early College High School honed in on college campus experience, rigors of coursework, support services, and free college credits. With this initiative, Berger et al. (2010) believed moving the traditional high school setting into the Early College High School assisted students in understanding the college experience. Killough (2009) stressed the challenge faced by the Early College High Schools was in assisting struggling students to reach the goal of graduation and simultaneously earn college credit. Berger et al. (2010) identified the core principle of the Early College Model as student-centered support system, an academic and social need that helped address the underprepared, therefore, preparing students for higher education. From the Early College High School, a high percentage of the students in the program continued on to postsecondary institutions with higher rates of degree completion compared to their peers. However, Nodine (2009) believed with this solution careful consideration must be given; Early College High School Model was supported by a foundation and employs rules similar to charter schools, so replication may be difficult. Hence, Ongaga (2010) considered the Early College High School model a "rigorous and accelerated learning experience with close supportive and respectful school environment" (p. 376).

The demand for accountability, improvement, and continued student success is critical in developmental education programs. As Vandal (2010), reported colleges must examine their programs because a universal approach did not work and often led to numerous semesters of non-credit coursework that drained the bank account for all stakeholders. With this knowledge, Boroch et al. (2010) and Vandal stressed the importance of stabilizing and strengthening the developmental education programs. Consequently, Zeidenberg (2008) recommended the colleges take charge by instituting data collection and evaluation systems for discovering what were working. Program evaluation is one way to obtain this information.

**Program Evaluation**

Colleges encountered mounting pressure from government agencies to focus on data showing evidence of progress in retention and persistence rates. While the pressure for the K-12 sector to use data-driven, effective practices, higher education institutions did not have this sense of urgency when making decisions on policies, coursework, or completion rates (Grantmakers for Education, 2010). While pressure existed, colleges must account for student performance and success using a measurement tool. The need existed for a measurement tool that was effective and consistent. Erisman and Gao (2006) promoted an accountability system as a way to evaluate the success and failures but also to increase production and quality; however, the task becomes difficult in the community college sector because of the distinct mission statement each community college adopts. Reports about internal data were valuable, but a statistical test of correlation to analyze data from all colleges would be more accurate. Levin and Calcagno (2008) clearly articulated the fact that legislators wanted to know about success

and failure rates, and Erisman and Gao (2006) stood behind a transparent accountability system for all stakeholders.

With developmental education as an institutional commitment, each institution must develop an action plan for data collection and data driven decisions. Kazis (2009) suggested developing an internal accountability system for collecting, reviewing, and making data-driven decisions toward success. In addition, Perin (2005) suggested gathering the data, determining outcomes, and identifying options for improving program outcomes; and Levin and Calcagno (2008) encouraged institutions to experiment with program changes, strategies or policies, not just gathering data for simple reports but for useful and meaningful decisions. The evaluation process provided must be a continuous cycle of improvement. To effectively measure the success of the developmental programs, researchers recommended gathering specific and useful data variables, analyzing components and results of the program, and developing an organizational structure for drawing conclusions (Merisotis & Phipps, 2000; Perin, 2005).

Before collecting data, administrators and faculty must determine what data exists, develop a plan for collection, analyze the data, and set priorities for program improvement. In addition, Perin (2005) recommended the institutional research board for assisting with assembling pertinent data on campus and from state databases. Furthermore, Mooney and Mausbach (2008) proposed starting with existing data and determining needed additional data for analysis completion toward reaching priorities. The evaluated, key areas in a developmental education program focused on completion in developmental and college-level courses, retention to next semester and second year, transfer rates, and graduation rates. When establishing the evaluation process, the

institution must be active by designing a diverse assessment component, conducting regular systematic evaluations and transparency of results with all stakeholders. In fact, Boroch et al. (2010) reported exemplary programs put time and effort into an ongoing systematic evaluation process instead of fragmented pieces.

While some institutions may evaluate irregularly or by a forced external deadline, Boylan (2002) found systematically evaluated programs were more successful. College recognition that the educational process may not be as effective and efficient as possible requires change. Boylan et al. (1997) reported that 14% of developmental programs use a systematic evaluation approach. Often the program evaluation component did not link to student success.

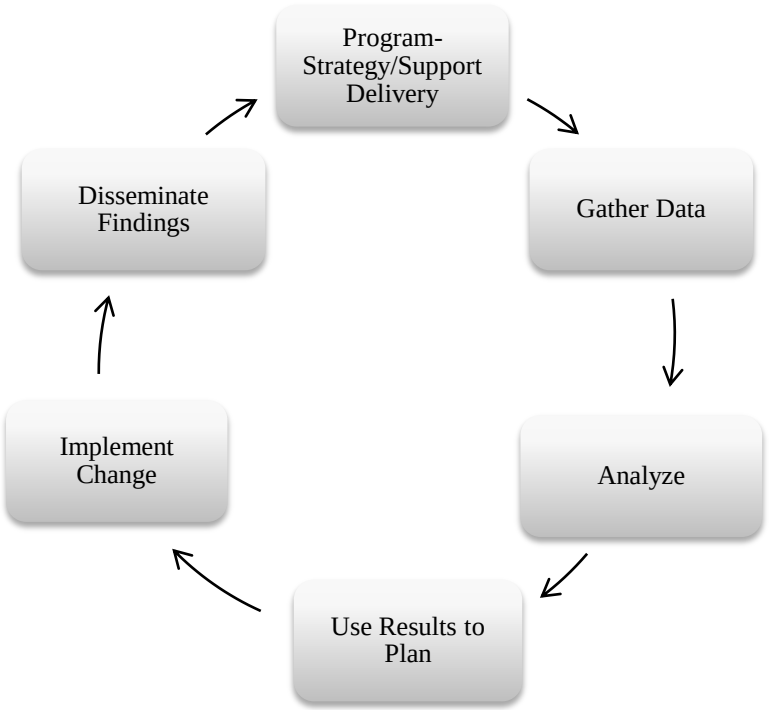


*Figure 1*. Systematic Evaluation Process

Each institution must determine the type of evaluation system to set up. Figure 1 suggests a systematic evaluation process for colleges to adopt. Before beginning the evaluation process, each institution must develop a multidisciplinary team. Members

included on the team should be faculty of developmental and college-level courses, advisors, counselors, personnel from financial aid, institutional research member, dean of programs and support services. Notably, Perin (2005) found faculty and administrator collaboration toward change worked more effectively than top down change. Faculty participation created ownership in the evaluation and decision-making process instead of an administrator reporting the data and making the decisions for faculty to accept. Faculty members were in charge of instituting the new strategies and program changes.

With the team in place, the first step begins with a defined program and identified goals and objectives. The team gathered data on the strategies for meeting the goals and objectives of the program. The team determined what variables and strategies to evaluate. Suggestions from Boylan (2002) and Perin (2005) included analyzing data such as specific program components, retention and course pass rates, semester persistence rates, graduation rates for developmental students, and enrollment in college-level courses. Next, the team must collect and analyze the evidence. With the findings from the evidence, the team draws conclusions for planning outcomes to improve student and program success. To improve the program, the team prioritized areas of concern for implementing new strategies. The disseminating the findings and changes to all stakeholders showed transparency. The evaluation cycle necessitates a continuous, ongoing process of evaluation.

Figure 1 presents a continuous model; however, some institutions may need to delve deeper in the assessment process by conducting an in-depth evaluation. Each institution's program varies in the type of program, support services, governance, and student population. Facilitating continuous improvement requires decision from data. In

fact, Boroch et al. (2010) offered a self-assessment tool for collecting quantitative and qualitative data for developing an action plan for improvement. Additionally, Boylan (2002) created an inventory for institutions to compare their program to best practices and priorities for change. To connect with all stakeholders, Greene and Forster (2008) developed a toolkit to focus on policy, programs, and transitions from high school to community college to four-year institutions. To reach high levels of effectiveness, institutions must build a plan and can use the suggestions from the listed researchers' tools or as a guide to create an evaluation tool. After conducting an inclusive, self-analysis, Kozeracki, and Brooks (2006) found Davidson County Community College changed policies and the role and organization of the developmental education program. For the developmental education program to benefit students, colleges must institute a detailed plan for evaluation for determining which policies, services, and improvements need changed.

**Summary**

Chapter Two encompassed a review of the literature for the following areas: history, opposition for and against developmental education, policy, types of programs and services, instructional practices, and program evaluation. The literature review provided background knowledge for the reader about past research on the subsequent topics. The review of literature found similarities with other studies looking at some of the same variables as the researcher's study; however, the methodology for examining the variables followed a different approach. Bettinger and Long (2005) and Calcagno and Long (2008) both looked at completion rates using a regression analysis. For this study, the completion rates examined completion rates using a Chi-Square Test and

Analysis of Variance (ANOVA). Waycaster (2001) conducted research which included observations and comparison of similar variables but only focused on one college; whereas, this study focuses on three colleges.

# Chapter Three: Methods

This research study examined the success of developmental education programs. The intention of the study was not to draw a causal relationship; instead, a variety of statistical tests analyzed relationships between independent and dependent variables. The focus of Chapter Three is to present the methodology including the purpose, research questions, hypotheses statements, data collection, and procedure.

## Purpose

The purpose of this study was to compare three community college's developmental education programs on student success. The researcher utilized a quantitative approach to examine the components of different efforts of developmental education administered at three community college campuses. Some students with high school diplomas enter colleges under-prepared for college-level work. In order to enroll in college-level courses, some of these students must enroll in developmental coursework. Through use of data related to student achievement and academic success, an analysis was performed to determine the types of relationships that exist between program strategies and student achievement and to identify the strengths and weaknesses of various developmental education methods. The three community colleges in the study all employ decentralized developmental education for students intent on improving college-level skills. The data collected from the community colleges allowed an examination of the strength of support offered by services in developmental programs intended to help students succeed in developmental education coursework. Identifying successful services may provide for changes to programs leading to improvement in student success rate for those enrolled in developmental courses.

## Research Questions

The research questions considered in this study are as follows:

1. What community college developmental education program efforts have a significant effect on course completion and retention?
2. What relationship, if any, exists between student withdrawal from a developmental course and course completion and retention?
3. Which of the following measured categories have the greatest effect on student success: teacher to student ratio in developmental education classes, course completion rate for developmental coursework, retention rate for developmental students, and average enrollment in developmental courses?

## Hypothesis Statements

**Null Hypothesis 1.** There will be no difference between developmentally enrolled student cumulative grade point average and non-developmentally enrolled.

***Null Hypothesis 1a.*** There will be no difference between developmentally enrolled student cumulative grade point when comparing Green College to Gray College.

***Null Hypothesis 1b.*** There will be no difference between students enrolled in non-developmental courses and student cumulative grade point when comparing Green College to Gray College.

**Null Hypothesis 2.** The developmental education program offered at the community college attended will be independent of the teacher-to-student ratio in developmental education classes.

**Null Hypothesis 3.** The remediation model offered at the community college attended will be independent of the course completion following developmental work.

**Null Hypothesis 4.** The developmental education model offered at the community college attended will be independent of the retention rate.

**Null Hypothesis 5.** The remediation model offered at the community college attended will be independent of enrollment in developmental courses.

**Null Hypothesis 6.** There will be no relationship between student withdrawal and course completion.

**Null Hypothesis 7.** There will be no relationship between student withdrawal and retention.

**Null Hypothesis 8.** There will be no difference between average values in retention rate when comparing data between each of the three study institutions.

**Null Hypothesis 9.**There will be no difference between average values in completion rate when comparing data between each of the three study institutions.

**Null Hypothesis 10.** There will be no difference between average values in the number of enrollments in developmental courses when comparing data between each of the three study institutions.

**Independent Variables**

The independent variable for the study was the type of developmental education model offered to support underprepared students enrolling in a two-year community college.

**Dependent Variables**

The dependent variables for the study include: graduation rate; teacher-to-student ratio in developmental education classes; developmental course completion rates; retention rate; and cumulative grade point average (GPA).

Table 2

*Placement Test Cut Off Scores for Institutions in Study*

| | Placement Test | English | Reading | Math |
|---|---|---|---|---|
| Green College | Accuplacer | <90 | >75 | >40<br>Algebra >86 |
| Brown College | Compass | >69 | >80 | >66<br>Algebra <66 |
| Gray College | Accuplacer | College designed rubric | >76 | >60<br>Algebra <80 |

Note: Green and Brown College's placement test scores were found on the college's website. Gray College's placement scores came from the placement test office on campus (Program Assistant for Student Assessment and Learning, personal communication, June 28, 2011).

**Population**

To gain the population sample, the researcher inquired at six community colleges in the state of Illinois, but only three of the colleges chose to participate. Students not meeting all the admission requirements were required to take a placement test. Based on the students' results, each college identified academic areas in which students were underprepared. Table 2 displays the cut off scores and placement tests the institutions in this study used to identify students requiring developmental courses. It is important to note that each college has a different score for determining placement in a developmental course. Students in the study were not assigned to a specific community college but chose to attend that particular college. Each institution provided permission for the

researcher to utilize existing data from an administrative database to run statistical analyses.

The population includes the sample of students who were taking one or more classes in remedial reading, writing, and/or math. Green and Gray College provided a sample of the population from fall semester of 2006 until spring semester of 2010. The researcher organized the population into a random sample. Brown College did not offer a population sample and instead provided a sample of a predetermined cohort of fall starting students, which the researcher used. Measured outcomes for success were defined by a C or better and focused on course completion, retention rates, and consecutive enrollment.

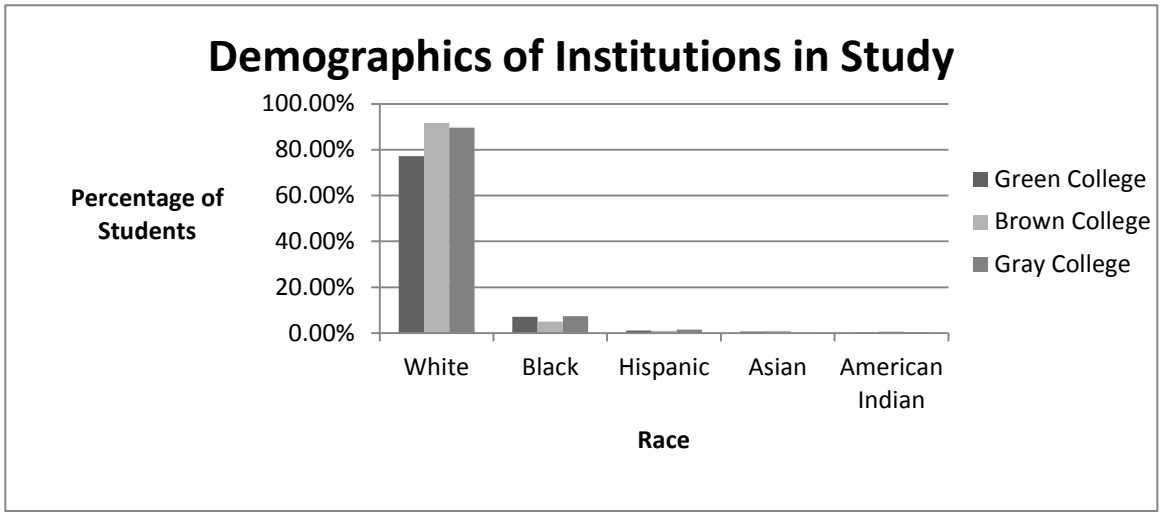


*Figure 2*. Demographics from the Three Community Colleges in the Study. Data for this figure from Illinois Board of Higher Education.

**Description of Colleges**

The three community colleges in the study showed many similarities in demographics, basic admission criteria, and transfer admission requirements. The Illinois Board of Higher Education listed the demographics of each institution under the

Institutional Profiles. Figure 2 illustrates the reported demographics from 2009 and indicates higher percentage of white students at each institution.

The researcher gathered and examined the admission criteria from each institution's catalog. Table 2 lists the basic admission criteria for each college. Green and Gray Colleges shared more similarities than with Brown College. In Chapter Two, a discussion about open admission policies explained how community colleges keep the admission criteria to a minimum in order to meet the open admission standard.

If students plan to enroll in a four-year university after completing course work at the community college, the student must follow and meet the guidelines in Table 3. Chapter Two discussion indicated that four-year university's criteria for admission were more selective than the community college.

Table 3

*Basic Admission Criteria for Each College*

| Admission Criteria | Green College | Brown College | Gray College |
|---|---|---|---|
| Complete Admission Form | X | | X |
| Send Official Transcripts | X | | X |
| Take College Placement Tests | X | X | X |
| Meet with an Academic Advisor | X | | |
| Enroll in Orientation course | X | | |
| Specific age | | X | X |

Note. Requirements retrieved from each college's catalog or website.

Table 4

*Admission Criteria for Transfer Degree Students*

| Admission Criteria | Green College | Brown College | Gray College |
|---|---|---|---|
| Four years of high school English | X | X | X |
| Three years of high school mathematics (algebra, geometry, advanced algebra | X | X | X |
| Three years of high school laboratory science or successful completion of one laboratory science course | X | X | X |
| Three years of social studies | | X | X |
| Two years of high school foreign language, music, vocational education, or art or successful completion of two courses in humanities, foreign language, or vocational education | X | X | X |
| Two flexible academic units — two additional courses (years) from any one or two of the science, social studies and/or electives categories in addition to approved courses in mathematics and English — such as advanced mathematics, computer science, journalism, speech and creative writing | | | X |

Note. Requirements retrieved from each college's catalog or website.

**Green College.** The college's enrollment for the fall 2009 term was 8,169. The attendance status for full-time students was 64% full-time 36% part-time. The retention rate for full-time students was 57% and 29% part-time. Green college's student population represented a high percentage of Caucasian students with 22.7% representing minority subgroups.

***Developmental education program.*** The definition for Green College's developmental education program came from personal communication with Director of Student Development and Counseling (DSDC) at the institution. Green College

decentralized program with the courses contained in the same academic area. Full time and adjunct faculty members teach the developmental courses.

**Brown College.** Brown College's enrollment for the fall 2009 term was 5,337 students. The attendance status for students was 45% full-time and 55% part-time. The retention rate for full-time students was 54% and 33% part-time. The student population for 2009 delineated a high percentage of Caucasian students with 8.3% representing minority subgroups.

***Developmental education program.*** The information to explain Brown College's developmental program came from personal communication with the Assistant to the President for Planning and Institutional Improvement (APPII) at the institution. Brown College's developmental program uses a decentralized developmental program, with the developmental courses falling into specific academic area. Full and part time faculty members taught the developmental courses at the institution.

**Gray College.** Gray College's enrollment for the fall 2009 term was 7,677 students. The attendance status for full-time students was 57% full-time and 43% part-time students. The retention rate for full-time students was 43% and 23% part-time students. Gray College's student population revealed a high percentage of Caucasian students with 10.4% of the population represented minority subgroups.

***Developmental education program.*** The program definition came from personal communication with the Dean of Arts and Humanities (DAH) at the institution. Gray College employs a decentralized developmental education model. Reading, composition, and math are handled by coinciding departments. Math was the only academic area utilizing full and part time faculty. Reading and composition were taught by full-time

faculty members.

**Data Collection**

Data was provided to the researcher with an anonymity code already assigned to each student. The data collected consisted of secondary data, which was gathered from each of the community colleges. Two of the institutions, Green and Gray Colleges, used a database system, Datatel, a software system for information storage. The researcher determined which types of data to collect and accepted data given by colleges. Brown College sent existing data from an analysis conducted at the college. A random sample of the population sample of Green and Gray College pulled 50 students from each college and 11 semesters.

Students earning a grade of C or better meet the measure for successful completion of coursework. Successful completion may also include students graduating from the college or transferring to a four-year college.

**Procedure**

1. The researcher secured agreement from three community colleges to provide overall and at-risk student data for description and analysis for use in this study. Information regarding each college's developmental education program was obtained through personal communication.
2. Once the data was available, the researcher categorized and organized the data. A randomizer was used for selecting a random sample from the populations from Green and Gray College to determine completion and withdrawal averages.
3. For hypothesis statement one, a *z*-test for the difference between the cumulative GPA averages among enrolled developmental and non-developmental students at

Green and developmental and non-developmental students at Gray. Then the *z*-test evaluated the difference among developmental students at Green and Gray. The data collected and provided for this test came from the two institutions.

4. To address hypothesis statements two through five, a Chi Square test for independence examined the relationship between variables. The data for developmental courses teacher-to-student ratio came from Green and Brown College and the average ratio of teacher-to-student was acquired from IPEDS (n.d.b). Retention rate data was provided by each of the institutions. Brown College's course completion and enrollment data was based on a cohort of students who began in the fall semester and supplied by the institution. Green and Gray College provided the population from fall 2006 to spring 2010 to the researcher. To find course completion rates and enrollment for Green and Gray Colleges, the researcher sorted the population into semesters. The researcher used a randomizer to pull a random sample of 50 students for each semester and used Microsoft Excel to organize each semester into the correct fiscal year. From each fiscal year, course completion and withdrawal data were found and used for testing purposes.
5. For hypothesis statements six and seven, a Pearson Product Moment Correlation Coefficient examined relationships between variables. Data for course completion and student withdrawal came from a random sample derived by the researcher.
6. To address hypothesis statements eight through nine, ANOVA comparison checked for differences in institutional data. Data for the ANOVA tests was secondary for the random samples.

7. The results were organized to compare strengths and weaknesses between student outcomes. The results guided an examination that determined similarities and differences in developmental programs.

**Tools**

**Z-Test for difference in means.** To determine whether a difference existed between developmental and non-developmental students' GPA, the *z*-test checked for differences. For this study, the GPA averages of two institutions determined a difference between first Green's developmental and non-developmental students, Gray's developmental and non-developmental students, and Green and Gray's developmental students. The *z*-test results determined whether to accept or reject the null hypothesis from statement one (Bluman, 2010).

**Chi-Square Test for independence.** The Chi-Square Test analyzed the independence of two variables (Bluman, 2010). In this study, hypothesis statements two through five used the Chi-Square Test to accept or reject the null hypothesis statement. The variables tested were teacher-to-student ratio, developmental course completion, retention rates, enrollment in developmental courses, and their relationship to the type of developmental program applied.

**Analysis of Variance.** ANOVA compared the means of three or more samples (Bluman, 2010). For this study, hypothesis statements six through 10, examined potential differences in student outcomes between each college enrollment. The variables examined by the ANOVA test were graduation rates, course completion after developmental courses, retention rates, and number of students enrolled in developmental courses.

**Pearson Product Moment Correlation Coefficient.** The purpose of the Pearson Test determined whether a relationship existed between two variables (Bluman, 2010). In this study, hypothesis statements six and seven tested if a relationship existed between students withdrawing from a developmental course and course completion and retention rates.

**Placement tests.** Green and Gray College both use the Accuplacer for the placement test students take upon enrolling college. The Accuplacer was a published placement test marketed by the College Board (2003) for assessing knowledge in the areas of reading, English, math, and writing for incoming college students. The Accuplacer Test is a computerized test "designed to diagnose students' strengths and weaknesses and help colleges and universities make appropriate course placement decisions for students" (College Board, 2003, p. 1). The Accuplacer continually tests its tool for reliability and validity. Reliability measurements assessed by test-retest and tests for internal consistency (College Board, 2003). Anastasi (1988) defined "reliability as the consistency of scores obtained by the same persons when reexamined with the same test on different occasions or with different sets of equivalent items, or under other variable examining conditions" (p. 109). To define validity, Fraenkel and Wallen (2009) stated "correct inferences can be made based on results from an instrument" (p. G9). The test continually measures content validity and measured predictive validity across 50 institutions (College Board, 2003).

Brown College used the Compass Placement test for evaluating students' readiness for college. The Compass Placement Test was "a comprehensive assessment, advising, retention, and outcomes- oriented system of services" (ACT, 2006, p. 1).

American College Testing, inc. (ACT) validated the test using correlation coefficients, validity indices, and evidence of predictive validity.

**Summary**

The purpose of this research study was to analyze the data and draw conclusions about which approaches in developmental education were successful at the three institutions. This was partially accomplished through additional examination of statistical differences between the three institutions. Chapter Four presents the analyzed data and Chapter Five summarizes the results, conclusions, and suggested recommendations.

# Chapter Four: Results

The purpose of this study was to compare secondary outcome data to determine the success of the program. In this chapter, the researcher describes and explains analysis of the data. Some institutions did not give all data requested for the hypotheses due to the time necessary to gather the data. The results of this study may lead to changes in programs and promote further research on how to improve transitions from high school into college-level courses.

## Results and Analysis of Data

**Null Hypothesis 1.** There will be no difference between developmentally enrolled student cumulative GPA and non-developmentally enrolled.

For this hypothesis statement, two institutions provided secondary data of average GPAs for developmental and non-developmental students. Brown College did not provide data for this hypothesis test. Based on the research about the "Mathew Effect" from Bahr (2007), the expectation was for the developmental students to have a lower GPA when compared to students taking only college-level courses. To determine whether a difference existed between developmental and non-developmental students, the *z*-test for difference in means was chosen to determine statistical significance in the difference between the means of the two different populations.

For the data relating to this hypothesis, the researcher combined two institutions' GPA averages for developmental and non-developmental students. Table 5 displays the results of application of the *z*-test for difference in means. The conclusion for this hypothesis was not to reject the null hypothesis. There was no difference between developmental and non-developmental student GPA.

Table 5

*GPA Comparison Between Developmental and Non-developmental Students*

| | Developmental Students GPA | Non-developmental Students GPA |
|---|---|---|
| Mean | 2.34375 | 2.4525 |
| Known Variance | 0.23979821 | 0.10750714 |
| Observations | 8 | 8 |
| Hypothesized Mean Difference | 0 | |
| *Z* | -0.521937526 | |
| *z* Critical two-tail | 1.959963985 | |

Table 6 indicates the results for comparison of Green College developmental and non-developmental student GPA. The conclusion for this hypothesis was not to reject the null hypothesis. There was no difference between developmental and non-developmental student GPA at Green College.

The results for Gray College in Table 7 demonstrated a significant difference. The non-developmental students had a higher mean. The conclusion for this hypothesis was to reject the Null Hypothesis. There was enough evidence to support a significant difference in means of developmental and non-developmental students for Gray College.

Table 6

*Green College GPA Comparison Between Developmental and Non-developmental Students*

| | Green College's Developmental Students | Green College's Non-developmental Students |
|---|---|---|
| Mean | 2.695 | 2.2475 |
| Known Variance | 0.228833 | 0.138292 |
| Observations | 4 | 4 |
| Hypothesized Mean Difference | 0 | |
| *Z* | 1.477120942 | |
| *z* Critical two-tail | 1.959963985 | |

**Null Hypothesis 1a.** There will be no difference between developmentally enrolled student cumulative grade point when comparing Green College to Gray College.

Table 7

*Gray College GPA Comparison Between Developmental and Non-developmental Students*

| | Gray College's Developmental Students | Gray College's Non-developmental Students |
|---|---|---|
| Mean | 1.9925 | 2.6575 |
| Known Variance | 0.001691667 | 0.000491667 |
| Observations | 4 | 4 |
| Hypothesized Mean Difference | 0 | |
| *Z* | -28.46371302 | |
| *z* Critical two-tail | 1.959963985 | |

The researcher also examined the difference between the two institutions developmental students. The results indicated in Table 8 illustrate a difference between the two means of GPA for each college. Green College's developmental students have a higher GPA than Gray College. The conclusion for this hypothesis was to reject the Null Hypothesis; there was enough evidence to support a significant difference.

Table 8

*Green and Gray College Comparison of Developmental Students*

| | Green College | Gray College |
|---|---|---|
| Mean | 2.695 | 1.9925 |
| Known Variance | 0.022883333 | 0.001601667 |
| Observations | 4 | 4 |
| Hypothesized Mean Difference | 0 | |
| *Z* | 8.978964767 | |
| *z* Critical two-tail | 1.959963985 | |

**Null Hypothesis 1b.** There will be no difference between students enrolled in non-developmental courses and student cumulative grade point when comparing Green College to Gray College.

In Table 9, the researcher compared non-developmental students GPA for Green College and Gray College. The conclusion for this hypothesis was to reject the Null Hypothesis. There was enough evidence to support a significant difference. For this result, Gray College's non-developmental students showed a higher GPA than Green College.

Results exhibited in Tables 8 and 9 were unexpected because the different institutions showed a statistical difference when comparing the two institutions. Green College developmental students yielded a higher GPA than Gray College. However, Gray College non-developmental students yielded a higher GPA than Green College.

Table 9

*Green and Gray College Comparison of Non-developmental Students*

| | Green College | Gray College |
|---|---|---|
| Mean | 2.2475 | 2.6575 |
| Known Variance | 0.138291667 | 0.000491667 |
| Observations | 4 | 4 |
| Hypothesized Mean Difference | 0 | |
| *Z* | -2.201127472 | |
| *z* Critical two-tail | 1.959963985 | |

**Null Hypothesis 2**. The developmental education program offered at the community college attended will be independent of the teacher-to-student ratio in developmental education classes.

Data were accumulated for this hypothesis from two sources. Green and Brown Colleges provided the developmental teacher-to-student ratio. The student-to-teacher ratio for non-developmental courses was acquired from IPEDS (n.d.b). Gray College did not provide a ratio for teacher-to-student ration for developmental courses; therefore, Gray was not included in this test. Table 10 displays the data collected. To determine whether teacher-to-student ratio was independent of educational strategies, a Chi-square test for independence was conducted. The assumption from the researcher was a smaller

ratio would affect success positively. The Chi-square test value 5.30 was greater than the critical value of 3.841. The decision was to reject the Null Hypothesis. There was not enough evidence support teacher-to-student ratio was independent of developmental education program. The teacher-to-student ratio does not make a difference on student success.

Table 10

*Teacher-to-Student Ratio for Developmental and Non-developmental Courses*

| | Green College | Brown College |
|---|---|---|
| Developmental courses teacher-to-student | 15 | 14 |
| Non-developmental courses teacher-to-student | 25 | 26 |

Note: $\alpha = .05$ This level was used to find the critical value. For this test, the d.f. was 1.

**Null Hypothesis 3**. The remediation model offered at the community college attended will be independent of the course completion following remedial work.

The data for this hypothesis came in two forms. Green and Gray College gave a population sample for starting the fall semester of 2006 through spring semester of 2010 equating to 11 semesters. A random sample of 50 students was pulled from each semester's population resulting in a sample size of 100 to 150 students in each fiscal year. The fiscal year 2009 had only two semesters and a sample of 100 students. From each fiscal year sample, an average completion rate was determined by counting all the students who passed the course divided by the whole sample. Then, for each fiscal year the average completion for each semester was added and divided to determine the average for each fiscal year completion rate, as found in Table 11. Brown College

provided completion rates for a cohort of developmental students who started in fall semester.

In Chapter Two, completion rates from existing research showed similar results from the studies when compared with Table 10. The data in Table 10 showed the completion rates for Green and Gray College from the random sample derived from the population. The completion rate for Brown represented secondary data provided by the institution. The most current and relevant to this study was the ICCB completion rate of 65%, which represented data from the state and included the institutions in this study. Bettinger and Long (2005) reported a 66% completion rate, which related closely to ICCB's findings. Both studies focused on two-year public, state institutions.

The data from Table 11 was used to complete the Chi-square test to determine whether college attended was independent of course completion. The Chi-square test value, 8.883, was less than the critical value of 12.52. The decision was to not reject the Null Hypothesis. There was enough evidence support the college attended was independent of completion rates. Enrolling and attending any of the colleges in the study does not make a difference in completion rates.

Table 11

*Developmental Course Completion Rates for Study Institutions*

| | Green College | Brown College | Gray College |
|---|---|---|---|
| FY06 | 59% | 42% | 66% |
| FY07 | 55% | 56% | 73% |
| FY08 | 59% | 57% | 70% |
| FY09 | 54% | 59% | 58% |

Note: $\alpha = .05$ This level was used to find the critical value. For this test, the d.f. was 6. FY refers to fiscal year. The fiscal year includes the term for fall, spring, and summer.

**Null Hypothesis 4.** The developmental education model offered at the community college attended will be independent of the retention rate.

Table 12

*Retention Rates for Students in Developmental Courses*

| | Green College | Brown College | Gray College |
|---|---|---|---|
| 2007FL | 72.81% | 66.60% | 78.40% |
| 2008FL | 75.20% | 65.05% | 78.90% |
| 2009FL | 75.79% | 65.50% | 81.10% |

Note: $\alpha = .05$ This level was used to find the critical value. For this test, the d.f. was 4. FL refers to fall semester.

Green and Gray Colleges provided secondary data for retention rates for the developmental student population; whereas, Brown College offered retention rates for a cohort of developmental students who started in the fall semester. From the literature, Waycaster (2001) found higher retention rates equating higher success rates for developmental students. Table 12 displays retention rates from each institution. From Waycaster's (2001) findings, the average retention from the study fell into a range between 61.9% and 80.6%. Table 12 showed each institution's retention rates and Gray College had three years where the retention rate fell into Waycaster's range. Green and Brown College's retention rates fell below the average. To test for independence, a Chi-square test was performed. The Chi-square test value, .212, was less than the critical value of 9.488. The decision was not to reject the Null Hypothesis. There was enough evidence to support that the developmental education model was independent of retention rates. The evidence from this test showed that none of the three types of programs seemed to contribute to measured retention rates. There is no relationship between the

independent variable (type of program) and the dependent variable (retention rate); therefore, it does not appear to matter which type of program is participated in with regard to retention rate.

**Null Hypothesis 5.** The remediation model offered at the community college attended will be independent of enrollment in developmental courses.

Table 13 displays the provided secondary data provided from each institution. The enrollment numbers displayed in Table 13 came from a random sample of the populations given from Green and Gray Colleges. Brown College's enrollment data represented a cohort of students enrolled in developmental courses for each fall semester. To determine whether the college attended was independent of enrollment in developmental courses, a Chi-square test for independence was conducted. The Chi-square test value, 97.18, was greater than the critical value of 12.52. The decision was to reject Null Hypothesis 5. There was not enough evidence to support that the college attended was independent of enrollment in developmental courses. Enrolling in one of the colleges in the study does mean a student will enroll in developmental courses.

Table 13 displayed the provided secondary data provided from each institution. The enrollment numbers displayed in Table 12 come from a random sample the population given from Green and Gray Colleges. Brown College's enrollment data represented a cohort of students enrolled in developmental courses each fall semester. To determine whether college attended was independent of enrollment in developmental courses, a Chi-square was conducted. The chi-square test value 97.18 was greater than the critical value of 12.52. The decision was to reject Null Hypothesis 5. There was not enough evidence support the college attended was independent of enrollment in

developmental courses. All colleges in the study enrolled students in developmental courses at similar rates.

Table 13

*Number of Students Enrolled in Developmental Courses*

| | Green College | | Brown College | | Gray College | |
|---|---|---|---|---|---|---|
| | Enrollment of Students | | | | | |
| | Developmental | Credit | Developmental | Credit | Developmental | Credit |
| FY2006 | 3,838 | 12,438 | 984 | 9,148 | 5,060 | 14,584 |
| FY2007 | 4,379 | 12,783 | 821 | 9,157 | 5,009 | 14,462 |
| FY2008 | 4,439 | 12,739 | 933 | 9,475 | 5,708 | 14,215 |
| FY2009 | 4,307 | 12,894 | 1,184 | 9,556 | 5,989 | 14,454 |

Note: $\alpha = .05$. This level was used to find the critical value. For this test, the d.f. was 6. FY refers to fiscal year. The fiscal year includes the term for fall, spring, and summer. ICCB (2011) reported credit enrollment data (p. 22).

**Null Hypothesis 6.** There will be no relationship between student withdrawal and course completion.

For this testing process, the withdrawal data attained for Green and Gray Colleges came from the random sample. Brown College's completion rates represented a cohort but Green and Gray College's completion rates represented random samples of the populations. To calculate the withdrawal rate, the researcher took the number of withdrawals in the sample and divided by the total number of students in the sample. A cohort of student averages only from the fall semester were given to the researcher, which represented Brown College's withdrawal rate. To see if a relationship existed, the researcher calculated a Pearson Product Moment Correlation Coefficient. Table 14 shows the results from the test. Green College's p-value .27 was more than .05; so the decision is to not reject the null. The coefficient value of .72 was not significant. Brown

College had a *p*-value of .04, which was less than .05, so the decision was to reject the null. Brown showed a strong, significant relationship because the Coefficient of Determination indicated that 91% of the variance in course completion was related to course withdrawal. Gray College's *p*-value was more than .05; so the decision was to not reject the null. The coefficient value of .0067 was not significant.

Table 14

*Students Withdrawing From Developmental Course and Course Completion*

| | Green College | Brown College | Gray College |
|---|---|---|---|
| Multiple R | 0.727963 | 0.954486548 | 0.006772699 |
| R Square | 0.529931 | 0.91104457 | 4.58695E-05 |
| *p*-value | 0.272037 | 0.045513 | 0.993227 |

Note: $\alpha = .05$.

**Null Hypothesis 7.** There will be no relationship between student withdrawal and retention.

For this testing process, the same withdrawal data from Null Hypothesis 6 was utilized for Green and Gray Colleges. Brown College provided secondary data from cohorts of students who enrolled in developmental courses each fall semester. Retention rate data acquired came from each institution as secondary data in the form of averages. To test the relationship, the researcher applied a Pearson Product Moment Correlation Coefficient and displayed the results in Table 15. Green College's *p*-value of .99 was more than .05; so the decision was to not reject the null. The coefficient value of .002 was not significant. Brown college's *p*-value of .99 was more than .05; so the decision

was to not reject the null. The coefficient value of .006 was not significant. For Gray College, the *p*-value of .77 was more than .05, so the decision was to not reject the null hypothesis. The coefficient of .34 was not significant.

Table 15

*Students Withdrawing From Developmental Course and Retention*

| | Green College | Brown College | Gray College |
|---|---|---|---|
| Multiple R | 0.002074 | 0.006032 | 0.341644 |
| R Square | 4.3E-06 | 3.64E-05 | 0.116721 |
| *p*-value | 0.998679 | 0.99616 | 0.778033 |

Note: $\alpha = .05$.

**Null Hypothesis 8.** There will be no difference between average values in retention rate when comparing data between each of the three study institutions.

Table 16

*Comparing Retention Rates Among the Institutions*

| | Sum | Average | Variance | *F* | Critical Value |
|---|---|---|---|---|---|
| Green College | 223.8 | 74.6 | 2.4901 | 84.30687 | 5.143253 |
| Brown College | 197.15 | 65.7167 | .0635833 | | |
| Gray College | 238.4 | 79.46667 | 2.063333 | | |

With this hypothesis, ANOVA was applied to data to check for a difference in the retention rates of the institutions. The data derived came from averages provided by each institution as secondary data. Table 16 displays the results from the ANOVA. Since the

*F* test value of 84.30 was more than the critical value of 5.14, the decision is to reject the null. There was enough evidence to support a statistical difference among the institutions with Brown College reporting an average rate lower than the other two institutions.

The researcher reviewed the fiscal years and retention rates among the three institutions. The results presented in Table 17 from the ANOVA show the differences when comparing fiscal years. The *F* test value of .37 was less than the critical value of 5.14; therefore, no difference existed year-to-year. The results supported the decision to not reject the null hypothesis.

Table 17

*Comparing Retention Rates Among the Institutions Year-to-Year*

| | Count | Sum | Average | Variance | *F* | Critical Value |
|---|---|---|---|---|---|---|
| FL07 | 3 | 217.81 | 72.60 | 34.84203 | 0.37172 | 5.143253 |
| FL08 | 3 | 219.15 | 73.05 | 51.4225 | | |
| FL09 | 3 | 222.39 | 74.13 | 62.9067 | | |

Note: FL refers to fall semester.

**Null Hypothesis 9.** There will be no difference between average values in completion rate when comparing data between each of the three study institutions.

For this hypothesis statement, the ANOVA was applied to examine the average completion rates for each institution. The data for completion rates for Green and Gray Colleges were found from random samples from the populations by the researcher. Brown College provided data on a fall semester cohort of students. Table 18 displayed the test results from the ANOVA. Since the *F* test value of 137.95 was greater than the

critical value of 4.25, the null hypothesis was rejected. There was enough evidence to support a difference among the institutions with Green College displaying a lower average.

Table 18

*Comparing Completion Rates Among the Institutions*

| Groups | Sum | Average | Variance | *F* | Critical Value |
|---|---|---|---|---|---|
| Green College | 0.022767 | 0.00569167 | 7.9537E-08 | 137.95 | 4.25 |
| Brown College | 2.14 | 0.535 | 0.006440667 | | |
| Gray College | 2.67 | 0.6675 | 0.004225 | | |

The researcher examined the fiscal years and completion rates. Table 19 represents the results from the ANOVA on course completion. The *F* test value of .02 was less than the critical value of 4.06; therefore, no difference existed year-to-year. The results supported the decision to not reject the null hypothesis.

Table 19

*Comparing Fiscal Years of Completion Rates Among the Institutions*

| | Sum | Average | Variance | *F* | Critical Value |
|---|---|---|---|---|---|
| FY06 | 1.081933 | 0.3606445 | 0.109248979 | 0.026277933 | 4.066180557 |
| FY07 | 1.2975 | 0.4325 | 0.14380275 | | |
| FY08 | 1.2769334 | 0.4256445 | 0.136278313 | | |
| FY09 | 1.1764 | 0.392133 | 0.112202253 | | |

Note: FY refers to fiscal year. The fiscal year includes the term for fall, spring, and summer.

**Null Hypothesis 10.** There will be no difference between average values in the number of enrollments in developmental courses when comparing data between each of the three study institutions.

The data for Green and Gray Colleges came from the random samples of the populations. Brown College's data represented a cohort of students. To determine whether a difference existed, the ANOVA test was run and the results were found in Table 20. The *F* test value of 192.30 was greater than the critical value of 4.25; the decision was to reject the null hypothesis. Brown College yielded a value that was different from the other two institutions. The reason for this difference could relate to the use of cohort data of students who enrolled in the fall semester instead of sample from the whole population over all semesters.

Table 21 shows the results of comparison of data by fiscal year. The ANOVA was conducted to check for a significant difference. Since the *F* value of .03 was less

Table 20

*Comparing Enrollment of Developmental Education Students Among the Institutions*

| | Sum | Average | Variance | *F* | F Critical |
|---|---|---|---|---|---|
| Green College | 16963 | 4240.75 | 75004.25 | 192.308 | 4.256495 |
| Brown College | 3922 | 980.5 | 23040.33333 | | |
| Gray College | 21766 | 5441.5 | 234459 | | |

than the critical value of 4.06, the decision was to not reject the null hypothesis. There was not enough evidence to conclude a difference from year-to-year.

Table 21

*Comparison of Fiscal Years of Enrollment Between Institutions*

| | Sum | Average | Variance | *F* | Critical Value |
|---|---|---|---|---|---|
| FY2006 | 9882 | 3294 | 4375396 | 0.034204 | 4.066181 |
| FY2007 | 10209 | 3403 | 5099268 | | |
| FY2008 | 11080 | 3693.333333 | 6117170.333 | | |
| FY2009 | 11480 | 3826.666667 | 5945046.333 | | |

Note: FY refers to fiscal year. The fiscal year includes the term for fall, spring, and summer.

**Summary**

Chapter Four presented the findings from the analysis of testing the hypotheses using the z-test for difference in means, Chi-square test for independence, Pearson Product Moment Correlation Coefficient, and ANOVA. Based on the results, six of the 10 hypotheses were rejected. Null Hypothesis 1 focused on comparing GPA between developmental and non-developmental students. After conducting the test, the results showed no difference in GPA between the two groups. For Null Hypothesis 2, the researcher examined if teacher-to-student ratio would impact student success and findings showed there is no impact. When comparing the three institutions to each other for course completion and retention rates, Null Hypotheses 8 and 9 resulted a different college showing higher rates that were statistically different. The purpose of Chapter Five is to provide conclusions, recommendations, and suggestions for further research.

# Chapter Five: Discussion

## Discussion of Results

This study employed statistical tests to determine which of the three community college developmental programs, among three institutions of higher learning, showed success. The researcher wanted to identify which factors showed statistical significance in the colleges enabling the students to move forward into college-level courses. Data sources from the three community colleges included secondary sources associated with academic achievement and success including completion rates, GPA, teacher-to-student ratio, enrollment in remedial courses, withdrawals from courses, and retention rates.

**Overview of methodology.** In order to determine the success of developmental programs, the first step was to secure agreement followed by collecting the data from committed institutions. The researcher organized and analyzed the data through a number of statistical tests. A z-test for difference in means determined whether a difference existed in GPA averages. For three hypothesis statements, the Chi-square test for independence analyzed independence status of variables as compared to the type of developmental program employed. To examine relationships between variables and institutions, a Pearson Product Moment Correlation Coefficient was calculated. Last, an ANOVA was utilized to check for differences in student outcomes between the three institutions. The results showed which institution demonstrated strengths in certain areas.

**Research questions and hypotheses.** Three research questions and 10 hypotheses guided this dissertation study. For the first research question, "What community college developmental education program efforts have a significant effect on course completion and retention?" the researcher aligned Null Hypotheses 8 (retention

rates) and 9 (course completion) to the question. To test both hypotheses, the researcher utilized data from all three institutions to conduct an ANOVA.

Table 22

*Retention Rates for Each College in the Study*

| | Green College | Brown College | Gray College |
|---|---|---|---|
| FL07 | 72.81 | 66.60 | 78.40 |
| FL08 | 75.20 | 65.05 | 78.90 |
| FL09 | 75.79 | 65.50 | 81.10 |

Note: FL refers to fall semester.

Null Hypothesis 8 stated there will be no difference between average values in retention rate when comparing data between each of the three study institutions. Table 22 presents the retention rates for each college for three semesters. When examining the retention rates for Null Hypothesis 8 among the institutions, only Brown College's results showed a statistical difference, which was lower. The data from Brown College represented a cohort from the fall instead of the population from all semesters. This cohort represented a preselected sample for use in the analysis. Brown College's retention rate was more significant than the others but not their course completion rate. The researcher expected one college to have an effect on both course completion and retention expecting a higher course completion to lead to retention of students. Instead, the results of this study showed two different colleges with emerging differences.

As the data from Chapter Four indicated, Brown College displayed a lower retention rate than the other two colleges in the study. Due to the difference, the researcher conducted an interview with the Dean of Institutional Effectiveness (DIE) at Brown College. The researcher asked "What supports—academic and nonacademic—

during the semester for students to complete the developmental course?" A few years ago the Higher Learning Commission did a visit to examine the assessment practices at the institution. From the visit, Brown College began focusing more directly on properly assessing all first-time students, developmental students in particular (DIE, personal communication, June 22, 2011). The institution has tried different strategies such as a Success Center, tutoring, and Fast Forward program, and it continues to evaluate each program's success. Along with the Success Center, the institution began offering extensive tutoring (DIE, personal communication, June 22, 2011). The Fast Forward program allowed students who are at the top of the developmental score range to enter into mastery based, self-paced courses (DIE, personal communication, June 22, 2011). Brown College intends to expand the Fast Forward format to English and Reading but has not yet. The institution also recently received a Title III grant to focus on developmental student success, although this was not part of the research data or study. As a result of this grant, the institution began making changes. For instance, all placement test cut scores have been re-examined and many revised (DIE, personal communication, June 22, 2011). Curriculum development on developmental courses has also been a priority for the Title III project. A new addition is a supplemental English test that can be administered to pinpoint student the weaknesses (DIE, personal communication, June 22, 2011).

After researching Brown College's webpage, the researcher found a specific page for retention services. The webpage listed the college's mission and values with regard to retention. One section specifically addressed faculty members by identifying the process the faculty member may use if they have a student failing. For students, the page offered

information about tutoring and career services and strategy workshops on memory, test taking, note taking, and study skills. The website shows the college is trying to improve and raise retention rates by using technology to assist students.

The next question asked "How or do you target developmental students for retention?" Brown College's goal is to assess students properly to place in the appropriate developmental classes assist with retention (DIE, personal communication, June 22, 2011). The DIE stated that the college does not target students with any other means other than placement tests (DIE, personal communication, June 22, 2011). The researcher followed with "What data do you use to improve your retention rates?" When students enroll in the fall, students are placed in cohort and tracked through degree completion (DIE, personal communication, June 22, 2011). In some instances, individual faculty members implement particular initiative or strategy for a year, examine results, and revise accordingly (DIE, personal communication, June 22, 2011).

The data collected from Brown College involved cohorts of students. The researcher asked DIE if a student was voluntarily or involuntarily placed into the cohort. All students entering developmental courses in the indicated fall semester were placed into the cohort with the students' knowledge with transparency of tracking to the students (DIE, personal communication, June 22, 2011).

Null Hypothesis 9 stated there will be no difference between average values in completion rate when comparing data between each of the three study institutions. The results showed a statistical difference for Green College having a lower average. Since Green College had a lower course completion rate, the researcher expected the retention rate to show a similar result, but it did not.

As the data from Chapter Four indicated, Green College showed a distinct difference. Since one college indicated a sharp difference, the researcher followed up with an interview question for the DSDC at Green College. The researcher asked "What supports—academic and nonacademic—during the semester for students to complete the developmental course?" Since the data for this hypothesis measured back several years, the director felt there were many other components that might have contributed to the completion rate during the timeframe. When looking at completion rates, Green College decided to make some changes. The data for this study evidenced a few of the changes the college made.

The first change centered on adding support services for students. During the fiscal years for this data, Green College added a writing desk and math lab offering tutoring services (DSDC, personal communication, June 2, 2011). Eventually, Green College added an additional fee raising the cost for all math classes to increase the financial resources. The math lab extended hours of operation and more tutors and had a faculty member monitoring and collecting data for improvements (DSDC, personal communication, June 2, 2011).

Another change the college implemented happened with the curriculum. Green College expanded Math 111-Prealgebra to a four-hour course, which was previously a three-hour course. With the change, the course offered more direct contact with the instructor and instruction time (DSDC, personal communication, June 2, 2011). In the area of reading and English, Green College had one course covering both topics. Green College took the once class and divided into a separate reading and English course. The actions taken by Green College influenced the completion rates.

The second question in the study examined, "What relationship, if any, exists between student withdrawal from a developmental course and course completion and retention?" To answer this question, the researcher utilized data from all three institutions in the study. Null Hypotheses 6 focused on the relationship between student withdrawal and course completion. Null Hypothesis 7 stated there will be no relationship between student withdrawal and retention. When determining the relationship between withdrawal and course completion, the researcher found that no relationship existed between the two variables at any institution. The expectation of the researcher was there would be a relationship, meaning students who withdrew from courses would be less likely to complete the course when they later enrolled in it. Null Hypothesis 6 was not rejected.

For the second part of the question, the researcher tested withdrawal and retention rates for Null Hypothesis 7. Again, the researcher expected withdrawal rates to impact retention rates. However, Null Hypothesis 7 was not rejected, so there was no relationship between the two variables.

The last research question asked, "Which of the following measured categories have the greatest effect on student success: teacher-to-student ratio in developmental education classes, course completion rate for developmental coursework, retention rate for developmental students, and average enrollment in developmental courses?" With regard to teacher-to-student ratio, Green and Brown both had a lower ratio of teacher-to-student in developmental classes versus college-level courses. The researcher's assumption was a smaller ratio benefited the class by supporting more interactions and

individual time with the instructor. For Null Hypothesis 2, the researcher found teacher-to-student ratio did not make a difference on student success.

Null Hypothesis 3 stated the remediation model offered at the community college attended will be independent of the course completion following developmental work. For this hypothesis statement, the researcher examined completion rates for developmental courses and did not reject this hypothesis. It did not matter which college the student attended in regard to retention rate; however, the ANOVA test for Null Hypothesis 9 showed a difference in completion rates when comparing all three institutions. Green College exhibited a statistical difference. Green College implemented changes to curriculum, added a support for writing, and expanded the math lab leading to improve the college's completion rate.

Null Hypothesis 4 examined whether the developmental education model offered at the community college attended will be independent of the retention rate. The retention rate was independent of the developmental education model meaning none of the program seemed to contribute to the measured retention rate. When comparing all three institutions for Null Hypothesis 8, Brown College showed statistical evidence of a lower rate. From the interview with the DIE, the college instituted changes. Some of the alterations to the developmental education program included properly assessing first time students, added and intensified strategies, a webpage, and a system for tracking students.

From enrollment data in developmental courses, Hypothesis 5 examined whether attending a certain college meant enrolling in developmental courses. The results showed the colleges in the study had similar rates of placement into developmental courses. Indicated in discussion from Chapter Two, the problem of underprepared students affects

all higher education institutions but particularly community colleges. For fiscal year 10, ICCB (2010) reported 115,842 students enrolled in at least one developmental course. The number was representative of all community colleges across the state.

In examining Null Hypothesis 1, the researcher expected a difference to exist and for non-developmental students to have a higher GPA than developmental students. The results showed that no difference existed. Other factors may have contributed to the lack of difference. For instance, Boroch et al. (2010) found additional supports for the developmental students assisted in improving GPA. Based on the data, the researcher did not know what other supports were available exclusively for the developmental students which may affect the GPA.

For Null Hypothesis 10, the researcher analyzed the enrollment at the three institutions. Green and Gray College's provided data and the researcher derived a random sample. Brown College's data represented a cohort of students from each fall semester. The results from the ANOVA showed Brown College statistically different from the other two institutions. If a population sample had been provided the analytical results might have possibly been different.

After gathering information about each college, the researcher found the three colleges to share more similarities than differences. From Figure 1, the demographics of each institution showed a similar student population. The completion rates for the institutions fell into the findings of other studies. If Brown College had given a population sample, the results might have been different.

The hypothesis statements represented the researcher's assumptions. After the data analysis, the results seemed unexpected because not one college showed statistical

difference on all tests. Instead, two of the three colleges showed statistical differences in four different hypotheses. The results showed the institutions in the study have strengths or implement better strategies and practices in certain areas.

**Recommendations**

The problem of the underprepared student is becoming more prevalent. While community colleges encompass an open door admission policy, Boroch et al. (2010) believed some students do not interpret this mission correctly meaning students expect to start college-level courses and earn a degree quickly. Students need to understand the expectations, responsibilities, and skills necessary for college-level courses. Based on the results and review of literature, the researcher developed some recommendations. To increase a student's chance of success in a developmental education program, the researcher recommended that policies and programs focus on reducing the need for developmental courses, assisting with transition from high school and into college-level courses, implementing effective support structures, and adopting a developmental education model.

To reduce the need for developmental courses, community colleges and high schools must collaborate to assist students before entering college. Both entities have an obligation to students that could be met by working together on aligning standards. By aligning standards and skills, the discrepancy between a high school graduate and college freshmen level work can be eliminated through these proactive and preventative approaches. First, as Collins (2009) suggested, community colleges and high schools must define college readiness and move on to develop aligned standards for high school and college. Before enrolling in college, high school students develop their own

expectations of college and become disenchanted because the college's expectations do not match their own. Often, students do not find out about expectations until after they arrive on the college campus and must enroll in developmental courses, which is too late. As a result, Boroch et al. (2010) and Merisotis and Phipps (2000) reported some states assessed high school students' readiness as freshmen and sophomores so as juniors and seniors they can work on deficits in order to be college ready. The result would be fewer students who need to take developmental courses. Community colleges could work on establishing a relationship for high school faculty and students to understand college-level expectations. Mecher-Karp and Hughes (2008a) believed credit-based transition programs (CBTP) and dual credit lead to positive outcomes because academic standards are raised and low achieving students reach higher standards. Students arrive at college ready to start the college-level course that counts toward transfer credit and degree completion. The stigma associated with developmental education courses would be erased, and more students may complete courses instead of withdrawing, improving completion and retention rates.

The typical process for placement into developmental education programs was through placement tests. The placement tests the institutions gave before college entrance demonstrated reliability and validity. However, the institutions can set the cut score, which leads to inconsistency in cut scores used from institution to institution. The recommendation suggested was for common cutoff scores across the state. Each college's assessment center is responsible for administering the placement test, which is computerized. Following along with aligning high school and college standards, Oudenhoven (2002) recommended developing benchmarks for identifying developmental

and college-level students for clarity. In addition, current assessments stem on intellect abilities not measuring attitudes, study skills, or time management, which play a critical role in academic success.

Colleges could make several changes to increase chance of success for transitions into and during college-level courses. Some components for establishing success included orientation, advising, early warning system, academic support services, and common assessments. In college orientation, students learn about how to be successful in college by knowing how to the utilize campus resources. The early warning system invests in preventing students from failing. Through the early warning system, an advisor is monitoring and offering support to students. Academic support services covers many academic aspects from tutoring and labs where students attain assistance with assignments. In this study, each college offered academic supports in reading, math, and writing. Common assessment should be utilized for targeting student's weaknesses, driving self-paced learning, and to show performance of the developmental education program. Each component must be fully implemented and utilized because it was not enough to just possess each component.

First, the researcher recommended that a comprehensive college orientation focused on supporting students through the transition be required for all students taking a developmental course. In comprehensive college orientation, students need the college expectations reinforced, and they need to understand and see the supports available, to learn nonacademic strategies and skills, and to distinguish their own individual learning styles. From Zeidenberg (2008), positive results stemmed from students taking college orientation for any students, but particularly unprepared students.

Next, student retention and completion rates should be measurements of student success and data evaluated regularly by higher education institutions. Two approaches, advising and early warning systems, can assist students in managing the college situation. Advisors should actively work with students before and during the semester regarding grades, concerns, or problems. The purpose of the early warning system was to prevent students from failing as opposed to letting the student fail before intervention. Both approaches build relationships with, thus strengthening the student's connection to the college.

In this study, each institution listed academic support services. The problem faced by all institutions was usage. Services were readily available but not utilized to the fullest capacity. Moreover, Boroch et al. (2010) reported a stigma associated to seeking assistance from support services. However, the research of Boroch et al. (2010) and Wilmer (2008) supported academic support services as effective in the learning process. Targeting students toward these services, instructors could take classes to visit the academic support services and encourage students to take assignments to academic support service locations to utilize available help. The colleges could also evaluate whether any support services could be offered online so students could access the services when convenient.

Taking developmental courses cost students' money and time; therefore, institutions must plan processes to help students move through the program efficiently and successfully. To make the developmental courses most efficient, the program must include assessments to target student weaknesses, permit self-paced learning, application of skills, and consistent program evaluation. For faculty teaching the developmental

courses, the college might offer training and share placement tests results for targeting students' strengths and weaknesses.

Since students do not earn credit toward degree completion for developmental coursework, the researcher suggests ways to expedite the process. Assessing students frequently in courses and using instruction to target student weaknesses focused on areas of deficiency allows students to move at their own pace for learning. Using benchmarks and placement test scores as a determining factor, compressed courses offered as an option for students who may not need as much remediation would assist in reaching his or her goals faster. Close attention must be given when making the decision because some students need more remediation than others and a compressed course might move too fast or teach the skills necessary for this type of student.

The goal for underprepared students is to acquire missing skills, but also to take those new skills and demonstrate their application in college-level courses and job training. From Chapter Two discussion, Boylan (1999) and Wilmer (2008) supported paired courses because students apply remedial skills and reduction in time spent in developmental courses. A history course would be paired with the developmental reading course. In the history course, the student is expected to meet the expectations on the course syllabus. The developmental reading course would use the history textbook to work on teaching missing reading skills. By embedding the reading skills in the curriculum, students find meaningful connections and application of skills. Collaborating with area businesses lends a way for students to learn practical application of skills.

Effective practices lead to achievement of desired student results, but the only way to know whether a program was successful is through evaluation and review. The

key for the program depends on linking the evaluation to decisions toward driving student success. From Chapter Two, Figure 1 illustrates an evaluation process as a starting point for the institutions to implement. In reviewing the research, the researcher found several tools for program evaluation and would recommend the following: *Student Success in Community Colleges* by Boroch, Hope, Smith, Gabriner, Mery, Johnstone, and Asera (2010); *What Works: Reasearch-Based Best Practices in Developmental Education* by Boylan (2002); and "Developmental Education Toolkit: Community College Bridges Opportunity Initiative University of Texas Austin" by Greene (2008). The other critical component for data gathering and analyzing would be to collect qualitative and quantitative pieces of data. By examining all sides of the data, a clearer picture can be construed.

**Recommendations for Future Studies**

From the results of this study, further research needs to be conducted at the institutions that yielded statistical differences. While the researcher followed up the results of this study with a few interview questions, more data should be collected and analyzed specific to the implementation of new changes would be beneficial. Two of the institutions in the study need to work on improving course completion and retention rates; however, there averages are above the state average as reported in Table 1. Further evaluation of the data from this study and collection of new data may yield new ideas for changes to implement to improve student success. Two institutions in the study implemented new strategies and supports that were not included in the data collected from this study, and they continued to add after the study. From the personal communication follow-up with Brown and Green College, each college instituted new

strategies that could change the results with the new data. With a more in-depth study, the researcher could hone in on specific changes to supports, curricula, and programs to identify which changes were successful.

A second recommendation for additional research relating to this study is to consider gathering qualitative data utilizing a self-assessment tool for evaluation of each program. Part of the assessment would include interviews with developmental education students, faculty, and administration at each institution. Since teacher-to-student ratio showed no impact, students' perceptions and input may add value for why lower ratios are assigned to the developmental courses. Through interviewing students, demographics regarding age could be further studied and examined against existing research surrounding traditional and nontraditional students' needs for developmental education courses. The other component to add revolves around examining and reflecting about current practices. This study provided an overview regarding certain variables quantitatively. Adding a qualitative component would bring perspective to the results offered by this dissertation.

Another recommendation to extend this study is to focus on Brown College. As a part of the institution's grant requirements, the college must revise transitional curriculum, examine placement test scores, and test piloting revisions for success (DAH, personal communication, February 3, 2011). The five-year grant was only in the second year; therefore, changes were made and applied after this study was completed. Brown College had the lowest retention rates in the study. A replication of this study using the new data might change the current results.

The last recommendation would be to give students who were close to the cut score, high school GPA, high school transcript evaluation, and letters of recommendation from former high school teachers the choice to take the developmental course or go straight into the college-level course. If a student's placement score showed the minimal need for developmental work, the student should have the opportunity to work with an advisor and make the decision to move into college-level work or start with developmental courses. Some students might do quite well in college, therefore, saving time and money.

**Summary**

Community colleges collectively implemented a mission for helping to develop the skills students need to reach their potential and contribute to society. For any plan or program to work and be successful all institution stakeholders must set dedicated policies, require committed staff members, and offer enough support for students. As the United States continues to move through the 21st century and strives to compete globally, higher education rises to the challenge to meet the needs of students. As John F. Kennedy (1961) proclaimed

> let us think of education as the means of developing our greatest abilities, because in each of us there is a private hope and dream which, fulfilled, can be translated into benefit for everyone and greater strength for our nation. (para. 7)

The door for higher education opened and continued to stay open through community colleges commitment to giving all students the chance at higher education or job training. Continued support through policy and legislation only strengthens the United States for competition in a global world.

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Zhao, Y. (2009). *Catching up or leading the way: American education in the age of globalization.* Alexandria, VA: AS

# Vitae

## EDUCATION

Doctorate of Education, Educational Leadership 2011
Lindenwood University
Masters of Science, Elementary Education 2001
Southern Illinois University at Edwardsville
Bachelor of Science, Special Education, LBS1 1998
Southern Illinois University at Edwardsville

## PROFESSIONAL EXPERIENCE

*Adjunct Instructor*, Lewis and Clark Community College, August 2004 – present
*Student On-line Learning Support Specialist,* Lewis and Clark Department of Enhanced Learning, September 2010 - present
*Special Education Teacher*, Eastwood Elementary School, 2004-2005
*Special Education Teacher*, Lewis and Clark Elementary School, 1999-2002
*Special Education Teacher*, Columbus Elementary School, 1998-1999

## COMMUNITY CONTRIBUTIONS

Parent Advisory Committee, Alton School District
Charter School Planning Committee Member, Alton School District
School Travel Plan Committee Member, Godfrey Township
Quality Counts Grant Reviewer, Children's Home and Aid Society