Escaping the Remedial Curse: An Evaluation of the Impact of a Credit-Bearing Alternative to Traditional Developmental Education

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ESCAPING THE REMEDIAL CURSE: AN EVALUATION OF THE IMPACT OF A CREDIT-BEARING ALTERNATIVE TO TRADITIONAL DEVELOPMENTAL EDUCATION

A Dissertation
Presented to
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Of the Requirements for the Degree
Doctor of Education

by
Daniel Jacob Super

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ESCAPING THE REMEDIAL CURSE: AN EVALUATION OF THE IMPACT OF A CREDIT-BEARING ALTERNATIVE TO TRADITIONAL DEVELOPMENTAL EDUCATION

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Although some view this degree as an accomplishment that sets individuals apart, I view it as yet another example of God’s unrelenting grace on my life. Without Him I am nothing and have accomplished nothing. Achieving this is simply one more instance in my life wherein I have been given much more than I deserve and absolutely indicates nothing about me.

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This study examined the impact of a credit-bearing intervention literacy course taught at a southeastern United States four-year public university on student retention rates and cumulative grade point average. Undergraduate students (N=1,038) entering the university from fall 2010 to spring 2013 classified as not college ready were assigned to the course as an alternative to a more traditional non-credit bearing developmental reading course.

Using binary logistic regression and hierarchical linear regression, two dependent outcome variables related to student success were measured to infer course effects: two-year retention status, defined as enrolling at the institution two years successful course completion, and two-year cumulative GPA, defined as the total student GPA two years after successful course completion. Several demographic and academic background characteristics served as covariates during binary logistic regression and hierarchical linear regression analyses. Additionally, analyses of covariance (ANCOVA) compared the outcomes for students completing the intervention course versus students completing the developmental course.

Results confirmed findings of previous studies regarding the influence of participants’ demographic and academic backgrounds on both outcome variables. Furthermore, analyses accounting for these variables revealed students successfully
completing the literacy course were more likely to be retained after two years and to have higher two-year cumulative GPAs than their counterparts completing the developmental reading course.
CHAPTER I: INTRODUCTION

It is no secret that the United States has slowly been losing its educational competitive edge over the past few decades. In the span of one generation, the U.S. worldwide ranking in educational attainment dropped from first to tenth place in high school graduates and from third to thirteenth place in college attainment (Council on Foreign Relations, 2013). Even though the U.S. now ranks thirteenth in the world, it still ranks number one in per-student spending at the college level. President Obama made clear his intention to regain the highest proportion of college graduates in the world by 2020, and since this proclamation, the educational world has seen a veritable blitzkrieg on “College and Career Readiness.” With the college-going rate remaining at near all-time highs (nearly 70%), coupled with an ever-growing national population, why is the U.S. losing international ground in post-secondary attainment? One answer is that the national average college dropout rate holds steady at 54% (Council on Foreign Relations, 2013). Attending to the students who have access to postsecondary education yet never reach degree completion is the focus of institutions across the country. Retention efforts take the shape of many arrows, with very few hitting the target.

One glaring adversary of college retention efforts is the nearly universal requirement that a large population of “underprepared” students take remedial/developmental coursework. Remedial education “refers to courses taught within postsecondary education that cover content below the college level” (Radford, Pearson, Ho, Chambers, & Ferlazzo, 2012, p. 1). Conceptually, the idea of remedial education is noble in nature. Just because students matriculated through a secondary educational sequence that left them underprepared for the rigors of collegiate scholarship,
they should not be excluded from the long-term personal, social, and economic benefits that accompany a college degree. According to a recent report from Complete College America (2012), nearly 20% of all incoming college freshmen at four-year institutions require at least one remedial course. The numbers are far worse at two-year institutions, as nearly 52% of freshmen require remediation. As concerning as these numbers may be, the percentages are far higher if the student happens to be African American (39.1% at four-year schools and nearly 68% at two-year) or from a low-income family (31.9% at four-year schools and nearly 65% at two-year). Overwhelmingly, students are entering college underprepared for entry-level, credit-bearing coursework.

Ironically, admitting underprepared students to postsecondary settings and helping them “catch up” (and thus potentially continue their college education) through a remedial course has had the opposite effect on student retention. If students are relegated to taking at least one developmental course, they are far less likely to graduate. In fact, only 35.1% of students who were required to take at least one developmental course graduated within six years of enrollment (Complete College America, 2012). This mandated pathway, sometimes referred to as higher education’s “Bridge to Nowhere,” is becoming increasingly prevalent, affecting some 1.7 million students per year (National Center for Education Statistics, 2011). As previously discussed, this number is disproportionately impacting underrepresented populations and students from low-income families.

Kentucky, like most states in the nation, is not immune to the effects of the need for remediation. Whereas the national average percentage of students requiring remediation at four-year institutions is just under 20%, Kentucky’s is over 31%. It is also
disproportionately impacting the state’s African American student population, as 62.2% require at least one remedial course, compared to the national average of 39.1% (Complete College America, 2012). Finally, students enrolled in four-year colleges in Kentucky who required at least one remedial course only graduate at a rate of 32.1% within six years. Students often become discouraged with the remedial course sequence and fail to complete the coursework leading to gateway, credit-bearing courses. In fact, fewer than 50% of students who were referred to remediation actually completed the course sequence, with 30% of those referred failing to enroll in any courses (Bailey, Jeong, & Cho, 2010). It is understandable that frustrations quickly arise when students are spending considerable amounts of money to take semester-long courses that do not help move them toward a credential, and that by virtue of this dissatisfaction, the mandate of partaking in those courses may actually be hindering their likelihood to persist toward graduation.

**Significance of the Study**

There are few institutions so treasured, so iconic, and so important as American higher education. For decades, American colleges and universities have served as a cornerstone of the intellectual community, as well as drivers for economic excellence and social reform. A recent publication by Georgetown’s Center on Education and the Workforce projected that by 2020 approximately 65% of all jobs in the United States will require postsecondary training. At the current trajectory of postsecondary credentialing attainment, the United States will fall five million candidates short of the 165 million jobs requiring workers with postsecondary training (Carnevale, Smith, & Strohl, 2013). There are a host of issues facing the American educational system, and it is undoubtedly the
confluence of many structural and societal inadequacies that are contributing to the current state of higher education. Unacceptable retention and graduation rates, coupled with burgeoning student loan debts due to the exploding cost of attendance, and the prevalence of students attending colleges and universities underprepared for success are a few impediments to American higher education sustaining its perch high above the educational world.

**Retention and Graduation Rates**

According to data published by the American College Test (ACT) organization (2015b), the average first-to-second-year retention rate of traditional four-year public universities in the United States is 72.1%. This number is highly contingent on the level of selectivity of the institution, as the highly selective universities average 93.1%. In contrast, open enrollment four-year public institutions only see a return 56.5% of their students to the second year. The trend in student retention rate is currently stabilizing after experiencing a marked decline in the past decade. In fact, of four-year public bachelor degree granting instructions in the United States, the current freshman to sophomore year retention rate of 64.2% (regardless of institutional selectivity) is down approximately 6% from its peak of 70.0% in 2004 (ACT, 2015c). Even with the apparent improvement in success rates of American higher education, the glaring differences that still exist between the “average” student and those who are mandated to enroll in remedial coursework is of paramount concern.

**An Alternative to Remediation**

Although there are undoubtedly a multitude of factors impacting persistence, one cannot ignore the impact of adequate academic preparedness in successful matriculation
within the postsecondary environment. Unfortunately, it is those students who enter the university having been inadequately prepared academically who are not only less likely to succeed but also more likely to experience poor academic service on behalf of the institutions once they arrive on campus. In an international address, Tinto (2010) stated that although “virtually all institutions make available a variety of support programs, what seems to matter was not simply the presence of support but whether the support, especially academic, was connected to or aligned with the classrooms in which students find themselves” (p. 3). Many college students across the United States find themselves surprised that ACT and other reading assessment scores indicate that they are not ready for the rigors of college reading when they graduate from high school. The typical intervention provided to this population of students is mandatory enrollment in a non-credit bearing, full price-of-tuition, remedial reading course.

The search for alternatives to the standard developmental sequence has been taking place for quite some time. Cox, Friesner, and Khayum (2003) demonstrated the academic approach of embedding the learning necessary for these underprepared students within the curricular goals of a course to be a viable approach when it is not delivered via the model of remediation. They established the connection between underprepared students, retention, graduation rates, and the effectiveness of reading skills courses via empirical evidence on the effectiveness of reading skills courses offered, among others, at a four-year Midwest university. The researchers, referring to students who are underprepared in reading, report that those who “take and pass a reading skills course experience significantly greater success in college over the long term compared to similarly underprepared students who either do not take, or do not pass, such a course”
(Cox et al., 2003, p. 189). In response to state legislation mandating all state-supported universities to decrease the number of students requiring remediation, while increasing rates of retention, the large public university at which the present study was conducted, created a credit-bearing literacy course for a subsection of students entering the institution classified as underprepared in reading. This three-hour course, designed for students scoring 18-19 on the reading portion of the ACT, emphasizes the development of high-level reading skills, deliberate approaches to deep comprehension, analysis of complex academic text including vocabulary and fluency, and a strong focus on scholarly writing. Key course experiences include exploration of and practice with a variety of strategies for gaining meaning from print and the study skills that college students need to be successful based on the six traits of highly successful college students presented by Nelson (1998). The stand-alone course aligns with evidence that alternatives to traditional developmental reading courses can prove more effective in retaining students (Cox et al., 2003). For the past few years, hundreds of underprepared students have taken this credit-bearing literacy course instead of the remedial reading course to which they would have previously been assigned. The literacy intervention course was modeled after several research-based and effective non-traditional intervention courses that are represented in the literature.

**Purpose of the Study and Research Questions**

This study examines the impact of a credit-bearing literacy intervention course on rates of student retention and grade point average (GPA) at one state university in the southeast United States. The course, mandated for students entering the university deemed minimally underprepared (ACT Reading scores of 18 or 19), allows a portion of
this student population to bypass enrollment in the typically assigned developmental coursework. This small band of scores indicate that these students are not “college and career ready,” as the state definition of that determination is set as an ACT Reading score of 20 and above.

For the purposes of this study, students are classified as having successfully completed either the (a) non-credit bearing developmental reading offering (ACT Reading ≤ 17) or (b) credit-bearing intervention literacy offering (ACT Reading 18 or 19). The following research questions were designed to allow for an investigation into the impact of the intervention literacy course on student retention status and cumulative grade point average (GPA):

1. To what extent does successful completion of the intervention literacy course impact subsequent student academic performance (as defined by retention status and cumulative GPA)?

2. Does the impact of the intervention literacy course vary for students with different demographic and academic backgrounds?

**Conceptual Framework**

The theoretical foundation for this work is based largely on the literature establishing predictive factors closely associated with persistence and graduation of college students across the country. For the past few decades, researchers have posited and tested theories regarding the reasons students persist in higher education as understanding the relevant factors is necessary for administrators, faculty, and staff to create environments that are most conducive to students matriculating to degree. Given the fact that student retention is becoming increasingly vital to the financial solvency of
many universities, the literature on this topic is even more relevant to professionals in the field. The wide body of research encompasses many theories and examples of best practices. As is typically the case in theory development and refinement, a number of theorists have, to varying degrees, recognized categories of variables that impact retention, broadly encompassing the role that satisfaction and institutional commitment of the student, as well as the importance of the organizational climate play in student retention (Astin & Oseguera, 2005; Bean, 1980; Tinto, 1993). Additionally, and most relevant to the current study, the impact of student background variables is discussed.

**Student Satisfaction and Institutional Commitment**

It may seem relatively intuitive to consider that a student’s satisfaction with and commitment to the university are explicitly tied to retention. Friedman and Mandel (2009) analyzed the relationships between students’ motivation to stay and succeed in college, academic and social goal setting, and previous academic performance (SAT and high school GPA) on retention. Using the Student Motivation Questionnaire (SMQ) to measure goal setting behaviors and expectancy to succeed, the researchers surveyed 583 entering freshmen at a state college in New York. Using a multiple regression analysis to determine the levels of relationship between variables and retention, the authors investigated the impact of motivation, goal setting, and high school academic preparation. The results supported previous notions that SAT scores and high school GPA are strong predictors of student persistence after one year. Additionally, the researchers concluded that the perceived grade attractiveness to obtain good grades (motivation to succeed) was also predictive of retention.
The idea that intention to persist within an institution is prevalent among students who are retained was the focus of a recent publication by Morrow and Ackerman (2012). The authors assessed students’ sense of belonging (or perceived fit) and motivation in predicting college retention. Using the Sense of Belonging Scale (SBS) and the Academic Attitudes Scale (AAS), the researchers found that students with instrumental goals such as getting a good job and being successful in society were more likely to persist than students who had unknown goals. Clearly defined purposes and intentions to achieve goals are critical components to students’ satisfaction and commitment to graduation.

**Organizational Determinants**

In addition to the individual variables associated with students, there are also impacting characteristics of an organization when it comes to student retention. These determinants are important to universities because they present opportunities for manipulation or intervention, whereas individual student traits are much more difficult to affect. Oseguera and Rhee (2009) investigated the influence of institutional retention climate on student persistence. Using aggregated data from IPEDS and other sources, the researchers determined that institutional retention climate, or the pervasive expectation of retention on campus, does positively influence the probability of retention. More specifically, peer retention climate is the most important influence on student persistence.

Other organizational factors can positively (and negatively) impact student retention. Wohlgemuth et al. (2007) found that work-study aid positively influences persistence, as does the relationship between increased loan aid in later college years. Marsh (2014) and Russo-Gleicher (2014) highlighted the importance of structural
supports such as faculty involvement in student success. Of particular note was the impact of tutoring services for at-risk students, which was found to have a positive effect on at-risk student’s retention and overall GPA (Laskey & Hetzel, 2011). Organizational factors such as faculty involvement, student support structures, and student climate can be separated into unique variables although they are likely explicitly influential in student satisfaction and commitment to the institution.

**Student Background Variables**

Most commonly researched are those variables impacting student retention that are related to a student’s individual background. Factors such as previous academic performance (high school GPA and ACT performance), race, and socioeconomic status have been associated with impacting student retention rates. Students with higher academic preparedness are more likely to experience success at the postsecondary level. Racial minorities have significantly lower retention rates than their counterparts (Wohlgemuth et al., 2007). The subject of much research in the field of persistence (Byrd & Macdonald, 2005; Ishitani, 2003; Soria & Stableton, 2012), first-generation students often have lower rates of retention than their non-first-generation peers for a number of theorized reasons.

For the purposes of the present study, only two of the aforementioned categories of variables impacting student retention will be analyzed. While the commitment of the individual to the university is an important aspect in predictive analytics regarding student retention, it is beyond the scope of the current analysis. Using tenets of the Program Theory model (Hansen, 2005), this evaluation endeavors to uncover the effects of the intervention course by measuring impact on successful completers. Furthermore, it
is of interest for whom the course works best. The credit-bearing intervention literacy course will serve as an indicator of the organizational commitment on behalf of the university to set in place a research-based, curricular support for students entering the university underprepared in the area of reading. This effort by the institution was enacted and has continued with the singular focus of providing students with the supports necessary to persist to graduation. In that arena, the student background variables that have been well-established as having significant correlations to academic persistence will serve to guide the evaluation.

Limitations and Delimitations of the Study

Limitations

The purpose of this study was to analyze the impact of students’ successfully completing a credit-bearing intervention literacy course on retention status and grade point average. It was beyond the scope of this project to delve into the world of curriculum and classroom practices. General descriptors, especially as they relate to philosophical approaches to teaching these populations of underprepared students, help to give the reader perspective into the differences in the courses. However, no attempts were made to illuminate, and consequently contrast, the curricular differences in the remedial and intervention courses.

Delimitations

The population sample analyzed for the purposes of this study was a cluster sample of all students with an ACT Reading score of record from fall 2010 until spring 2013. While there are other college readiness indicators utilized by the university to place students into the remedial reading course, the intervention literacy course, or no
required intervention, the ACT Reading score is the standard metric for placement decisions. For simplicity of research design and consistency within groups, it was decided to only include those students with an ACT Reading score on file with the university.

**Organization of the Dissertation**

The organizational structure of this dissertation is such that the study is presented over the course of five chapters. Chapter I endeavored to present the purpose and significance of the study, while establishing the research questions guiding the research. Chapter II explores the current literature that serves as the foundation for the project. Chapter III details the methodological procedures; Chapter IV presents the results from the analyses of associated data. Finally, Chapter V includes the discussion and implications of the findings of the study, as well as recommendations for future research.
CHAPTER II: REVIEW OF THE LITERATURE

This chapter presents a review of the literature concerning the historical trends, current state of practices, and recommendations for changes in developmental education. The chapter includes three sections, each of which detail the relevant information to provide adequate context for framing the current study. The first section provides the historical background and definitions of remedial and developmental coursework. The second explores the literature on the effectiveness of developmental coursework as it is currently constructed, paying particular attention to retention, student success, and the associated financial impacts. Finally, the third section provides an overview of the calls for changes in the approaches to serving this population of underprepared students.

Historical Background

The United States of America is known well for engaging in the greatest social experiment in self-governance and for providing more individual freedoms than the world has ever known. The very fabric of our being is rooted in a belief that there are God-given rights ascribed to each citizen of the planet, and that the individual should be afforded full opportunities to realize the potential within. This conviction includes the right of individuals, and the society as a whole, to become educated, informed, and productive members of the collective. Admittedly, the early systems of higher education were not always fully inclusive; however, the United States’ meteoric rise to power and influence in such a relatively short time is largely due to the historic commitment to the education of each of its citizens. As the country is home to a richly diverse populace, there are varying levels of educational opportunities and supports available. Institutions of higher education have aligned themselves to meet the needs of all types of students,
including those ill-prepared to achieve their aspirations of college credentialing. After all, anything less would not be reflective of American ideals.

**Remedial vs. Developmental Education**

It is common practice across the country for colleges and universities to admit students who have not demonstrated the readiness in terms of academic achievement to successfully navigate the rigors of postsecondary coursework. As a result, these students are typically referred to services provided by the university designed to assist their academic and holistic development. Through a variety of individualized and group academic interventions, tutoring services, and advising, the university endeavors to best serve students who entered the university underprepared. The collective term for these services is *developmental education* (Boylan, Bonham, & White, 1999). However, the most commonly implemented institutional support for students who require such academic intervention is mandatory enrollment in a *remedial course*. These courses, most commonly in the areas of English, reading, and math, are below the college level and therefore bear no college credit, but still require the full price of tuition (National Center for State Legislatures, 2015). Developmental courses, on the other hand, are considered to be college level, but are typically focused on affective domains such as critical thinking, freshman experience, or study skill development; the objectives are often behavioral (Ross, 1970). Academic course content is regularly delivered via a zero-credit remedial course structure. This arrangement of delivering student assistance via the conduit of a regularly scheduled course has previously been considered the most efficient utilization of time and university resources.
Although there are clear distinctions separating the philosophical and existential purposes of developmental and remedial programs, a method commonly found in the literature is to consolidate the two approaches and refer to them as one entity (Calcagno & Long, 2008; Grubb, 2001; Ignash, 1997; Martorell & McFarlin Jr., 2011; Scrivener & Weiss, 2013; Weissman, Silk, & Bulakowski, 1997). Illich, Hagan, and McCallister (2004) refer to this as taking a narrow instead of a broad view of developmental education. The researchers argue that underprepared students may well benefit from a more comprehensive approach than what is offered with remedial coursework, wherein it is assumed that the academic subject in which students are underprepared is the only area they require assistance. A likely justification for interchanging the terms is the predominant utilization of mandated enrollment in zero-credit remedial courses for students presenting to a university underprepared. While there may be additional services offered to other underprepared students, the most streamlined institutional intervention is course enrollment. Given the propensity for the terms developmental and remedial to be so commonly interchanged in the literature, the present study will also take such liberties.

**History of Underprepared Students**

The concept of underprepared students needing additional academic assistance upon admission to a college or university is not a new phenomenon. In fact, the roots of a systematic approach to remedying the imbalance of access and preparedness have been established for more than a century. A preparatory department was established at the University of Wisconsin in 1849 and by 1865, over 88% of the student body registered for courses offered therein. Within only five more years the differences between student
preparedness levels and college admissions requirements were so apparent that more than 80% of American college campuses had established preparatory educational departments to serve students (Wyatt, 1992). With the passage of the Morrill Act of 1862 establishing land-grant colleges, came the dramatically improved access to higher education as well as the requisite need for preparatory courses (Dempsey, 1985).

In the 1930’s, universities began creating programs specific to remediation, as NYU established a reading laboratory in 1936, as did Harvard in 1938 (Markus & Zeitlin, 1998). By 1944, with the passage of the Serviceman’s Readjustment Act (commonly known as the GI Bill), President Roosevelt provided substantial incentive for returning service members to attend college. The number of degrees awarded by colleges and universities in the U.S. more than doubled in the decade from 1940 to 1950. More specifically, from 1945 to 1950, the percentage of Americans with a four-year degree or higher rose from only 4.6 to 25 percent. As social progress continued through the 1950’s and 1960’s, particularly with the passage of the Civil Rights Act in 1964 and the Higher Education Act of 1965, open admissions policies paired with available government funding, led to increased enrollments (Payne & Lyman, 1996). With an influx in enrollment, particularly in institutions with open enrollment, there became an increased need for developmental education services. Then, the 1970’s brought what is now characterized as an “open door” policy wherein women and other minorities began enrolling in postsecondary programs at a much higher rate. Many of the students taking advantage of these new opportunities were representative of the lower tiers of previous academic achievement, and were therefore, less prepared for the rigorous expectations of college-level work than were their predecessors.
Proponents of remedial education cite a variety of altruistic reasons for its existence and continued utilization. Existentially, institutions of higher education should provide opportunities for underprepared students to experience the social upward mobility afforded by advanced education. Many times, this means specialized academic programming to bridge the gaps or chasms left void by students’ prior educational experiences. McCabe (2000) also highlighted the disproportionate numbers of poor students requiring remediation due to underpreparedness for college-level work. It is difficult to argue the well-intentioned purposes of affording access to higher education for all students, especially those from disadvantaged backgrounds or that may have been underserved by failing schools.

The Effects of Remediation

The theory behind and necessity for remediating the skills of underprepared college students have been well established. The missional purposes of a large portion of the institutions of higher education in this country include, if not focus on, serving this population of students. While the number of high school graduates attending some form of postsecondary schooling has risen in the past few decades, the college completion rate has remained static (Bound, Lovenheim, & Turner, 2010). It is apparent that the issue is here to stay and as such, it is prudent to examine the effects of the approach to remedying the problem of changing the trajectory of underprepared students.

Effectiveness of traditional remediation

Evaluating the causal effects of remedial coursework is wrought with methodological and practical impediments. True experimental designs are not necessarily the appropriate approach to evaluating interventions in many educational
settings (Kember, 2003), while comparing the effects of different interventions typically fails to consider the host of confounding variables that may well contribute to any perceived differences in outcome. Even though remedial courses fill the landscape of higher education, purporting to intervene with a population of underprepared students so that they may be more successful in their pursuit of higher education, there is very little known about their effectiveness (Bettinger & Long, 2009; Boylan & Saxson, 1999). Likely due to this intrinsic impediment, much of the literature on effectiveness of these programs is mixed. A few studies have utilized more innovative methodologies to analyze the effects of remediation quantitatively, while other researchers have examined these programs via a qualitative approach, specifically attending to what is occurring in the classroom.

Utilizing a regression discontinuity (RD) approach with a dataset exceeding 100,000 students from the state of Florida, Calcagno and Long (2008) found that the impact for both math and reading remediation were positive in terms of short-term credits earned, but not statistically significant for total college credits earned. That is to say, the researchers suggested that participation in remedial math and reading courses promoted early college persistence, but had no effect on degree completion. Similarly, Scott-Clayton and Rodriguez (2012) found that assignment to remediation does not develop students’ skills in ways meaningful enough to be manifested in their rates of college success. The researchers go on to claim that the diversionary nature of remedial mandates prohibit up to 70 percent of students from taking a college-level alternative in which they were likely to earn a B or better. These findings are consistent with those from Attewell, Lavin, Domina, and Levey (2006) wherein no positive effects of
enrollment in remedial or developmental coursework were identified. Furthermore, the researchers indicated that participation in such programs was associated with between a six and seven percent decrease in the likelihood of graduation.

Instead of focusing solely on the impact of an individual remedial or developmental course, Bailey et al. (2010) analyzed the effects of developmental education via completion of the developmental sequence. The developmental sequence refers to complete academic intervention that begins with the initial referral to a remedial course and ends with entry into the gateway content course (p. 2). Utilizing a sample of more than a quarter million students, Bailey et al. found that only between 33%-40% of students referred to a remedial course ever completed the sequence. This number indicates that nearly two-thirds of all students referred to a remedial course failed to enroll and complete the first credit-bearing course in the content area. Undoubtedly, the failure to persist to entry-level credit-bearing courses is the primary reason that only 35% of students who are mandated to take even one developmental course will graduate within six years (Complete College America, 2012).

Conversely, some studies such as Adelman (1998) have concluded that students successfully completing only a few remedial courses have experienced greater educational successes than their similarly prepared counterparts. Illich et al. (2004) also found that successfully completing remedial coursework may serve to prepare students for the rigors of entry-level college courses. However, the researchers also found that when students fail to complete a remedial course that is taken concurrent to other college-level courses, they do poorly in all courses irrespective of the area in which they were underprepared.
Even though the debate continues to exist between those who support and those who criticize remedial programs, there has been little conclusive empirical evidence regarding their effectiveness, mostly due to ill-constructed methodological approaches (Grubb, 2001). The problems with many of the approaches to measuring impact is the limited control afforded to the researchers, resulting in the inability to make compelling and conclusive causal inferences regarding the effects of remedial coursework. Using the National Educational Longitudinal Study (NELS:88) database, Attewell et al. (2006) were able to control for students’ academic skills and coursework prior to entering college, as well as measures of family background. This database, unlike most of the previous approaches to analyzing the effects of remediation, allowed researchers to account for students’ preexisting academic skill deficiencies. Using a logistic and propensity model to analyze the probability of degree completion, the researchers considered students who enrolled in one or more reading remediation courses. After controlling for academic and social background, they found that students were between seven and 11% less likely to obtain a credential if they enrolled in a reading remediation course. These findings seem to contradict Adelman’s (1999) finding that poor high school preparation is primarily responsible for poor chances of graduation for those taking remedial coursework. This clear negative effect was the only such conclusion regarding reading remediation, as both math and writing remediation showed neither benefit nor deleterious effects.

**Psychology of Enrollment in Remedial Coursework**

It has been hypothesized that students who are identified as underprepared and are relegated to taking remedial coursework may well suffer from the negative stigma of
merely being associated with the course and its students (Boylan & Bonham, 1994; Arendale, 2010). Martin, Goldwasser, and Harris (2015) analyzed the academic self-concept of students who were enrolled in developmental coursework at a college in the southeastern United States. The researchers found that students who were enrolled in two of more developmental courses reported lower academic self-concepts than did their peers who enrolled in one or fewer such courses. However, they also noted that the reported measures of self-concept and self-efficacy were stable over the course of the semester in which students were enrolled, dispelling the idea that mere enrollment in a developmental course negatively impacts the psychological health of the student. Scott-Clayton and Rodriguez (2012) assert that an unspoken and “implicit function” of relegating students to remedial coursework may serve to indicate the students’ likelihood of matriculating to graduation, saying that it “may be efficient to both the student and the institution to realize this and adjust their investments sooner rather than later” (p. 2).

Placement

Commonly, the students comprising the remedial/developmental population of universities are recent high school graduates who successfully completed the requirements of the secondary system but do not demonstrate the academic proficiencies to succeed in the postsecondary environment based upon standardized test scores. Upon admission to a college or university, they are typically given a standardized placement test to determine the mandatory level of remediation required, a practice common to over 90% of institutions (Bettinger, Boatman, & Long, 2013; Gerlaugh, Thompson, Boylan, & Davis, 2007). This standard operating procedure is reflective of years of research suggesting that best practice in identifying the students who need developmental
education and ensuring they receive the services is via the means of placement testing (Boylan et al., 1999; Morante, 1989). Considering the widely varied academic backgrounds of incoming students from around the country and the globe, universities must rely on the standardized administration and interpretation of these assessments to direct students to appropriate services.

For years the practice of placing students into developmental coursework based largely (if not solely) on the performance on a standardized test went unquestioned. After all, universities must collect the relevant data to establish consistent policies and make informed placement decisions. However, as Scott-Clayton, Crosta, and Belfield, (2014) highlighted, the instances of misplacement due to these procedures are rampant. According to their analyses, between 20%-33% of students are severely misplaced, regardless of the screening tool. The issues surrounding overplacement, wherein students are erroneously granted enrollment in college-level, credit-bearing courses are self-evident. However, the estimates of Scott-Clayton et al. (2014) suggest that underplacement is more common and more impacting. According to their models, between one in four and one in three students relegated to remedial coursework could have earned an A or a B in the college-level counterpart had they been granted permission to enroll. The evidence suggests that universities may well consider utilizing other means of placement, such as high school transcripts and GPA, or reevaluating the arbitrary and static nature of a single threshold cutoff score. This aligns with the Complete College America (2013) suggestion to consider a range of scores when making placement decisions. As it stands, the disservice to a large proportion of students enrolled in remedial coursework, wherein they lose valuable time-to-degree while paying
full tuition for a course yielding no college credit due to the errors and inefficiencies of the placement systems utilized by universities is unacceptable on all accounts.

**Associated Financial Implications**

As is the case for every component of the delivery of higher education, the financial implications of student underpreparedness must be considered. In the case of universities accepting, then subsequently educating and supporting students whom have not demonstrated readiness to succeed in college-level coursework, the financial considerations are numerous. The following sections provide insight regarding the financial impacts of requiring developmental or remedial coursework on the institution, the individual(s) responsible for payment, and the national economy.

**The Rising Cost of College Attendance**

For 2014-2015, the average cost of attendance for in-state students at a public, four-year institution was approximately $19,000 per year. That number increases dramatically if the student is out-of-state, to nearly $33,000, and even more so if the four-year institution is a private nonprofit, to more than $42,000 per year (College Board, 2015). Considering the fact that many students do not actually graduate within four years, and that these averages are rising at the rate of 3% or more per year, that puts the average cost of an in-state public bachelor’s degree at approximately $100,000. This incredible rise in price has started taking its toll on students, as well as the country. The total outstanding student loan debt as of early August 2015 stands at $1.27 trillion (Bricker, Brown, Hannon, & Pence, 2015). The most recent graduating class of 2015 is saddled with the largest amount of student loan debt in history, with an average of more
than $35,000 per borrower (Berman, 2015), a debt that has risen by more than $10,000 in just five years.

In any economic transaction, it is essential to consider the relative factors affecting the price of goods or services. In the case of college attendance, the abhorrent neglect of considerations regarding affordability and subsequently, the future of the institution of higher education, has caused many skeptics to purport that universities are pricing themselves toward extinction. This issue has dominated the headlines in recent years and is the topic of conversation among citizens, particularly those intimately involved in higher education, across the country. It is the legitimate fear of many that the cost of obtaining college credentialing, as well as the associated crippling personal and federal debt that accumulates as a result of financing such an endeavor, will eventually cause irreversible damage to the economic and social viabilities of the country. These burdensome and often prohibitory costs are further exacerbated when students are paying for courses that do not count for college credit.

The Cost of Remedial Education

Mandatory enrollment in courses that award no credit toward graduation, while prohibiting participation in gateway general education courses does not come without consequence. Besides the aforementioned unlikelihood of persistence to graduation, students are also saddled with insurmountable debt upon exiting the postsecondary environment, more often than not, without a degree to help with repayment. Statistically, many of these students are leaving school with tens of thousands of dollars in student loan debt and are only credentialed to enter the work force at an entry-level position (if at all) that does not afford them the financial freedom to repay their debts or contribute
positively to the economic health of the country. Much like the cost of nearly everything in society, the cost of remedial education has skyrocketed in the past decade. Estimates from the late 1990’s suggested that public colleges spent approximately $1 billion per year on remediation (Breneman & Haarlow, 1997). More recent estimates show that states and students spent over $5.6 billion in 2011 (Amos, 2011), and approximately $7 billion in 2014 (Scott-Clayton et al., 2014). Furthermore, the contributions that students who are relegated to enrollment in these courses (and fail to graduate at astounding rates) are making to the student loan debt figures cannot be undersold. This is even more concerning considering that the increased time to degree associated with enrollment in zero credit courses (Venzia, Kirst, & Antonio, 2004) often leads to lower completion rates. Making matters worse, opponents to remedial education posit that in many instances, taxpayers are being billed twice for educational services that should have been provided in the P-12 system (Merisotis & Phipps, 2000). In the current economic climate, particularly as it relates to the national conversation regarding the ever-increasing burden of student loan debt, the debate surrounding the liabilities associated with remedial education will undoubtedly continue.

Costs to the Institution

In general, the research is relatively limited, if not unclear regarding the full costs of remedial education delivery (Martinez & Bain, 2013). Saxson and Boylan (2001) reported that in every institution included in a study of remedial education delivery cost, the revenues collected by student tuition completely covered or exceeded institutional liabilities. Furthermore, particularly in community colleges, remedial course tuition revenues generated more revenue than cost of delivery, making it a valuable source of
fiscal revenue – of which the excess often supports other programs. Additionally, very few remedial courses are taught by full-time faculty, yet they are filled with students paying full tuition (Gerlaugh et al., 2007). However, these students also require significant resources that are more difficult to quantify, such as additional advising, placement assessments, and other academic assistance. Ultimately, as noted by Martinez and Bain (2013), universities are likely making decisions based on incomplete or ill-conceived models of financial impact when it comes to offering and supporting remedial education. As unclear as the research is regarding the effectiveness of these courses, the equally ambiguous understanding of the financial impacts only serves to further convolute stakeholders’ decisions concerning how institutions will continue to support this population.

Other Variables Affecting Student Success

Undoubtedly, there are a number of factors associated with the likelihood that a student will be successful in the postsecondary environment. The impacts of remedial education are difficult to analyze without also considering the confluence of other academic and demographic elements that have presented links to persistence. These covariates are not necessarily causal in nature, yet they have been found to be consistently related to the historical measurements of student academic success. It is important to be mindful of these connections when considering the impact of any one intervention.

Ethnicity and Student Academic Success

While the American mantra for opportunity through hard work and determination is echoed through the halls of postsecondary institutions much like in other arenas, there
are a few factors affected students’ likelihood to persist to graduation that are beyond their control. One such static variable is membership in a racial/ethnic group. The relationship between ethnicity and postsecondary school success has long been a metric of interest in the United States for a variety of reasons ranging from social justice and equity to financial models and emerging markets.

The data on the successes of students representing ethnic minorities in postsecondary environments are relatively clear. Even though the vast majority of high school students now express intentions to pursue some form of postsecondary credential, there are still significant gaps in enrollment rates by ethnicity. Unfortunately, this is most likely due to many underrepresented minorities being underprepared during their K-12 experience and therefore requiring remediation at the postsecondary level (ACT, 2010). In fact, the degree completion rates of White students exceed those by African American students by approximately 17%. Understanding the factors associated with decreased graduation and retention rates of ethnic minorities is the first step in creating solutions for the inequity in access and support. There have been a number of studies that point to non-academic factors as additional or alternative explanations for this phenomenon.

The initial consideration of racial discrimination, either real or perceived, or the stigma associated with an individual’s race in particular contexts is a relevant factor when considering postsecondary success for these populations. Huynh and Fuligni (2012) found that although perceived discrimination on behalf of the individual decreases throughout the course of involvement in a university setting, the perceived devaluation of society increases. These negative perceptions are associated with long-term depressive symptoms that may contribute negatively to attempts at upward mobility. It is also
difficult to separate perceived societal devaluation from the sense of community and belonging that are vital to student success, regardless of ethnicity. According to Tinto (1993), an imperative component in the development of the individual student’s identity with the institution is the sense of belongingness that is manifested as a result of the student’s integration into the very fabric of the university. Students from underrepresented ethnic classes tend to have a lower sense of belonging than do their White/Caucasian counterparts (Johnson et al., 2007). The propensity to be relatively less engaged and/or feel as if they do not fit well in the environment of the institution becomes an important non-academic consideration for researchers, administrators, and practitioners endeavoring to positively impact student retention.

First-Generation Students and Retention

There are some cycles that are difficult to break because of their inherently recursive, cyclical, and self-fulfilling nature. Educational attainment, particularly as it is measured by postsecondary achievement, is one such construct in which the increased likelihood of matriculation toward a credential is perpetuated by the educational attainment of the parent(s). The familiar phrase for this phenomenon is that “education begets education.” Indeed, those students aspiring toward higher education who have a family member with previous experience and postsecondary accomplishments experience a veritable Matthew Effect. This concept, more commonly expressed as “the rich get richer and the poor get poorer,” is exemplified in that the initial benefit of such a relationship continues to expand into subsequent advantages.

To illustrate the associative impact of being a first-generation college student, consider that fewer than half of students whose parents had no college experience attend
college themselves, while students of parents holding a college degree attend at a rate of 85% (Engle, Bermeo, & O’Brien, 2006). Additionally, first-generation college students are more likely to be from an underrepresented minority group, delay enrollment in postsecondary coursework, and require remediation. Finally, these complete fewer credits, earn lower grades on average, and are far more likely to withdraw before completion than their non-first-generation counterparts (Chen, 2005). The impacts of blazing the trail of higher education with no familial guidance often ends before graduation day.

Not only do first-generation students attend college and succeed at a lower rate than students whose parents attended or graduated college, but first-generation students are also much more likely to attend less academically rigorous institutions (Pascarella, Pierson, Wolniak, & Terenzini, 2004). This same longitudinal study found that even though first-generation students are less likely to fully engage in extracurricular offerings with peers, they benefitted much more than did their peers with college-experienced parents. A natural explanation of this effect is that the peer social group could act as a proxy for the types of experience and advice that otherwise may come from a parent. If this apparent lack of social capital is not sufficiently replaced by the connections made on campus, the inconsistencies with what is expected from the university and what the student believes to be necessary become problematic. Collier and Morgan (2008) found that there is a relative lack of “explicit” and “implicit” knowledge for first-generation students regarding the functioning of a university. The authors further claim that the ability of students to become “role experts” in applying this knowledge perpetuates the process of reproduction, wherein subsequent generations are benefitted with the
inheritance of the knowledge (p. 442). Schademan and Thompson (2015) examined the potential of faculty members serving as the cultural agents so many first-generation students are missing. Although the views of student readiness varied widely among faculty, those who do not choose a deficit view of students with first-generation status have experienced much more success in enacting student readiness. Nonetheless, in the absence of knowledge regarding the successful navigation of higher education lies the increased likelihood of failure. Students without access to parents who can provide this knowledge find themselves at an inherent disadvantage.

There are also considerations regarding the non-academic cognitive characteristics of first-generation college students. Vuong, Brown-Welty, and Tracz (2010) found academic success and persistence to be functions of academic self-efficacy and that first-generation college students fared worse than their second-generation peers. These findings support similar results from Ramos-Sanchez and Nichols (2007) stating that first-generation college students report lower levels of academic self-efficacy and lower levels of academic success and that initial levels of self-efficacy are associated strongly with academic performance (Friedman & Mandel, 2009; Wright, Jenkins-Guarnieri, & Murdock, 2012). When students enter the postsecondary environment with low academic self-efficacy paired with little to no access to the knowledge necessary to navigate higher education due to their first-generation student status, it becomes increasingly unlikely that they will persist to graduation.

**Low-Income Students and Retention**

Another factor impacting the likelihood of students succeeding in the postsecondary environment is the financial status of the party responsible for paying for
school. In the vast majority of cases for traditional age students, this means consideration of parental income. Depending on a variety of factors in addition to gross income such as family size, number of kids attending college, etc., students may qualify for federal financial aid in the form of a Pell grant (Gobel, 2015). Even though membership in a socioeconomic status (SES) of low-income may offer students the opportunity to receive financial assistance to pay for college, other associated detrimental effects may well outweigh such a benefit.

According to data collected by the ACT organization (2013), low-income high school graduates are dramatically less likely to meet the college readiness standards in all academic subjects. As such, they are far less likely to earn a bachelor’s degree by the age of 25 (The White House, 2014). There may be a number of explanations for why a positive relationship exists between socioeconomic status and postsecondary success. Cabrera and La Nasa (2001) found that among students in eighth grade nearly 80% of the lowest SES quartile had parents with no college experience. Conversely, the highest SES quartile included over 99% of students whose parents had previous postsecondary experience. As low SES students enter college, they are far less likely than their higher SES counterparts to experience the parental involvement and support that are vital to academic success. According to Attewell et al. (2006), low SES students are also much more likely than high SES students to require remedial coursework.

Unfortunately, low SES is also often compounded by the fact that students fitting this description attend schools with fewer academic resources and qualified teachers, as well as reputations for decreased rigor and college preparatory focus. Research conducted by Darling-Hammond (2004), Goe (2002), and others highlights the
disproportionate numbers of SES students receiving instruction from under-qualified and emergency certified teachers. Intuitively, students from less affluent families, engaging in fewer cultural experiences, attending less rigorous schools, and without parents with college experience are less likely to succeed in college. However, it is important to note that even though nearly every study examining this construct includes SES as a controlling factor given the correlational information available, it is still not definitively clear as to why some low SES students succeed despite these odds (Cabrera, Burkum, La Nasa, & Bibo, 2012). Even so, the commitment to ensuring that students from disadvantaged economic backgrounds receive access to high quality higher education, as well as providing the required supports, remains a missional focus of thousands of institutions across the country.

**Previous Academic Performance and Retention**

It is no secret that past academic performance and future academic performance are highly correlated. After all, previous behavior is typically the best predictor of future behavior. In the postsecondary arena, decisions regarding admissions and placement often consider students’ previous academic performance as measured by grade point average (GPA). Kobrin et al. (2008) reported that high school GPA was closely associated (adjusted $r^2 = .54$) with first year college cumulative GPA, a finding that is not uncommon among researchers in the field (Belfield & Crosta, 2012; Kim, 2002). When it comes to students representing racial and religious minority groups, academic achievement in high school has been demonstrated to be a better predictor than are standardized test scores (Hoffman & Lowitzki, 2005). A conjecture for these relationships is that high school GPA does not simply represent the academic
achievement, but rather is reflective of a more encompassing view of the student in terms of commitment to success, as well as other affective traits that influence academic outcomes.

While there are other metrics of previous academic performance that correlate well with postsecondary success, such as enrollment in and successful completion of Advanced Placement (AP) coursework, dual-credit/dual-enrollment participation, and fulfilling college preparatory curriculum sequences, high school GPA continues to be an important indicator of readiness. More specifically, student entering the postsecondary environment having maintained a high school GPA of 3.0 or above are strongly associated with successful completion of credit-bearing gateway college courses (ACT, 2012; American Institutes for Research, 2013). Even though GPA is measured as a continuous ratio variable, the importance of the 3.0 high school cumulative GPA threshold is evidenced in numerous studies.

**Best Practices and Calls for Change**

As a result of the national attention surrounding the education of underprepared students, a number of adjustments have been made in the public school sector in an attempt to rectify the issue. The adoption of the Common Core standards by nearly every state, the increased focus on individualized and differentiated instruction, requirements associated with response to intervention (RTI), as well as a host of other changes signify the social and political dissatisfaction with the preparatory reputation of the typical public school sequence. However, the promise of receiving more prepared students has not proven sufficient for many institutions. Just as their public school counterparts have
evolved, so too have many universities in an attempt to best serve the students as they are, regardless of preparedness.

Best Practices

Of primary concern is the philosophical approach of “dipping down” to the current academic achievement of students in remedial courses. In this mindset, “many faculty believe that all students referred to developmental education need slower-paced instruction stretched out over extended periods of time” (Edgecombe, 2011, p. 31). The prescriptive approach to delivering remedial curricula is most commonly skills based, disconnected, and repetitive, offering little or no student engagement. As one respected researcher noted, “it is foolish to think that students who have never learned to read for meaning…can suddenly learn quickly from another round of skills and drills” (Grubb, 2001, p. 11). Critics of this approach claim that students do not need to simply repeat the same version of secondary math, reading, or English, rather they need to be exposed to rigorous performance standards with unwavering expectations and to consistently practice the skills and habits necessary for achieving at the college level (Edgecombe, 2011; Grubb, 2001).

The pedagogical method commonly associated with remediation has been the so-called drill and skill approach. Students are exposed to a new concept or application and are then asked to engage in repetitive practices utilizing the new skill until they are expected to achieve mastery. Typically, the application of these exercises occurs via inauthentic materials that are disconnected from real content. As Levin and Calcagno (2008) suggested, this style of teaching is similar to what students experienced in previous academic settings, which often elicits the same negative attitudes and obstinate
behaviors that contributed to their current state of underpreparedness. Similarly, Grubb (2001) called for less didactic instruction, instead recognizing the social and communicative needs of students to utilize language in learning. Instructors should create lively, student-centered, and engaging classroom environments. This suggestion aligns well with the trend for courses that are more “student or learning-centered” rather than “remedial” or developmental in nature (Flippo & Caverly, 2009, p. 371). Cognitive-based models should replace the stigma-charged and outdated deficiency models that often do not improve underprepared students’ skill and strategy development or do not improve dropout and graduation rates (Adelman, 1996; Bohr, 1994; Flippo & Caverly, 2009; Gourgey, 1999; Maxwell, 1997; Mt. San Antonio, 2008). The best designed courses include learning experiences where students use cognitive-based models to learn about how the brain functions with language and learning.

**Promising Practices**

As Adelman (1998) purported, when a student’s deficiency is primarily in the area of reading, the chances of that student being successful in the college environment are substantially diminished, given the pervasive requirements of reading throughout all coursework. Similarly, Simpson and Nist (2000) criticized the academic skillsets and habits of a portion of college students who only possess “rote-level strategies for reading and studying” (p. 528). The researchers go on to claim that as much as 85% of the reading that is required in college level courses requires some form of strategic approach to comprehension on behalf of student. As such skills are commonly deficient in many students, some universities have created reading skills courses targeting a wide range of students, not just those mandated into remedial coursework. In a six-year longitudinal
study of the effectiveness of a reading improvement course at a community college, Hennessey (1990) reported that students who enrolled in and completed the course succeeded at a higher rate and persisted longer than those who either failed to complete or failed to participate in the course. Caverly, Nicholson, and Radcliffe (2004) found that explicit instruction delivered via a strategic reading course resulted in significant effect sizes in student grades in subsequent reading intensive content courses. Courses such as these tend to focus instruction on authentic materials from content with which underprepared students often struggle.

A two-year study on a program implemented at City University of New York (CUNY), which serves over half a million students per year, called Accelerated Study in Associate Programs (ASAP), found that a systematic and comprehensive support program for students requiring remediation can have substantial positive impact on persistence. The program, which provided comprehensive advisement, tutoring, career services, and financial assistance in addition to developmental/remedial course enrollment, saw a 66% increase in two-year graduation rates (Scrivener & Weiss, 2013). The comprehensive approach is in stark contrast to simply mandating students to take a remedial course in isolation. Edgecombe (2011) called for improving the alignment between developmental education and traditional college-level coursework, so as to provide the relevancy students require if the experience is to be positive. New calls for change do not discount the need of many students for intensive academic assistance to develop the habits and skillsets that were deficient upon postsecondary enrollment. Instead, mounting evidence suggests that most students who are currently placed in remedial coursework that must be completed before entrance into an associated gateway
course could be successful if placed in the gateway course with corequisite support (Vandal, 2014).

**Calls for Change**

One suggestion that seems to be gaining momentum is to abandon the almost arbitrary dichotomy that exists with classifying students as requiring developmental coursework or being college ready. This binary approach is almost exclusively based on college readiness test scores such as the ACT and SAT and does not allow students around the cutoff point on either side to receive the full benefits and support they need. There are those who are relegated to developmental coursework who present with such academic qualities that they may not require such far-reaching remediation. A longitudinal study of students requiring developmental courses in the state of Tennessee provided a unique insight on the impacts of developmental education programs on underprepared students (Boatman & Long, 2010). Generally, students who are less severely underprepared or only require one or two developmental courses are negatively impacted by enrollment in such classes. However, the more critical the academic need with which a student presents, the more likely participation in developmental curriculum may have a positive effect. The researchers were careful to point out that these “positive” effects may be relative in nature or simply have much smaller negative effects. Conversely, there are students being labeled as college ready, who barely crossed the threshold of such a classification and therefore receive no additional assistance, even though they possess relatively weak academic skillsets (Bailey, 2009). Aligned with this thinking is the suggestion from Complete College America (2013) to utilize a placement range, not a single cut score, when considering the most effective supports for students.
Another suggestion for overhauling the traditional approach to developmental coursework and remediation is to integrate the core academic skills support necessary within the gateway, college-level credit-bearing courses (Complete College America, 2013). This may occur via single-semester co-requisite models, parallel remediation, or single-semester courses being stretch over the full academic year. In any of these iterations, students are immediately beginning their postsecondary careers in credit-bearing college courses. Further suggestions from this same report include enrolling students in cohorts, ensuring they sign up for at least 15 hours of credit per semester, and structuring students’ schedules to avoid taking unnecessary courses while completing the courses necessary to their success.

The implementation of student success courses aimed at this population of underprepared students has shown positive effects. These courses, promoted as best practice for acclimating students to college life, are typically one-semester, credit-bearing offerings. They primarily focus on the affective components of student success, but also incorporate the teaching of study skills and other academic strategies for success (Rutschow & Schneider, 2011). These approaches to readying students for the rigors of college do not ignore the social, emotional, and other non-cognitive factors associated with student success. There is much more to persistence and eventual graduation than simple academic preparedness and content knowledge. Students must quickly acclimate to the dramatically increased workload and academic expectations, as well as navigate the system without the traditional hand-holding supports that are provided in the P-12 environment.
Increasingly there have been calls for contextualized instructional models to replace the dated, isolated course designs common to remedial offerings (Rutschow & Schneider, 2011). These models offer students the opportunity to enhance their developmental skillsets within the context of other programs that align well with their interests and career paths. Commonly, these may be presented as co-requisite or dual enrollment formations, many times as cohort or learning communities in which students matriculate through coursework as a unit.

Levin (1991), looking through the lens of economic theories that help explain the rising cost of higher education, suggested that universities must innovate to improve. The lack of innovation can be attributed to the glacial pace at which any changes are accepted and incorporated into the fabric of the institution, largely due to the decentralized control of resources and the lack of faculty incentive to evolve. The ultimate recommendation stemming from this work was that universities endeavor to become “experimenting institutions” (p. 260) that innovate and take risks to become more effective and productive instead of keeping the status quo.

**Looking Forward**

The data condemning the current approaches to remediating underprepared students, for the most part, applies to institutions nationwide. As universities objectively examine their own programs and plan to make adjustments based on the national calls for change and the literature of what constitutes best practice in the field, there are a few components, that if present, will increase the likelihood of successfully changing the trajectory of developmental education. While these suggestions are not exhaustively reflective of the many unique approaches to addressing the remedial curse, they do
represent achievable adjustments that universities can make in their pursuit to turn the tide of underprepared students failure to persist.

**Qualified, committed personnel.** The trend for most institutions has been to staff developmental education courses with part-time, adjunct faculty. This proves the most cost effective solution for educating a populace for whom the university has little hope of continuing longer than only a few semesters. Adjunct faculty report spending much less time than their full-time counterparts giving students feedback and meeting with students. They are rarely involved in college student success initiatives and rarely, if ever, have opportunities to receive professional development (Center for Community College Student Engagement, 2014). Approximately 25% or fewer of developmental courses are taught by full-time faculty (Gerlaugh et al., 2007). Counterintuitively, the population of students who may well require the most support are not receiving it from the most qualified faculty. There is little doubt that the quality and effectiveness of the instruction offered to this population of students is a chief factor in their ultimate success (Rutschow & Schneider, 2011). If universities expect to intervene on behalf of the underprepared students admitted and hope to retain those students to graduation, they must commit to serve them with highly qualified, committed faculty members.

**Increase academic rigor.** Students coming in to universities receive a classification as being academically underprepared, largely based on their performance on a college admissions exam. Metadata from large organizations, such as ACT, have shown that certain scores on these standardized tests are associated more closely with positive GPAs and retention toward graduation than other scores. What this information tells universities and students is that students who fail to meet the criteria to be admitted
into gateway credit-bearing courses are not yet academically prepared to do so; they are underprepared. What these classifications do not mean is that these students are unintelligent or incapable. It does not mean that they cannot accomplish college-level work, rather that they have not had experience with such rigor. There is ample research on raising rigor in the classroom to increase achievement (Schnee, 2008; Wakelyn, 2009). Universities and faculty alike must understand that it is a disservice to students to lower expectations. There must be a universal commitment to support students toward meeting the rigorous expectations that will exist in all college courses.

**Immediately enroll students in credit-bearing coursework.** Every call from national and state organizations is to keep students on track to graduate in as little time as possible. Kentucky’s “15 to Finish” campaign is indicative of the initiatives occurring around the country to educate students on the importance of fulfilling 15 credit hours per semester to decrease the student loan burden and increase the likelihood of continued matriculation. According to Complete College America (2014), only 19% of students pursuing a bachelor’s degree attending universities classified as “non-flagship” graduate within four years. Even “flagship” or “very high research” universities only boast a 36% four-year graduation rate. Universities must find a way in the curricular process to offer introductory level coursework that provides the necessary support to underprepared students without the need for zero credit developmental courses, a notion supported by Crawford (1993). This would aid in the time to degree and encourage students to persist toward completion, as the more rapidly progress is made toward a credential, the more likely students are to complete college (Bowen, Chingos, & McPherson, 2009). Universities cannot ignore that failure on the part of many students to complete
developmental sequences may be due in part to “significant structural obstacles” created by institutions (Edgecombe, 2011, p. 25). Ultimately, the ethical obligation to provide students with the best educational environment and support systems remains the duty of every college and university as soon as the decision is made to admit the student. The obstacles that too often prohibit the incorporation of best practices must be overcome in each case.

There is no magic formula for addressing these pressing concerns; however, there are proven practices from which all universities can adapt their own approach. What is for certain is that the current trajectory of student loan debt, the cost of higher education, the current economic climate, and the dwindling global positioning of the United States as it relates to education demands universities and public schools alike attend to the matter of providing the levels of education all students deserve to live productive lives.

Conclusion

There has long been a need for students of all academic backgrounds to gain access and the necessary supports to achieve success in their pursuit of higher education. Community colleges, as well as open access institutions, admit students who are underprepared to succeed in even the basic, entry-level college courses. As such, it is common practice to bridge the gaps of underpreparedness via a curricular remedy in the form of a mandatory remedial or developmental course. The research on the effectiveness of these courses details mixed results and is afflicted with a variety methodological problems.

When students are relegated to taking courses that do not count toward degree completion, issues surrounding affordability, time to degree, and financial implications
begin to arise. Given the current fiscal climate of the country, and higher education in particular, state and federal agencies have issued calls for changes in the way that universities serve students who are underprepared. The need for the creation and evaluation of viable alternative models of instruction and student support is only becoming more apparent as the debate surrounding remediation continues.

The present study endeavored to gauge the impact of a credit-bearing literacy intervention course on students’ academic performance in the semesters after completing the course. Given the criticisms of mandatory enrollment in non-credit bearing remedial programs, particularly as it relates to lower levels of persistence, it is important to explore the possibilities of alternative approaches to educating underprepared students. The status of student preparedness levels upon college enrollment, burgeoning student loan debts, and the ever-increasing premium placed on retaining students each require innovative, yet practical solutions. The following details the analytic methods and results of one university’s effort to provide an effective alternative to the traditional remedial education model.
CHAPTER III: METHODOLOGY

This study examined the degree to which successful completion of an intervention literacy course impacted student academic performance in subsequent semesters. More specifically, the course was compared to the longstanding developmental reading course in terms of impact on student academic performance. Finally, in an attempt to understand how individual background differences may affect student academic outcomes within these courses, a number of demographic and academic background variables were considered as covariates.

Research Questions

The following research questions guided the research methods, procedures, and associated analyses to investigate the impact of the credit-bearing intervention literacy course on student retention and graduation rates:

1. To what extent does successful completion of the intervention literacy course impact subsequent student academic performance (as defined by retention status and cumulative GPA)?

2. Does the impact of the intervention literacy course vary for students with different demographic and academic backgrounds?

Data

This study, utilizing data obtained from a four-year public institution in Kentucky, focused on the cluster sample of all students first attending the university with an ACT score on file between the fall of 2010 and spring 2013. While there are other, less-commonly used placement assessments, the ACT proved to be the standard metric for directing students into the course mandated by the university. For the purposes of this
study, that course designation in reading is either (a) the developmental, non-credit bearing reading course or (b) the intervention, credit-bearing literacy course.

Furthermore, because the purpose of both of these courses is to serve as a treatment for students who enter the university underprepared in reading, only students awarded a final grade of A, B, or C in the respective course were included in the final data. Students who received a D, F, or W (withdraw) are not considered by the university as having successfully completed the treatment. It only stands to reason that fair judgment of any treatment should consider only those individuals having fully partaken in the complete offering. It is assumed that those students receiving a D, F, or W in either course failed to receive the full (if any) treatment.

Considering students first attending the university with an ACT score between 16 and 19 on file during these eight semesters and achieving an A, B, or C in their respective course requirement in reading, the following analyses were based on 1,038 student records. The decision to only include data points comprised on two bandwidths on either side of the threshold was not taken lightly. The university policy requires that only students scoring an 18 or 19 on the Reading portion of the ACT take the credit-bearing intervention literacy course. Attempts to compare this population of students with any student taking the non-credit-bearing developmental reading course would be unfair, considering students are relegated to that course with ACT Reading scores as low as 6. Instead, the decision was made to match the number of bins (ACT scores) on the opposite side of the threshold. This nonparametric strategy is common in regression discontinuity design (see Crisp & Delgado, 2013; Matsudaira, 2007; Thistlethwaite & Campbell, 1960) and operates under the assumption that students scoring close to the cutoff are only
meaningfully different in the treatment they receive. The case for such as assumption is even more compelling considering that on the ACT Reading test, a student must answer only one additional question correctly to cross the threshold from a scale score of 17 to 18 (ACT, 2015a). Even though the data set only includes students with ACT Reading scores of two bandwidths above and below the threshold (16/17 and 18/19), additional statistical measures were taken to consider the ACT Reading score as a covariate.

Finally, to obtain the student records for this project, a formal request was made to the university’s department of Institutional Research (IR) for data to be delivered to the researcher blinded as to any identifiable student information. The appropriate measures of human subjects approval were pursued and approved by the university’s Institutional Review Board (IRB). The stamped letter indicating that this project was exempt from full board review is included in the appendix.

Variables

To analyze the two research questions guiding this study, the dependent measure of student academic performance was calculated utilizing the dichotomous variable of student retention status, either students are still enrolled at the university or they are not. This dependent measure was computed at two-years after the respective initial enrollment for each student. Additionally, for the purposes of this study, the dichotomous measure of persistence (coded as 1 for persisting and 0 for failing to persist) was defined as re-enrollment at the same university at each time frame considered. No attempts were made to account for student transfer to other institutions. Additionally, as another measure of student academic performance, two-year cumulative GPA was used as a dependent
variable. As it is used as an outcome variable in this context, GPA is considered to be a continuous, ratio variable considering the university uses a standard 4.0 grading scale.

The independent variables included in the analyses for research question one are simply the university-established mandated course placements for students as determined by the ACT Reading score. These categorical variables are comprised of the following ranges of placement scores:

- Students with ACT Reading scores of 6-17 were mandated to enroll in the developmental, non-credit bearing reading course (coded as 0)
- Students with ACT Reading scores of 18-19 were mandated to enroll in the intervention, credit-bearing literacy course (coded as 1)

Lastly, the other independent variables representing student demographic and academic background variables were coded as described in this paragraph. The dichotomous variable of gender was coded 1 = female and 0 = male. The ethnicity of each student, a self-identified determination, was coded into three categories: 1 = Black/African American, 2 = White; or 3 = Other. The final category of “other” composed ethnic classifications of Hispanic, Asian, Non-Resident Alien, Hawaiian/Pacific Islander, American Indian/Native Alaskan, Two or more races, and Race/Ethnicity Unknown. Previous academic performance was measured using information from students’ unweighted high school cumulative grade point average. This variable was coded dichotomously with a threshold of 3.00, with 0 = GPA from 0.00 to 2.99 and 1 = GPA from 3.00 to 4.00, to correspond to the aforementioned research on the importance of that threshold. Parental college experience, designated as “legacy”, was considered to analyze the potential impact of first generation college student status and
was coded into three categories: 1 = first generation college student or 2 = not first generation college student (member of family with previous college experience). Finally, family income was determined by student eligibility for federal Pell grant funds and was coded as 1 = low income and 0 = not low income.

Statistical Analyses

This study used three methods of analyzing student data to make inferences regarding the impact of the intervention literacy course on student academic outcomes. Binary logistic regression was used to examine the relationship between a host of independent variables on the dichotomous outcome variable of two year retention status (Miles & Shevlin, 2001). Measuring retention or persistence rates in higher education on a dichotomous scale and evaluating the associated impacts of a variety of independent variables is common in the literature (Cabrera, 1994). The variables in the present study included demographic information such as ethnicity, parental legacy, and low-income status. Additionally, academic background variables such as cumulative high school GPA and ACT reading score were included.

A hierarchical linear regression was conducted to measure the unique impact of the independent variable of reading course passed on two-year GPA above and beyond the effect of all associated personal and academic background variables already factored. This method of analysis helps to guard against the likelihood of overestimation that is common in aggregated analyses and the underestimation of effects associated with disaggregated approaches (Osborne, 2000). It also allows for determinations of relationship strength of each specific independent variable on the dependent outcome (Hoffman, 1997). By making this a two-step process first loading the associated
demographic and academic background variables in the analysis of model one and subsequently including the addition of the reading course in model two, the unique contribution of the reading course on predicting the dependent variable can be observed.

Finally, to further examine if there is an interaction between the intervention and student demographic and academic background variables, two-way analyses of covariance (ANCOVAs) were performed. In each analysis, two-year cumulative GPA served as the dependent variable, reading course passed (intervention) served as one independent variable, and ACT reading score the covariate. Each of the aforementioned demographic and academic background variables served as the other independent variable in each analysis. This allowed for the detection of statistical differences between the IV of reading course passed at each level of the independent variable analyzed, yielding further information related to the inquiry of the second research question. All statistical calculations were performed using IBM Statistical Package for the Social Sciences, version 23 (SPSS™ 23).

**Limitations**

The data utilized in this study were provided by the office of institutional research at one state university and were limited in two primary ways: (a) only students who were admitted to the university with an ACT score on file were considered, and (b) no attempts were made to track student transfer or re-enrollment after leaving the institution. While there are other college admission and placement tests utilized by the university, the overwhelming majority of students have an ACT score on file. The decision to only consider students with an ACT score was made to eliminate the need for the arduous, if not arbitrary, task of analyzing test equivalency policies. Additionally, due to the
inherent difficulties of accurately tracking transfer and re-enrollment at other universities, the present study measured retention only in terms of subsequent term re-enrollment at the same university.

These limitations were calculated decisions made considering the associated drawbacks. Admittedly, failure to include transfer students in the data set is not the ideal choice, as a certain population of students are being considered as unretained when they may well have simply changed institutions. However, the lack of valid and reliable tracking data for these students, as well as the associated lack of research control over variables related to the decision to transfer, posed more detriments than benefits.

Even though the decisions made in analyzing the current dataset were methodologically sound and were sufficient to address the research questions, the fact remains that the current study is representative of what has been occurring at only one institution over the span of a few years. More robust data representing multiple colleges and universities, with clear placement indicators, and with more efficient control over student transfer record keeping would likely yield even more powerful analyses.
CHAPTER IV: RESULTS

The results from the present study are detailed in this chapter and are reported in three sections: Descriptive Statistics; Results of Regression Analyses; and Results of ANCOVAs.

Descriptive Statistics

A description of the demographic variables associated with the cluster sample population is provided in the following sections. Descriptive statistics including frequencies and percentages for the categorical variables of gender, ethnicity, low-income status, parental legacy, ACT Reading score, and high school GPA (above and below 3.0) for the entire sample and each intervention group are presented in Table 1. Finally, the dependent measures of two-year retention status and two-year cumulative GPA are reported for each of the aforementioned variables in Tables 2-4.

Gender and Ethnicity

Table 1 indicates that female students \( (n = 590) \) comprised 56.8% of the population, while the remaining 43.2% consisted of males \( (n = 448) \). This dispersion of gender is nearly identical to the national composition of 56.2% female and 43.8% male (IES, 2014). The demographics were less similar in terms of ethnicities represented, as the current study included an overrepresentation of both white \( (n = 666; 64.2\%) \) and black/African American \( (n = 298; 28.7\%) \) students compared to the national averages of 58.3% and 14.7%, respectively. These differences are balanced by the underrepresentation of students classified as non-white and non-black (other), as the study included 74 such cases, comprising 7.1%. The national average of this classification is approximately 27%. The demographic profiles of both the literacy
intervention group and developmental reading group are similar. But the literacy intervention group had higher ACT reading scores and high school GPA than did the developmental reading group.

Table 2 indicates that males were retained at two years at a rate of nearly 80% \((n = 339)\), slightly less than females at 81.5% \((n = 481)\). As expected, there were similar differences in average cumulative GPA at two-years (Table 3), with males averaging 2.47 and females 2.65. White students experienced the highest two-year retention rate by ethnicity (Table 2) at 82.9% \((n = 552)\), followed by students categorized as other at 75.7% \((n = 52)\), and black/African American students at 74.5% \((n = 222)\). As with gender, the relative differences among ethnic classifications were similar by GPA and retention. Table 3 illustrates that white students’ two-year cumulative GPA was the highest at 2.70 on average, followed by students classified as other at 2.56, and black/African American the lowest at 2.28.

**Low-Income Status**

For the purposes of this study, students were classified as low-income status if they qualified for a federal Pell grant. Students meeting the designation of low-income comprised 58.4% \((n = 606)\) of the sample, while the other 41.6% \((n = 432)\) did not meet the eligibility requirements for such financial assistance (see Table 1). According to College Board (2013), approximately 36% of students across the country qualified to receive federal Pell grant assistance. The university as a whole had 38.8% of its undergraduate student population qualify for a federal Pell grant in 2014 (WKU Fact Book, 2015), a number commensurate with the national average. The disproportionate numbers of students from low income families sampled in the current study is consistent
with previous research (Cabrera & La Nasa, 2001; Darling-Hammond, 2004) indicating that, for a variety of reasons, underprepared students come disproportionately from low income families.

As evidenced in Table 2, students classified as low-income were retained after two years at a rate of 76.1% \((n = 461)\), while their counterparts were retained at a rate of 85.4% \((n = 369)\). The two-year cumulative GPA average for low income students (Table 3) was 2.49, compared to 2.69 for those not meeting the criteria for that classification.

**Parental Legacy**

The number of students in the sample population classified as a first-generation college student \((n = 433)\) was 41.7%, while the remaining 56.0% \((n = 581)\) identified as having an immediate family member with college experience (Table 1). The data included 12 cases that were not included in the analyses, as they did not clearly identify a classification regarding legacy. According to the National Center for Education Statistics (2013), part of the United States Department of Education, the national average for first-generation college students stands at 32%, with 68% having some familial legacy. The number of first-generation students will continue to dwindle as the trend described by Engle et al. (2006) perpetuates the high likelihood of education begetting education. The relative disparity in first-generation representation is also indicative of this sample population only including students who are underprepared, reiterating Chen’s (2005) findings that the educational aspirations and successes of first-generation students.

Table 2 indicates that students classified as first-generation were retained after two years at a rate of 75.5% \((n = 327)\) and had two-year cumulative GPAs of 2.51 (Table
5). After two years, their counterparts with college experience in their family were retained at a rate of 82.8% (n = 481) and had GPAs of 2.62.

Table 1

Descriptive Statistics for Categorical Background Variables (N=1038)

<table>
<thead>
<tr>
<th>Category</th>
<th>Total Frequency</th>
<th>Total Valid Percentage</th>
<th>Developmental Reading</th>
<th>Literacy Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>448</td>
<td>43.2%</td>
<td>47.0%</td>
<td>36.2%</td>
</tr>
<tr>
<td>Female</td>
<td>590</td>
<td>56.8%</td>
<td>53.0%</td>
<td>63.8%</td>
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<tr>
<td><strong>Low Income Status</strong></td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Low Income</td>
<td>606</td>
<td>58.4%</td>
<td>61.8%</td>
<td>53.4%</td>
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<tr>
<td>Not Low Income</td>
<td>432</td>
<td>41.6%</td>
<td>38.2%</td>
<td>46.6%</td>
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<tr>
<td><strong>Ethnicity</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Black/African American</td>
<td>298</td>
<td>28.7%</td>
<td>34.2%</td>
<td>25.6%</td>
</tr>
<tr>
<td>White</td>
<td>666</td>
<td>64.2%</td>
<td>56.6%</td>
<td>67.6%</td>
</tr>
<tr>
<td>Other</td>
<td>74</td>
<td>7.1%</td>
<td>9.2%</td>
<td>6.8%</td>
</tr>
<tr>
<td>Total</td>
<td>1038</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
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<tr>
<td><strong>Parental Legacy</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>1st Generation</td>
<td>433</td>
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<td>45.4%</td>
<td>43.9%</td>
</tr>
<tr>
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<td>56.0%</td>
<td>52.9%</td>
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<td>1.2%</td>
<td>1.7%</td>
<td>0.8%</td>
</tr>
<tr>
<td>Total</td>
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<td>100.0%</td>
</tr>
<tr>
<td><strong>ACT Reading</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>194</td>
<td>18.7%</td>
<td>37.7%</td>
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</tr>
<tr>
<td>17</td>
<td>298</td>
<td>28.7%</td>
<td>59.0%</td>
<td>2.2%</td>
</tr>
<tr>
<td>18</td>
<td>276</td>
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<td>1.9%</td>
<td>48.3%</td>
</tr>
<tr>
<td>19</td>
<td>270</td>
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<td>47.6%</td>
</tr>
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<td>Total</td>
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<td>100.0%</td>
<td>100.0%</td>
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<tr>
<td><strong>High School GPA</strong></td>
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<td>≥ 3.00</td>
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<td>0.0</td>
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<td>Total</td>
<td>1036</td>
<td>99.8%</td>
<td>100.0%</td>
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</table>
### Table 2

*Two-Year Retention by Categorical Background Characteristics*

<table>
<thead>
<tr>
<th>Category</th>
<th>Frequency</th>
<th>Valid Percentage</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
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<td></td>
</tr>
<tr>
<td>Male</td>
<td>349</td>
<td>77.9%</td>
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<tr>
<td>Female</td>
<td>481</td>
<td>81.5%</td>
<td>590</td>
</tr>
<tr>
<td>Total</td>
<td>830</td>
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<td>1038</td>
</tr>
<tr>
<td><strong>Low Income Status</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Low Income</td>
<td>461</td>
<td>76.1%</td>
<td>606</td>
</tr>
<tr>
<td>Not Low Income</td>
<td>369</td>
<td>85.4%</td>
<td>432</td>
</tr>
<tr>
<td>Total</td>
<td>830</td>
<td></td>
<td>1038</td>
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<tr>
<td><strong>Ethnicity</strong></td>
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<td></td>
</tr>
<tr>
<td>Black/African American</td>
<td>222</td>
<td>74.5%</td>
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</tr>
<tr>
<td>White</td>
<td>552</td>
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<tr>
<td>Other</td>
<td>56</td>
<td>75.7%</td>
<td>74</td>
</tr>
<tr>
<td>Total</td>
<td>830</td>
<td></td>
<td>1038</td>
</tr>
<tr>
<td><strong>Parental Legacy</strong></td>
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<tr>
<td>1st Generation</td>
<td>327</td>
<td>75.5%</td>
<td>433</td>
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<tr>
<td>Not 1st Generation</td>
<td>481</td>
<td>82.8%</td>
<td>581</td>
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</tr>
<tr>
<td>Total</td>
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<td>1026</td>
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<td><strong>ACT Reading</strong></td>
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<tr>
<td>17</td>
<td>233</td>
<td>78.2%</td>
<td>298</td>
</tr>
<tr>
<td>18</td>
<td>230</td>
<td>83.3%</td>
<td>276</td>
</tr>
<tr>
<td>19</td>
<td>225</td>
<td>83.3%</td>
<td>270</td>
</tr>
<tr>
<td>Total</td>
<td>830</td>
<td></td>
<td>1038</td>
</tr>
<tr>
<td><strong>High School GPA</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤ 2.99</td>
<td>373</td>
<td>74.3%</td>
<td>502</td>
</tr>
<tr>
<td>≥ 3.00</td>
<td>455</td>
<td>85.2%</td>
<td>534</td>
</tr>
<tr>
<td>Missing</td>
<td>2</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>830</td>
<td></td>
<td>1036</td>
</tr>
<tr>
<td><strong>Reading Course</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Literacy Intervention</td>
<td>468</td>
<td>84.6%</td>
<td>553</td>
</tr>
<tr>
<td>Developmental Reading</td>
<td>362</td>
<td>74.6%</td>
<td>485</td>
</tr>
<tr>
<td>Total</td>
<td>830</td>
<td></td>
<td>1038</td>
</tr>
</tbody>
</table>
High School GPA and ACT Reading Score

Nationally, the average cumulative high school GPA was approximately 3.0, with the national average for males (2.90) being slightly less than that of females (3.10), according to the last major nationwide study conducted by the IES (2009). Furthermore, white students outperformed black/African American students by an average of 3.09 to 2.69, respectively. Data from the present study indicates very similar averages, with a total average high school GPA of 3.00 (SD = .480) and an average two-year cumulative GPA of 2.57 (SD = .622). The average of the sample population, combined with previous research (ACT, 2012; American Institutes for Research, 2013) indicating that the threshold of 3.0 GPA is strongly associated with successfully completing entry-level coursework, reinforces the decision to categorize students dichotomously for the sake of some analyses. The differences in ethnicity are also commensurate with national averages as white students averaged a 3.10 (SD = .445) high school cumulative GPA and black/African American students averaged a 2.75 (SD = .463).

The ACT Reading range for the present study was limited to scores ranging from 16-19 for reasons previously justified. According to university policies, students scoring a 16 or 17 on the reading portion of the ACT are required to take the developmental reading course, whereas students scoring an 18 or a 19 take the intervention literacy course. Table 1 indicates that students scoring a 16 (n = 194; 18.7%) or a 17 (n = 298; 28.7%) comprised just under half of the sample (n = 492; 47.4%). Conversely, students scoring an 18 (n = 276; 26.6%) or a 19 (n = 270; 26.0%) constituted the other half (n = 546; 52.6%).
Students whose high school GPAs were 3.0 or above were retained after two years at an 85.2% rate \((n = 455)\) compared to 74.3% \((n = 373)\) for those whose GPA was lower than 3.0 (see Table 2). The two-year cumulative college GPA of these two groups also differed, with those having a \(\geq 3.0\) high school GPA boasting a GPA of 2.78 after two years of college, compared to a 2.35 average in the lower group (see Table 3).

**Results of Regression Analyses**

A logistic regression was performed to examine the effects of reading course passed, high school GPA, ethnicity, parental legacy, low income status, and ACT reading score on the likelihood that students would be retained at the university two years after completing the reading course. The statistical significance level for all inferential statistics is set at alpha = .05 level. The logistic regression model was statistically significant, \(\chi^2(6) = 56.100, p < .0005\). The model explained 8.4% (Nagelkerke \(R^2\)) of the variance in retention status and correctly classified 80.0% of cases. Sensitivity was 99.9%, specificity was 1.4%, positive predictive value was 61.5% and negative predictive value was 74.3%.
Table 3

Means and Standard Deviations Two-Year Cumulative GPA by Categorical Background Characteristics

<table>
<thead>
<tr>
<th>Category</th>
<th>Two-Year Cumulative GPA</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>2.47</td>
<td>448</td>
</tr>
<tr>
<td>Female</td>
<td>2.65</td>
<td>590</td>
</tr>
<tr>
<td>Total</td>
<td>2.57</td>
<td>1038</td>
</tr>
<tr>
<td><strong>Low Income Status</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low Income</td>
<td>2.49</td>
<td>606</td>
</tr>
<tr>
<td>Not Low Income</td>
<td>2.69</td>
<td>432</td>
</tr>
<tr>
<td>Total</td>
<td>2.57</td>
<td>1038</td>
</tr>
<tr>
<td><strong>Ethnicity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black/African American</td>
<td>2.28</td>
<td>298</td>
</tr>
<tr>
<td>White</td>
<td>2.70</td>
<td>666</td>
</tr>
<tr>
<td>Other</td>
<td>2.56</td>
<td>74</td>
</tr>
<tr>
<td>Total</td>
<td>2.57</td>
<td>1038</td>
</tr>
<tr>
<td><strong>Parental Legacy</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1st Generation</td>
<td>2.51</td>
<td>433</td>
</tr>
<tr>
<td>Not 1st Generation</td>
<td>2.62</td>
<td>581</td>
</tr>
<tr>
<td>Missing</td>
<td>-</td>
<td>12</td>
</tr>
<tr>
<td>Total</td>
<td>2.57</td>
<td>1026</td>
</tr>
<tr>
<td><strong>ACT Reading</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>2.36</td>
<td>194</td>
</tr>
<tr>
<td>17</td>
<td>2.48</td>
<td>298</td>
</tr>
<tr>
<td>18</td>
<td>2.68</td>
<td>276</td>
</tr>
<tr>
<td>19</td>
<td>2.73</td>
<td>270</td>
</tr>
<tr>
<td>Total</td>
<td>2.57</td>
<td>1038</td>
</tr>
<tr>
<td><strong>High School GPA</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤ 2.99</td>
<td>2.35</td>
<td>502</td>
</tr>
<tr>
<td>≥ 3.00</td>
<td>2.78</td>
<td>534</td>
</tr>
<tr>
<td>Missing</td>
<td>-</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>2.57</td>
<td>1036</td>
</tr>
</tbody>
</table>
Of the six predictor variables only four were statistically significant ($p < .05$): reading course passed, high school GPA, parental legacy, and low income status (as shown in Table 4).

Table 4

*Logistic Regression Predicting Likelihood of Two-Year Retention based on Reading Course Passed, High School GPA, Ethnicity, Parental Legacy, Low Income Status, and ACT Reading Score*

<table>
<thead>
<tr>
<th></th>
<th>B</th>
<th>S.E.</th>
<th>Wald</th>
<th>df</th>
<th>Sig.</th>
<th>Odds Ratio</th>
<th>95% C.I. for Odds Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reading Course</td>
<td>.617</td>
<td>.282</td>
<td>4.775</td>
<td>1</td>
<td>.029</td>
<td>1.853</td>
<td>1.066 - 3.223</td>
</tr>
<tr>
<td>HS GPA</td>
<td>.828</td>
<td>.178</td>
<td>21.606</td>
<td>1</td>
<td>.000</td>
<td>2.288</td>
<td>1.614 - 3.244</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>-.045</td>
<td>.145</td>
<td>.097</td>
<td>1</td>
<td>.755</td>
<td>.956</td>
<td>.719 - 1.271</td>
</tr>
<tr>
<td>Legacy</td>
<td>.381</td>
<td>.160</td>
<td>5.678</td>
<td>1</td>
<td>.017</td>
<td>1.464</td>
<td>1.070 - 2.002</td>
</tr>
<tr>
<td>Low Income</td>
<td>-.430</td>
<td>.178</td>
<td>5.793</td>
<td>1</td>
<td>.016</td>
<td>.651</td>
<td>.459 - .923</td>
</tr>
<tr>
<td>ACT Reading</td>
<td>-.111</td>
<td>.131</td>
<td>.707</td>
<td>1</td>
<td>.401</td>
<td>.895</td>
<td>.692 - 1.159</td>
</tr>
<tr>
<td>Constant</td>
<td>.338</td>
<td>2.255</td>
<td>.022</td>
<td>1</td>
<td>.881</td>
<td>1.402</td>
<td></td>
</tr>
</tbody>
</table>

Table 4 presents the odds ratios, which suggest that the odds of being retained after two years are increasingly greater as cumulative high school GPA increases. The results also echo Engle et al. (2006) in that students not classified as low income are more likely to be retained. Similarly, congruent with findings from Chen (2005), students coming from families wherein another person attended college are also more likely to be retained after two years. The variable associated with the research questions guiding the study (reading course passed) was also found to be statistically significant ($p < .05$).
Indeed, students passing the intervention literacy course had 1.85 times higher odds to be retained at the university two years later than did students passing the developmental reading course.

**Hierarchical Linear Regression**

A hierarchical linear multiple regression was conducted to determine if the addition of reading course passed improved the prediction of cumulative two-year GPA over using the demographic and academic background variables of ethnicity, legacy, low income status, ACT reading score, and high school GPA alone. See Table 5 for full details on each regression model. Model one considers the known demographic and student academic background variables of ethnicity, legacy, low income status, ACT reading score, and cumulative high school GPA. The addition of the reading course passed, in this case either the developmental reading course or the intervention literacy course, was the discerning difference in the second model. The full model of ethnicity, legacy, low income status, ACT reading score, high school GPA, and reading course passed (Model 2) was statistically significant, $R^2 = .258$, $F(6, 1006) = 58.244$, $p < .0005$; adjusted $R^2 = .253$. The addition of reading course passed to the prediction of Model one led to a statistically significant increase in $R^2$ of .004, $F(5, 1007) = 68.477$, $p < .05$. However, once reading course passed is included in the model, ACT reading score is no longer a statistically significant predictor of cumulative two-year GPA.
Table 5

_Hierarchical Multiple Regression Predicting Two-Year Cumulative GPA from Ethnicity, Legacy, Low Income Status, ACT Reading Score, High School GPA, and Reading Course Passed_

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model 1</th>
<th></th>
<th></th>
<th>Model 2</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>β</td>
<td>B</td>
<td>β</td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>-.603</td>
<td>.264</td>
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<td></td>
</tr>
<tr>
<td>Ethnicity</td>
<td>.112</td>
<td>.100*</td>
<td>.115</td>
<td>.103**</td>
<td></td>
</tr>
<tr>
<td>Legacy</td>
<td>.082</td>
<td>.065*</td>
<td>.085</td>
<td>.035*</td>
<td></td>
</tr>
<tr>
<td>Low Income</td>
<td>-.095</td>
<td>-.075*</td>
<td>-.090</td>
<td>-.071*</td>
<td></td>
</tr>
<tr>
<td>ACT Reading</td>
<td>.076</td>
<td>.130**</td>
<td>.024</td>
<td>.041</td>
<td></td>
</tr>
<tr>
<td>HS GPA</td>
<td>.521</td>
<td>.399**</td>
<td>.509</td>
<td>.390**</td>
<td></td>
</tr>
<tr>
<td>Reading Course</td>
<td></td>
<td></td>
<td>.140</td>
<td>.112*</td>
<td></td>
</tr>
<tr>
<td>$R^2$</td>
<td>.254</td>
<td></td>
<td>.258</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$F$</td>
<td>68.48**</td>
<td></td>
<td>58.24**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\Delta R^2$</td>
<td>.254</td>
<td></td>
<td>.004*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\Delta F$</td>
<td>68.48**</td>
<td></td>
<td>5.536*</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note. N=1024. *p<.05, **p<.001

Results of ANCOVAs

_Ethnicity_

A two-way ANCOVA was conducted to determine the differing effects of passing one of two university reading courses by student ethnicity on two-year cumulative GPA after controlling for ACT Reading score. First of all, the assumptions of ANCOVA were checked. There was a linear relationship between reading course passed and two-year cumulative GPA, as assessed by visual inspection of a scatterplot. There was
homogeneity of regression slopes as the interaction term was not statistically significant, $F(1, 1034) = .014, p = .907$. Standardized residuals for the interventions and for the overall model were normally distributed, as assessed by visual inspection of the normal curve over a histogram plot. There was homoscedasticity and homogeneity of variances, as assessed by visual inspection of a scatterplot and Levene’s test of homogeneity of variance ($p = .283$), respectively. There were no outliers in the data, as assessed by no cases with standardized residuals greater than ±3 standard deviations.

Table 6 presents the unadjusted and adjusted means and variability for cumulative two-year GPAs by reading course passed and ethnicity. The ANCOVA results in Table 7 showed that, after adjustment for ACT Reading score, there was a statistically significant difference in two-year cumulative GPA by reading course passed, $F(1, 1031) = 15.085, p < .0005$, partial $\eta^2 = .014$. Additionally, there was a statistically significant difference in two-year cumulative GPA by ethnicity, $F(2, 1031) = 46.144, p < .0005$, partial $\eta^2 = .082$. However, the interaction of these two independent variables was not statistically significant, $F(2, 1031) = 1.077, p = .351$, partial $\eta^2 = .002$. Post hoc multiple comparisons (see Table 8) showed that students identifying as white averaged statistically significantly greater two-year cumulative GPA ($p < .0005$) than did students identifying as black/African American, as did students classified as other ($p < .0005$). Finally, Table 9 provides the statistical evidence that students successfully completing the intervention literacy course had statistically significantly higher two-year cumulative GPAs than did students successfully completing the developmental reading course, regardless of ethnicity (Black/African American, $p = .002$; White, $p = .005$; Other, $p = .006$). Figure 1 demonstrates these differences via visual plot.
Table 6

Adjusted and Unadjusted Two-Year Cumulative GPA Means and Variability by Reading Course Passed and Ethnicity using ACT Reading Score as a Covariate

<table>
<thead>
<tr>
<th></th>
<th>Unadjusted</th>
<th></th>
<th></th>
<th>Unadjusted</th>
<th></th>
<th></th>
<th>Unadjusted</th>
<th></th>
<th></th>
<th>Unadjusted</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Black/Af. Am.</td>
<td>White</td>
<td>Other</td>
<td>Black/Af. Am.</td>
<td>White</td>
<td>Other</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>M</td>
<td>SD</td>
<td>N</td>
<td>M</td>
<td>SD</td>
<td>N</td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SE</td>
</tr>
<tr>
<td>Dev. Rd.</td>
<td>164</td>
<td>2.15</td>
<td>.578</td>
<td>283</td>
<td>2.57</td>
<td>.610</td>
<td>38</td>
<td>2.35</td>
<td>.613</td>
<td>2.17</td>
<td>.053</td>
</tr>
<tr>
<td>Int. Rd.</td>
<td>134</td>
<td>2.44</td>
<td>.518</td>
<td>383</td>
<td>2.81</td>
<td>.567</td>
<td>36</td>
<td>2.78</td>
<td>.633</td>
<td>2.42</td>
<td>.055</td>
</tr>
</tbody>
</table>
Table 7

Two-Way Analysis of Covariance Two-Year Cumulative GPA as a Function of Ethnicity and Reading Course Completed, Using ACT Reading Score as a Covariate

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>P</th>
<th>eta²</th>
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</thead>
<tbody>
<tr>
<td>Corrected Model</td>
<td>6</td>
<td>9.469</td>
<td>28.304</td>
<td>.000</td>
<td>.141</td>
</tr>
<tr>
<td>Intercept</td>
<td>1</td>
<td>5.450</td>
<td>16.291</td>
<td>.000</td>
<td>.016</td>
</tr>
<tr>
<td>ACT Reading</td>
<td>1</td>
<td>.247</td>
<td>.739</td>
<td>.390</td>
<td>.001</td>
</tr>
<tr>
<td>Reading Course</td>
<td>1</td>
<td>5.047</td>
<td>15.085</td>
<td>.000</td>
<td>.014</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>2</td>
<td>15.437</td>
<td>46.144</td>
<td>.000</td>
<td>.082</td>
</tr>
<tr>
<td>Reading Course*Ethnicity</td>
<td>2</td>
<td>.360</td>
<td>1.077</td>
<td>.341</td>
<td>.002</td>
</tr>
<tr>
<td>Error</td>
<td>1031</td>
<td>.335</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 8

Pairwise Comparisons for Mean Differences of Two-Year Cumulative GPA as a Function of Ethnicity, Using ACT Reading Score as a Covariate

(I) | (J) | Ethnictya | Ethnicitya | Mean Difference (I-J) | Std. Error | Sig. b | 95% CI for Differenceb Lower Bound | Upper Bound |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
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<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td></td>
<td></td>
<td>-.391*</td>
<td>.041</td>
<td>.000</td>
<td>-.470</td>
<td>-.311</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-.273*</td>
<td>.075</td>
<td>.000</td>
<td>-.420</td>
<td>-.125</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td></td>
<td></td>
<td>.391*</td>
<td>.041</td>
<td>.000</td>
<td>.311</td>
<td>.470</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.118</td>
<td>.071</td>
<td>.098</td>
<td>-.022</td>
<td>.257</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td></td>
<td></td>
<td>.273*</td>
<td>.075</td>
<td>.000</td>
<td>.125</td>
<td>.420</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-.118</td>
<td>.071</td>
<td>.098</td>
<td>-.257</td>
<td>.022</td>
</tr>
</tbody>
</table>

Based on estimated marginal means
* The mean difference is significant at the .05 level.
a. Ethnicity coded as 1=Black/African American; 2=White; 3=Other
b. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

Table 9
**Pairwise Comparisons for Mean Differences of Two-Year Cumulative GPA as a Function of Ethnicity and Reading Course Completed, Using ACT Reading Score as a Covariate**

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>Reading Course&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Reading Course&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Mean Difference (I-J)</th>
<th>Std. Error</th>
<th>Sig. &lt;sup&gt;b&lt;/sup&gt;</th>
<th>Lower Bound</th>
<th>Upper Bound</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black/AA</td>
<td>1</td>
<td>0</td>
<td>.254&lt;sup&gt;*&lt;/sup&gt;</td>
<td>.084</td>
<td>.002</td>
<td>.090</td>
<td>.419</td>
</tr>
<tr>
<td>White</td>
<td>1</td>
<td>0</td>
<td>.195&lt;sup&gt;*&lt;/sup&gt;</td>
<td>.069</td>
<td>.005</td>
<td>.060</td>
<td>.330</td>
</tr>
<tr>
<td>Other</td>
<td>1</td>
<td>0</td>
<td>.392&lt;sup&gt;*&lt;/sup&gt;</td>
<td>.143</td>
<td>.006</td>
<td>.112</td>
<td>.672</td>
</tr>
</tbody>
</table>

Based on estimated marginal means

* The mean difference is significant at the .05 level.

<sup>a</sup> Reading Course coded as 0=Developmental Reading and 1=Intervention Literacy

<sup>b</sup> Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

*Figure 1. Cumulative two-year GPA by ethnicity and reading course passed.*

**Low Income**
A two-way ANCOVA was conducted to determine the differing effects of passing one of two university reading courses by low-income status on two-year cumulative GPA after controlling for ACT Reading score. There was a linear relationship between reading course passed and two-year cumulative GPA, as assessed by visual inspection of a scatterplot. First of all, the assumptions of ANCOVA were checked. There was homogeneity of regression slopes as the interaction term was not statistically significant, $F(1, 1034) = .014, p = .907$. Standardized residuals for the interventions and for the overall model were normally distributed, as assessed by visual inspection of the normal curve over a histogram plot. There was homoscedasticity and homogeneity of variances, as assessed by visual inspection of a scatterplot and Levene’s test of homogeneity of variance ($p = .051$), respectively. There were no outliers in the data, as assessed by no cases with standardized residuals greater than ±3 standard deviations.

Table 10 presents the unadjusted and adjusted means and variability for cumulative two-year GPAs by reading course passed and low income status. ANCOVA results in Table 11 showed that, after adjustment for ACT Reading score, there was a statistically significant difference in two-year cumulative GPA by reading course passed, $F(1, 1033) = 11.606, p = .001$, partial $\eta^2 = .011$. Additionally, there was a statistically significant difference in two-year cumulative GPA by low income status, $F(1, 1033) = 18.708, p < .0005$, partial $\eta^2 = .018$. However, the interaction of these two independent variables was not statistically significant, $F(2, 1033) = .701, p = .402$, partial $\eta^2 = .001$. Post hoc comparisons (Table 12) showed that students successfully completing the intervention literacy course had statistically significantly higher two-year cumulative GPAs than did students successfully completing the developmental reading course,
regardless of low income status (not low income, $p = .017$; low income, $p < .0005$), while Figure 2 provides visual representation of these differences.

**High School GPA**

A two-way ANCOVA was conducted to determine the differing effects of passing one of two university reading courses by high school GPA on two-year cumulative college GPA after controlling for ACT Reading score. There was a linear relationship between reading course passed and two-year cumulative GPA, as assessed by visual inspection of a scatterplot. First of all, the assumptions of ANCOVA were checked. There was homogeneity of regression slopes as the interaction term was not statistically significant, $F(1, 1034) = .014$, $p = .907$. Standardized residuals for the interventions and for the overall model were normally distributed, as assessed by visual inspection of the normal curve over a histogram plot. There was homoscedasticity and homogeneity of variances, as assessed by visual inspection of a scatterplot and Levene's test of homogeneity of variance ($p = .078$), respectively. There were no outliers in the data, as assessed by no cases with standardized residuals greater than ±3 standard deviations.
Table 10

*Adjusted and Unadjusted Two-Year Cumulative GPA Means and Variability by Reading Course Passed and Low Income Status using ACT Reading Score as a Covariate*

<table>
<thead>
<tr>
<th></th>
<th>Unadjusted</th>
<th></th>
<th>Adjusted</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low Income</td>
<td>Not-Low Income</td>
<td>Low Income</td>
<td>Not-Low Income</td>
</tr>
<tr>
<td>N</td>
<td>M</td>
<td>SD</td>
<td>N</td>
<td>M</td>
</tr>
<tr>
<td>Dev. Rd.</td>
<td>311</td>
<td>2.34</td>
<td>.646</td>
<td>174</td>
</tr>
<tr>
<td>Int. Rd.</td>
<td>295</td>
<td>2.65</td>
<td>.588</td>
<td>258</td>
</tr>
</tbody>
</table>
Table 13 presents the unadjusted and adjusted means and variability for cumulative two-year GPAs by reading course passed and high school GPA. ANCOVA results in Table 14 showed that, after adjustment for ACT Reading score, there was a statistically significant difference in two-year cumulative GPA by reading course passed, $F(1, 1031) = 9.606, p = .002$, partial $\eta^2 = .009$. Additionally, there was a statistically significant difference in two-year cumulative GPA by high school GPA (either above or below 3.0), $F(1, 1031) = 38.294, p < .0005$, partial $\eta^2 = .102$. Finally, the interaction of these two independent variables was not statistically significant, $F(1, 1031) = .009, p = .923$, partial $\eta^2 = .000$. Post hoc comparisons (Table 15) showed that students successfully completing the intervention literacy course had statistically significantly higher two-year cumulative GPAs than did students successfully completing the developmental reading course, regardless of high school GPA classification (HS GPA $\leq 2.99, p = .044$; HS GPA $\geq 3.0, p = .040$), while Figure 3 provides a visual depiction of these differences.
Table 11

Two-Way Analysis of Covariance Two-Year Cumulative GPA as a Function of Parental Income and Reading Course Completed, Using ACT Reading Score as a Covariate

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>P</th>
<th>eta²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corrected Model</td>
<td>4</td>
<td>8.014</td>
<td>22.396</td>
<td>.000</td>
<td>.080</td>
</tr>
<tr>
<td>Intercept</td>
<td>1</td>
<td>4.737</td>
<td>13.237</td>
<td>.000</td>
<td>.013</td>
</tr>
<tr>
<td>ACT Reading</td>
<td>1</td>
<td>.532</td>
<td>1.487</td>
<td>.223</td>
<td>.001</td>
</tr>
<tr>
<td>Reading Course</td>
<td>1</td>
<td>4.153</td>
<td>11.606</td>
<td>.001</td>
<td>.011</td>
</tr>
<tr>
<td>Low Income</td>
<td>1</td>
<td>6.695</td>
<td>18.708</td>
<td>.000</td>
<td>.018</td>
</tr>
<tr>
<td>Reading Course*Low Income</td>
<td>1</td>
<td>.251</td>
<td>.701</td>
<td>.402</td>
<td>.001</td>
</tr>
<tr>
<td>Error</td>
<td>1033</td>
<td>.358</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 12

Pairwise Comparisons for Mean Differences of Two-Year Cumulative GPA as a Function of Parental Income and Reading Course Completed, Using ACT Reading Score as a Covariate

<table>
<thead>
<tr>
<th>Income</th>
<th>Reading Course (I)</th>
<th>Reading Course (J)</th>
<th>Mean Difference (I-J)</th>
<th>Std. Error</th>
<th>Sig. b</th>
<th>95% CI for Difference a</th>
<th>Lower Bound</th>
<th>Upper Bound</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not Low Income</td>
<td>1</td>
<td>0</td>
<td>.190*</td>
<td>.079</td>
<td>.017</td>
<td>.034</td>
<td>.345</td>
<td></td>
</tr>
<tr>
<td>Low Income</td>
<td>1</td>
<td>0</td>
<td>.254*</td>
<td>.071</td>
<td>.000</td>
<td>.113</td>
<td>.394</td>
<td></td>
</tr>
</tbody>
</table>

Based on estimated marginal means

* The mean difference is significant at the .05 level.

a. Reading Course coded as 0=Developmental Reading and 1=Literacy intervention
b. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).
Figure 2. Cumulative two-year GPA by low income status and reading course passed.
Table 13

Adjusted and Unadjusted Two-Year Cumulative GPA Means and Variability by Reading Course Passed and High School GPA using ACT Reading Score as a Covariate

<table>
<thead>
<tr>
<th></th>
<th>Unadjusted</th>
<th>Adjusted</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>HS GPA ≤ 2.99</td>
<td>HS GPA ≥ 3.00</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>M</td>
</tr>
<tr>
<td>Dev. Read</td>
<td>272</td>
<td>2.24</td>
</tr>
<tr>
<td>Int. Read</td>
<td>230</td>
<td>2.49</td>
</tr>
</tbody>
</table>
Table 14

Two-Way Analysis of Covariance Two-Year Cumulative GPA as a Function of High School GPA and Reading Course Completed, Using ACT Reading Score as a Covariate

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>P</th>
<th>eta²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corrected Model</td>
<td>4</td>
<td>15.853</td>
<td>48.411</td>
<td>.000</td>
<td>.158</td>
</tr>
<tr>
<td>Intercept</td>
<td>1</td>
<td>4.897</td>
<td>14.953</td>
<td>.000</td>
<td>.014</td>
</tr>
<tr>
<td>ACT Reading</td>
<td>1</td>
<td>.449</td>
<td>1.370</td>
<td>.242</td>
<td>.001</td>
</tr>
<tr>
<td>Reading Course</td>
<td>1</td>
<td>3.146</td>
<td>9.606</td>
<td>.002</td>
<td>.009</td>
</tr>
<tr>
<td>HS GPA 3.0</td>
<td>1</td>
<td>38.294</td>
<td>116.939</td>
<td>.000</td>
<td>.102</td>
</tr>
<tr>
<td>Reading Course*HS GPA 3.0</td>
<td>1</td>
<td>.003</td>
<td>.009</td>
<td>.923</td>
<td>.000</td>
</tr>
<tr>
<td>Error</td>
<td>1031</td>
<td>.327</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 15

Pairwise Comparisons for Mean Differences of Two-Year Cumulative GPA as a Function of High School GPA and Reading Course Completed, Using ACT Reading Score as a Covariate

<table>
<thead>
<tr>
<th>HS GPA</th>
<th>Reading Course</th>
<th>Reading Course</th>
<th>Mean Difference</th>
<th>Std. Error</th>
<th>Sig.</th>
<th>95% CI for Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>GPA ≤ 2.99</td>
<td>1</td>
<td>0</td>
<td>.196*</td>
<td>.072</td>
<td>.006</td>
<td>.055 – .336</td>
</tr>
<tr>
<td>GPA ≥ 3.00</td>
<td>1</td>
<td>0</td>
<td>.189*</td>
<td>.072</td>
<td>.009</td>
<td>.048 – .330</td>
</tr>
</tbody>
</table>

Based on estimated marginal means
* The mean difference is significant at the .05 level.
  a. Reading Course coded as 0=Developmental Reading and 1=Literacy intervention
  b. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).
Figure 3. Cumulative two-year GPA by high school GPA and reading course passed.

Legacy

A two-way ANCOVA was conducted to determine the differing effects of passing one of two university reading courses by parental legacy on two-year cumulative GPA after controlling for ACT Reading score. There was a linear relationship between reading course passed and two-year cumulative GPA, as assessed by visual inspection of a scatterplot. First of all, the assumptions of ANCOVA were checked. There was homogeneity of regression slopes as the interaction term was not statistically significant, $F(1, 1034) = .014, p = .907$. Standardized residuals for the interventions and for the overall model were normally distributed, as assessed by visual inspection of the normal curve over a histogram plot. There was homoscedasticity and homogeneity of variances, as assessed by visual inspection of a scatterplot and Levene's test of homogeneity of
variance ($p = .150$), respectively. There were no outliers in the data, as assessed by no cases with standardized residuals greater than $\pm 3$ standard deviations.

Table 16 presents the unadjusted and adjusted means and variability for cumulative two-year GPAs by reading course passed and parental legacy. ANCOVA results in Table 17 showed that, after adjustment for ACT Reading score, there was a statistically significant difference in two-year cumulative GPA by reading course passed, $F(1, 1009) = 12.764$, $p < .0005$, partial $\eta^2 = .012$. Additionally, there was a statistically significant difference in two-year cumulative GPA by parental legacy, $F(1, 1009) = 7.035$, $p = .008$, partial $\eta^2 = .007$. Finally, the interaction of these two independent variables was also statistically significant, $F(1, 1009) = 6.120$, $p = .014$, partial $\eta^2 = .006$.

Post hoc comparisons (Table 18) showed that students successfully completing the intervention literacy course had statistically significantly higher two-year cumulative GPAs than did students successfully completing the developmental reading course for non-first-generation ($p < .0005$) students, while Figure 4 provides a visual depiction of these differences.
Table 16

Adjusted and Unadjusted Two-Year Cumulative GPA Means and Variability by Reading Course Passed and Parental Legacy using ACT Reading Score as a Covariate

<table>
<thead>
<tr>
<th></th>
<th>Unadjusted</th>
<th></th>
<th>Adjusted</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>First Generation</td>
<td>Not- First Generation</td>
<td>First Generation</td>
<td>Not-First Generation</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>M</td>
<td>SD</td>
<td>N</td>
</tr>
<tr>
<td>Dev. Read</td>
<td>205</td>
<td>2.40</td>
<td>.629</td>
<td>265</td>
</tr>
<tr>
<td>Int. Read</td>
<td>228</td>
<td>2.61</td>
<td>.580</td>
<td>316</td>
</tr>
</tbody>
</table>
Table 17

Two-Way Analysis of Covariance Two-Year Cumulative GPA as a Function of Parental Legacy and Reading Course Completed, Using ACT Reading Score as a Covariate

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>P</th>
<th>eta^2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corrected Model</td>
<td>4</td>
<td>7.623</td>
<td>21.080</td>
<td>.000</td>
<td>.077</td>
</tr>
<tr>
<td>Intercept</td>
<td>1</td>
<td>4.587</td>
<td>12.686</td>
<td>.000</td>
<td>.012</td>
</tr>
<tr>
<td>ACT Reading</td>
<td>1</td>
<td>.498</td>
<td>1.377</td>
<td>.241</td>
<td>.001</td>
</tr>
<tr>
<td>Reading Course</td>
<td>1</td>
<td>4.616</td>
<td>12.764</td>
<td>.000</td>
<td>.012</td>
</tr>
<tr>
<td>Legacy</td>
<td>1</td>
<td>2.544</td>
<td>7.035</td>
<td>.008</td>
<td>.007</td>
</tr>
<tr>
<td>Reading Course*Legacy</td>
<td>1</td>
<td>2.213</td>
<td>6.120</td>
<td>.014</td>
<td>.006</td>
</tr>
<tr>
<td>Error</td>
<td>1009</td>
<td>.362</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 18

Pairwise Comparisons for Mean Differences of Two-Year Cumulative GPA as a Function of Parental Legacy and Reading Course Completed, Using ACT Reading Score as a Covariate

<table>
<thead>
<tr>
<th>Legacy</th>
<th>Reading Course^a</th>
<th>Reading Course^a</th>
<th>Mean Difference (I-J)</th>
<th>Std. Error</th>
<th>Sig.^b</th>
<th>95% CI for Difference^b</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st Gen.</td>
<td>1</td>
<td>0</td>
<td>.141</td>
<td>.080</td>
<td>.078</td>
<td>-.016, .298</td>
</tr>
<tr>
<td>Not 1st Gen.</td>
<td>1</td>
<td>0</td>
<td>.330^*</td>
<td>.072</td>
<td>.000</td>
<td>.188, .473</td>
</tr>
</tbody>
</table>

Based on estimated marginal means

*. The mean difference is significant at the .05 level.

a. Reading Course coded as 0=Developmental Reading and 1=Literacy intervention

b. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).
Figure 4. Cumulative two-year GPA by parental legacy and reading course passed
CHAPTER V: DISCUSSION AND RECOMMENDATIONS

The purpose of the present study was to examine the impact of a credit-bearing literacy intervention course on rates of student retention and grade point average at one state university in the southeast United States. As the sample population comprising the participants of the study all arrived at the university categorized as underprepared, the study specifically analyzed the differences in subsequent academic performance between students successfully completing a developmental, non-credit bearing course and those completing the literacy intervention course. This chapter provides a summary of the results of the study and make recommendations for future research.

Summary

In an effort to more fully understand the impacts on academic performance (as defined by retention status and cumulative GPA) of a university’s approach to serving students underprepared in reading, quantitative methods were employed. The cluster sample of students was comprised of all students with an ACT reading score on file at the university who first attended during the years of 2010-2013. Furthermore, only students scoring between a 16 and 19 on the reading portion of the ACT were included in the study. The methodological justifications for the subsample are included in Chapter III. Ultimately, a total of 1,038 students were included in the analyses.

Using both descriptive and inferential statistical procedures, the impact of an intervention literacy course was analyzed, particularly as it was compared to its counterpart developmental reading course. Using retention status and cumulative GPA as the dependent measures of subsequent academic performance after successfully completing the required reading course, regression techniques and analyses of covariance
were employed. For the dependent variable of retention status, which is binary in nature, binary logistic regression was conducted on a number of demographic and academic background variables. For the dependent measure of cumulative GPA, hierarchical linear regression was used considering the same variables. Furthermore, the impact of completing the respective reading course was analyzed separately utilizing an ANCOVA procedure, using each of four independent variables, with ACT reading score serving as the covariate.

**Findings**

1. Being classified as low income, defined in this case as being eligible to receive federal Pell grant support, was a significant predictor of not persisting and lower two-year cumulative GPA when compared to other demographic background variables.

2. Having a family member who attended college in the past, classifying the student as not first-generation, was a significant predictor of persisting and of cumulative GPA after two years when compared to other demographic background variables.

3. Entering the university with a good cumulative GPA from high school was a significant predictor of success after two years of college – both in terms of persistence and GPA. As the cumulative high school GPA increased, so did the probability of persistence and the cumulative two-year college GPA.

4. The ethnic classification of the student did not significantly predict retention status after two years; however, when the dependent measure was continuous (two-year cumulative GPA) instead of dichotomous (retention status),
ethnicity became more predictive. More specifically, white students had the highest two-year cumulative GPAs, followed by students classified as other, and then students identifying as black/African American.

5. Students’ scores on the reading portion of the ACT were predictive of two-year cumulative GPA, but only when the reading course passed was precluded from the model. With the introduction of the reading course variable, ACT reading score was no longer significantly predictive of GPA or retention status.

6. The reading course students successfully completed, in this case either the non-credit developmental course or the credit bearing intervention literacy course, significantly predicted both two-year cumulative GPA and retention status.

7. Further analyses of the impact of the reading course completed indicated that regardless of ethnic classification, students completing the credit bearing intervention literacy course had significantly higher two-year cumulative GPAs than did their counterparts completing the developmental reading course.

8. Similar to the findings of ethnicity, low income status did not interact with reading course completed when measuring students’ two-year cumulative GPAs. Regardless of low income status, students completing the intervention literacy course had significantly higher GPAs than did students completing the developmental reading course.
9. Whether students were classified as entering the university with a cumulative high school GPA of either above or below 3.0, those completing the intervention literacy course had significantly higher GPAs after two years at the university than did students completing the developmental reading course.

10. Students with family members having some college experience (not first generation) posted significantly higher two-year cumulative GPAs if they completed the intervention literacy course as opposed to the developmental reading course. The difference between the two reading courses taken in performance of first generation students was not quite significant.

**Research Questions**

Two guiding questions provided the direction and methodological approach for the study. The previous section detailed the individual findings that resulted from the analyses incorporated in an effort to answer these questions. The following answers to these questions serve as the final conclusions derived from the study.

**Question 1**

*To what extent does successful completion of the intervention literacy course impact subsequent student academic performance (as defined by retention status and cumulative GPA)?* To evaluate the impact of the intervention literacy course on subsequent academic performance, two forms of regression analyses were conducted. The dependent measure of retention status is dichotomous in nature, therefore binary logistic regression was employed. Results of the analysis indicated that the reading course passed variable was a statistically significant predictor \( p < .05 \) of retention status after two years of completing the course. Specifically, students completing the
intervention literacy course had 1.85 times higher odds to be retained at the university two years later than did students passing the developmental reading course.

A hierarchical linear regression was conducted to evaluate the unique impact of the intervention literacy course on the continuous dependent variable of two-year cumulative GPA. Results of the analysis indicated that the addition of the reading course passed variable to the second model in the hierarchy led to a statistically significant increase ($p < .05$) in two-year cumulative GPA. Furthermore, with the addition of this variable, the once significantly predictive variable of ACT reading score became no longer predictive.

**Question 2**

*Does the impact of the intervention literacy course vary for students with different demographic and academic backgrounds?* Each of the four demographic and academic background variables identified in the literature as influential to student success were investigated separately using ANCOVA, with ACT reading score serving as the covariate for each analysis. Results indicated that students passing the intervention literacy course had statistically significantly higher two-year cumulative GPAs than did their counterparts passing the developmental reading course in nearly every comparison. In terms of ethnicity, the GPA was higher for the intervention literacy course in every category (white, black/African American, other), as was low income status (low income, not low income), and high school GPA (HS GPA $\leq 2.99$, HS GPA $\geq 3.00$). Finally, the dichotomous classification for the variable of legacy (first generation, not first generation) was the only scenario in which there was not a statistically significant difference for all classifications. Students classified as not first generation had
significantly higher two-year cumulative GPAs if they passed the intervention literacy course than if they passed the developmental reading course; however, there was not a statistically significant difference for the first generation group.

**Discussion**

The results of this study concur in a number of areas with findings from previous research. For example, underrepresented ethnic minorities tended to achieve lower academic outcomes than did their white counterparts, regardless of the reading course passed (ACT, 2010). Similarly, students who were not first generation status outperformed those students who were the first in their family to attend college (Engle et al., 2006; Chen, 2005). Students from low income households had statistically lower academic outcomes than their higher income classmates (ACT, 2013), and students with higher high school GPAs fared better than their less accomplished peers (Belfield & Crosta, 2012; Kim, 2002; Kobrin et al., 2008). It is important to note the similarities of this population to the findings in the literature to provide context for the outcomes of this study, particularly as they relate to the effectiveness of the intervention literacy course.

For the underprepared student, the implications of being ill-equipped for the academic challenges of college are unsettling. Considering those students relegated to enrollment in zero credit remedial and developmental coursework, the literature is quite clear: they are dramatically less likely to persist to graduation. There are disagreements regarding the cause of these students’ failure to receive a credential, particularly as it relates to the effectiveness of the mandated remedial coursework. Are students performing poorly because of the placement in the zero credit course or are there fundamental differences in demographics and academic preparedness of this population
that impede matriculation? Perhaps it is the confluence of these factors that negatively contributes to the abysmal rates of retention and graduation for these students. The results of the present study, at least as they represent the population sample, give some hope to this seemingly futile state of serving underprepared students. Regardless of ethnicity, high school GPA, or low income status, students completing the intervention literacy course achieved statistically greater academic outcomes than their counterparts in the developmental reading course. Meanwhile, they also earned three hours of credit instead of paying full price tuition with little to show for their labors. What this means is that it is possible to enroll students in college-level coursework and guide them to success, no matter their background.

The continuation and expansion of this approach to educating underprepared students should only serve to strengthen the financial structures of the university. Not only should the institution benefit from the recurring enrollment of students that may have otherwise dropped out, but also it will share in the increased government appropriations that are increasingly becoming contingent on performance measures such as retention and graduation rates. The curricular approach to intervening with this population is costly in terms of human resources, but remains a valuable and potentially profitable investment. Indeed intervening with students via a curricular solution is the most efficient avenue of capturing the highest percentage of the population that would benefit from the service. Because the infrastructure of universities is constructed to operate in this manner, mandating that underprepared students enroll in certain courses will likely continue be the preferred conduit, just as it has been for remediation. However, as the results of this study suggest, there are more effective ways of structuring
and delivering the curricular intervention so that students are more likely to experience academic success.

Opponents to the national calls to begin dismantling and replacing non-credit remedial education (Astin, 2000; Merisotis & Phipps, 2000) raise legitimate concerns about the needs of the underprepared students to acquire critical college-level skills to be successful, as well as the disproportionate effects this may have on underrepresented populations. Proponents of these changes (Bowen et al., 2009; Crawford, 1993; Edgecombe, 2011) cite the dismal academic performance of these students, the increased time to degree, and the burgeoning student debt saddling this population. The results of this study suggest that it may indeed be possible to assuage both sides of the argument. If non-credit remedial courses can be replaced by credit-bearing alternatives that efficiently address academic and affective underpreparedness for all populations of students, there should be little resistance from any stakeholder.

**Implications of the Findings**

The findings of this study offer confirmation that some demographic and academic background variables that have been commonly associated with student academic success in college are indeed so. Particularly, the effects of these variables were, for the most part, associated in similar ways for the present sample of underprepared students as they are for the average population. The most significant finding of this research, however, is the apparent influence on student GPA and retention of successfully completing a credit-bearing intervention literacy course instead of a non-credit developmental reading course. While the aforementioned demographic and academic background variables are still influential, the effects of these variables can be
overcome by an intervention offered by the university. The apparent reality that a university can assist in the development of its underprepared students in such a way that is significantly more beneficial and efficient than previous remedial or developmental approaches that have little, if any, demonstrated success raises a number of questions. The following section explores the associated implications of these findings via the questions that are raised by knowing this information.

Firstly, if this approach to serving underprepared students can work for the population designated by this university, what are the next steps in terms of expanding these services to include more students? There are two considerations for expansion: serving additional students who are more underprepared, that is including larger bands of students whose college readiness indicator scores in reading indicate that they are less prepared than those scoring an 18 or 19 on the reading portion of the ACT; and serving additional students who are technically already prepared for college-level reading. The results of this study seem to support the notion of allowing more students to bypass the remedial mandate and enroll in the credit-bearing intervention literacy course, especially as the data are compared to the highest ACT reading scores of that designation. However, would students who barely cross the threshold of consideration of being “college ready” also reap similar benefits? The difference in raw score of a student scoring a 20 on the reading ACT and one scoring a 19 is only one or two correctly answered questions. Even if a university believes that these students are “college ready,” it is arguable that they are still not college practiced. Results as compelling as these demand that a university consider broadening the impact in both directions.
As it is currently being implemented, the intervention literacy course is delivered in isolation from other content coursework. With no particular systematic approach, students from all different academic majors sign up for the course. Given the success of the course as evidenced by the data in this study, should the university consider pairing sections of the course with content courses that have reputations for being difficult for students coming to the university as underprepared? For example, if a first year history course is known for causing students difficulty due to the heavy reading demands, why not pair the intervention reading course with the history course, allowing for ready and authentic application of learning in the content course? If the measured impact of the course is this meaningful when the course is taught in isolation from content application, maybe the university should consider creating the infrastructural supports necessary to target specific courses as corequisites, thereby increasing the potential impact of the course.

Among the many differences between the intervention literacy course and the developmental reading course is the credentialing and employment status of the faculty teaching. The developmental course is taught largely by adjunct faculty members, almost none of whom have advanced credentialing in either reading or literacy. This is not required by most states or universities because the course bears no college credit. This is not an uncommon practice either as, previously mentioned, the cost of delivery of remedial and developmental coursework is greatly reduced by employing adjunct instructors (Gerlaugh et al., 2007). Considering that these students pay full price tuition for the course, these offerings have proven to be quite lucrative to universities. However, if the intended effect of these courses is not being realized by better preparing students to
succeed in their subsequent academic endeavors, then these cost savings are only short-term financial successes. The intervention literacy course is taught exclusively by full-time faculty members, all of whom possess advanced credentialing in literacy. If the primary influence in student success is the quality of the instructor (Rutschow & Schneider, 2011), then why is the standard operating procedure of universities to fill classes full of underprepared students with the least qualified instructors? The intuitive answer to that question is that universities may not want to invest the resources into qualified faculty for a population of students they view as being unlikely to succeed anyway. The results of this study suggest that this line of thinking is short-sighted, both in the investment in student success and the financial investments that are vital to the viability of the future of higher education. The value of retaining students to graduation is far more lucrative than the simple cost savings of cheaper delivery of services. Given the results of this study, this university in particular, and any university endeavoring to positively impact retention, should consider its investment in qualified and committed faculty.

**Methodological and Statistical Limitations**

There were a few issues related to the methodological and statistical approaches to evaluating the effects of the course passed (either developmental reading or literacy intervention) on subsequent academic performance. Firstly, as is almost universally the case in education, the researcher is afforded extremely limited, if any, control over randomization in placement of participants. In the present case, students were directed to one of the two course offerings based on their ACT reading score. Naturally, this created a scenario of inherent differences in ACT reading score between the two intervention
groups. The combination of a nonparametric approach to selecting participants (in this case only students with ACT reading scores ranging 16-19), which assumes localized randomization, as well as the aforementioned inclusion of the known covariate of ACT reading score in the statistical models, allowed for reasonable comparisons to be made.

Another limitation to the interpretation to these results is that only students who passed each respective course with an A, B, or C were included in the analyses. While the justification for this decision previously discussed is sound, the results should be interpreted with caution considering this limitation. Additionally, it should be noted that any differences in subsequent student academic performance that can be attributed to the course passed should be considered within the context of the many distinctions between the two courses, including factors such as curriculum, climate, and faculty credentialing. Finally, the regression analyses and means comparisons employed in this study, while appropriate techniques given the inferential nature of the research questions, are not intended to be interpreted with causality. The methodological structure of this study was devised as such given the constraints associated with preexisting group assignment and lack of researcher control on random assignment.

**Recommendations for Future Research**

There are a variety of recommendations to be made for future research stemming from the findings of the present study, especially considering the current economic climate of higher education and the trajectory of its fiscal health. The apparent impacts of the unique credit-bearing literacy intervention course on meaningful measures such as student retention are just the intervention solutions sought by universities across the countries. Outside the scope of this study, but relevant, if not imperative to the
conversation, is a descriptive accounting of what occurs in the course. If and when universities choose to adopt or mimic this curricular approach to intervening with underprepared students, they will need to know how to proceed. The findings of these efforts are limited without the corresponding investigations more germane to the practitioner.

The findings of this study suggest that the successful completion of the intervention literacy course is associated with positive academic outcomes two years after passing the course, particularly for those students who enter the university underprepared in the area of reading. The implications of the findings, as previously discussed, may suggest that the university include greater numbers of students in the course, specifically those whom are more severely underprepared, to maximize any positive effects of the course. It may well be worth the time and effort required to investigate the impacts of such a course on students entering the university very close to the threshold of preparedness, yet are not classified as underprepared. These students, who often receive very little academic supports, may experience similar benefits by successfully completing an intervention literacy course. In the same spirit of positively impacting as many students as possible, universities may also choose to revisit the appropriateness of college-ready classifications, particularly when a mandated intervention has such compelling evidence of effectiveness.

Also worthy of further investigation is the effects of pairing a course such as the intervention literacy course with other content courses known for their difficulty in terms of reading complexity and volume. Intuitively, the androgogical benefits of a corequisite structure such as this would be far superior to the isolatory nature of the current structure
of the course. Universities and students would benefit doubly by the symbiotic nature of this delivery.

Finally, continued exploration into the value added of credentialed full-time faculty would be valuable information for all institutions offering these types of courses. A full scale cost-benefit analysis considering the myriad of factors associated with employing adjunct instruction versus full-time faculty would be necessary to obtain meaningful data, but as it is currently understood, universities are making decisions largely based on considerations of the present instead of with an investment mindset. Any data that could serve to provide reasonable confidence in the best approach as it relates to staffing decisions would allow the financial decision makers of universities to appropriate resources in the healthiest possible ways.

Final Thoughts

Institutions of higher education across the country are either continuing or beginning to deal with economic realities that will cause stakeholders to question the status quo of operation. The confluence of societal pressures, federal and state budget crises, and an ever-evolving student population no longer permits universities to persist in the classic, if not archaic, structures of old. Leaders of institutions that will emerge as successful must seek to innovate, finding ways to balance the existential purpose of higher education with the daunting economic challenges associated with the sector. A philosophy that will be imperative to that survival must be to question the vitality of every component of the institution, to seek and to recognize what is working well while resourcing and expanding its impact. Though it may come at the expense of long-
standing traditions, the pursuit of excellence must be singular of focus and devoid of sentiment.
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APPENDIX: IRB APPROVAL

DATE: November 4, 2015
TO: Daniel Super
FROM: Western Kentucky University (WKU) IRB

PROJECT TITLE: [826261-1] Reading Intervention Effectiveness by Placement
REFERENCE #: IRB 16-179
SUBMISSION TYPE: New Project
ACTION: APPROVED
APPROVAL DATE: November 4, 2015

REVIEW TYPE: Exempt from Full Board Review

Thank you for your submission of New Project materials for this project. The Western Kentucky University (WKU) IRB has APPROVED your submission regarding analysis of pre-existing data. This approval is based on an appropriate risk/benefit ratio and a project design wherein the risks have been minimized. All research must be conducted in accordance with this approved submission.

This submission has received Exempt from Full Board Review based on the applicable federal regulation.

Please note that any revision to previously approved materials must be approved by this office prior to initiation. Please use the appropriate revision forms for this procedure.

All UNANTICIPATED PROBLEMS involving risks to subjects or others and SERIOUS and UNEXPECTED adverse events must be reported promptly to this office. Please use the appropriate reporting forms for this procedure. All FDA and sponsor reporting requirements should also be followed.

All NON-COMPLIANCE issues or COMPLAINTS regarding this project must be reported promptly to this office.

This project has been determined to be a Minimal Risk project.

Please note that all research records must be retained for a minimum of three years after the completion of the project.

If you have any questions, please contact Paul Mooney at (270) 745-2129 or irb@wklu.edu. Please include your project title and reference number in all correspondence with this committee.

This letter has been electronically signed in accordance with all applicable regulations, and a copy is retained within Western Kentucky University (WKU) IRB's records.