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African American Male Community College Completion and Mode of Instruction

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COLLEGE OF EDUCATION

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2015

Abstract

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MA, Southeastern Louisiana University, 1997

BA, The University of Texas at Dallas, 1992

Doctoral Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Abstract

Despite innovative policy and pedagogical transformations, postsecondary achievement gaps continue to exist between African American males and other students. Low college credential completion rates by African American males have prevented an East Texas community college from meaningful participation in the President's 2020 postsecondary education attainment goal of increasing U.S. college graduates by 5 million. The purpose of this quantitative study was to investigate a hypothesized connection between the independent variable, mode of instruction, and the dependent variables, mathematics course completion and college completion by African American males. Guided by Ogbu's cultural-ecological theory of minority school performance, a chi-square test of independence was used to compare 407 African American males who participated in the mode of lecture and 412 who participated in modular instruction. Findings included a significant relationship (p <.05) between mode of instruction and developmental mathematics completion (p = .000) with the lecture mode associated with higher achievement. No significant relationship existed between instructional mode and college credential completion (p = .503). These findings called the effectiveness of modular instruction into question and indicated that, at this research site, the instructional mode in developmental mathematics is insufficient to address the disparity in college completion rates of African American males. These results informed a policy recommendation paper, written to help local college administrators better understand African American male remedial math and college credential completion rates. This study contributes to positive social change by generating data-based local institutional policies that will promote African American male postsecondary achievement.

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Dedication

To my son, Hunter, I have received many blessings from God in my life. You have been the greatest of them all. Watching me complete a doctorate should be an incentive for you to follow and to fulfill your destiny. Never give up on your dreams because, as I have learned, sometimes they just take a long time to come true. I love you, all the way to Walmart and back, son.

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Achievement is never a solitary act. Many people in my personal and professional life facilitated the conferment of my doctoral degree. I offer heart-felt thanks and sincere gratitude to my family, friends, colleagues, college leaders, and doctoral committee.

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Section 1: The Problem

Introduction

To explore the relationship between mode of instruction and completion rates for African American male community college students, I acknowledged postsecondary achievement gaps between African American males and other college students; the need for remediation or developmental education, especially in mathematics, for African American males; and the importance of college completion for national economic prosperity. In Section 1, I address the problem of racial and gender inequality in institutions of higher education, provide documentation of these inequalities in local and larger educational settings, identify a theoretical framework to study the postsecondary achievement gap problem, and demonstrate the existence of the postsecondary achievement gap problem as related to African American male college completion as discussed in the research literature. Section 1 is concluded with a summary of significant points and an overview of the next section.

Definition of the Problem

The postsecondary achievement gap between African American males and other college students has been documented for the past 3 decades. Despite published studies and recommendations for change in student engagement, required curricula, and instructional modalities, African American males continue to lag behind their counterparts on college campuses with regard to the completion of a certificate or a degree (Autor, 2010; Baber, 2014; McDaniel, DiPrete, Buchmann, & Shwed, 2011; Palmer, Davis, Moore, & Hilton, 2010, Wood, 2012). The need for remediation or

developmental education, especially in mathematics, has contributed to the postsecondary achievement gap between African American males and other college students (Davis & Palmer, 2010; Harris & Wood, 2013; Levin, Cox, Cerven, & Haberler (2010). Researchers have confirmed a higher level of representation of African American males in remedial courses than other male and female college students (Sparks & Malkus, 2013; Wood, 2012; Wood & Harris, 2013). Regardless of race or gender, African American males lead their college counterparts in the need for remediation and trail behind their college counterparts in completion of a credential.

Racial and gender inequality as related to postsecondary achievement of a credential in the form of a certificate or a degree is significant because this problem, once considered only social, is predicted to become an economic issue for the United States (Autor, 2010; Boggs, 2010; Palmer et al., 2010; Treuhaft, Scoggins, & Tran, 2014). College completion signifies to employers that a prospective employee is equipped with the desired and required 21st century workforce competencies and skill sets. Symonds (2011) emphasized that 41% of the jobs available in the current workforce can be obtained and sustained with a high school diploma; however, by 2018, it is forecasted that 63% of jobs in the U.S. workforce will require at least some college (pp. 6-7). Because national population predictions also forecast a decrease in the European American population percentages and anticipate that other races and ethnicities such as African American, Hispanic American, and Asian Americans populations will increase to encompass 50% of the national population by 2050, college completion among racial minorities is essential to the U.S. economy and well-being (Palmer et al., 2010; Treuhaft

et al., 2014). In analysis of the U.S. labor market, Autor (2010) confirmed the negative impact of racial and gender inequality by illustrating that the need for a highly-educated and highly-skilled workforce has continued to increase while the supply of such workers, particularly African American males, has continued to stagnate. Palmer et al. (2010) asserted that improving college graduation rates for African American males is not only about equity but also about the future ability of the United States to compete in the global economy. There is a need for a reduction of postsecondary college completion achievement gaps of African American males to diminish the negative impact that these gaps have upon the future of the U.S. economy (Treuhaft et al, 2014).

The present state and uncertain future of the U.S. economy prompted a focus on the relationship between college completion and national economic prosperity. Furthermore, widespread concern about the United States' ability to remain globally competitive launched a national spotlight on college completion (Boggs, 2011; Gallard, Albritton, & Morgan, 2010; Mesa, 2012; Mullin, 2011; Palmer et al., 2010; Pretlow &Wathington, 2011). This focus reached a crescendo in October 2010 when Second Lady Dr. Jill Biden chaired the first-ever White House Summit on Community Colleges (McPhail, 2011; U.S. Department of Education, Office of Vocational and Adult Education, 2011). The purpose of this summit was to emphasize the role and responsibility of community colleges to foster higher education attainment goals and to expand the U.S. workforce (American Association of Community Colleges, 2014a, para. 1).

For the United States to remain relevant and competitive, President Obama declared his intent for the United States to be ranked first in the world with regard to postsecondary attainment rates by the year 2020 (McPhail, 2011). President Obama's 2020 postsecondary education attainment goal, which is also commonly referred to as The *College Completion Agenda*, places the burden of producing an additional 5 million graduates upon the nation's community colleges (Bailey & Cho, 2010).

The establishment of community colleges across the United States provides convenient and open access to higher education that is not only a reasonable expectation but also an attainable objective for all U.S. citizens. Community colleges have accepted the challenge of President Obama's college completion agenda. The American Association of Community Colleges (2014b) stated that "traditional values of access, opportunity, and quality," as well as helping all U.S. citizens and immigrants make an impact in their personal lives, their local community, their state, and their nation, have long been associated with the mission of community colleges (para. 1).

Problem in Local Setting

The local setting for this study, an East Texas community college (ETCC), like most U.S. community colleges, is under pressure to contribute to President Obama's 2020 goal. At this time, ETCC is not poised to meet the national college completion requirements, especially with regard to African American males, who have a high need for remediation, particularly in mathematics, and a low rate of remedial course completion and of credential completion needed to subsidize the 2020 goal. ETCC is an open admissions postsecondary institution of higher education that is located within an

educational region of Texas that is comprised of 17 counties (Texas Education Agency, 2014). Although the college recruits students from the entire population of this region, this study only included the demographics of two ethnicities: African American and European American. The region's total population in 2010 was 68% European American and 16% African American (Texas Department of State Health Services, 2014). The fall 2010 ETCC total enrollment was 60% European American and 23% African American (Texas Higher Education Coordinating Board, 2012b). Compared to the regional population, African American and European American students were disproportionally enrolled at ETCC. The inequality in college enrollment posed the first barrier for ETCC to participate in the 2020 plan. If African American males are not enrolled in college, their absence makes achieving an increase of college graduates less likely for the nation as a whole.

When African American males do enroll in college, not only in ETCC's region but on a national level, many choose to do so at a community college (Baber, 2014; Harris & Wood, 2013). More African American males than other college students who attend community college are required to take remedial or developmental education courses due to their basic skills gaps (Owens, Lacey, Rawls, & Holbert-Quince, 2010). ETCC's state reporting data confirmed that the highest enrollment in remediation, especially in mathematics, was represented by African American males (Texas Higher Education Coordinating Board, 2012a).

The lack of remediation completion, especially in mathematics, has been identified as a barrier to college certificate and/or degree completion (McCormick &

Lucas, 2011; Palmer & Davis, 2012). This prediction is demonstrated at ETCC; a disproportionate college completion rate for African American males is documented in state reporting data (Texas Higher Education Coordinating Board, 2012b). In the fall of 2010 the total male, full-time, first-time-in-college population was 6% European American and 4% African American (Texas Higher Education Coordinating Board, 2012b). The degree completion rate for full-time, first-time-in-college, European American males who enrolled at ETCC in fall 2010 and completed a credential in spring 2014 was 12% compared to only 3% for their African American counterparts (Texas Higher Education Coordinating Board, 2014b). A smaller proportion of African American male students complete a credential at ETCC. The ETCC has perpetuated the postsecondary achievement gap between African American males and other college students in terms of remedial mathematics completion and of college credential completion. This state of affairs should be addressed in order for ETCC to successfully contribute to the nation's 2020 college completion agenda goals.

Problem in Larger Educational Setting

Just like ETCC, the community college that represented the local perspective for this study, the state of Texas and the nation, have struggled with postsecondary achievement gaps between African Americans and other college students. In order to decrease these gaps and to increase the numbers of highly-credentialed and highly-skilled employees in the U.S. workforce, President Obama's *College Completion Agenda* illuminated the importance of community colleges and the contribution that the possession of an associate's degree or a certificate will make to the nation's future well-

being and economy. Community colleges are an appropriate venue for a college completion agenda, particularly in the state of Texas. Yearly, community colleges (public 2-year) enroll more students than universities (public 4-year) in Texas (Texas Higher Education Coordinating Board, 2014a). In fall 2012, 53.6% of higher education students enrolled at Texas community colleges compared to 43.3% who enrolled at Texas universities (Texas Higher Education Coordinating Board, 2014a). Recognizing racial and gender disparity in academic achievement and accepting responsibility to diminish it, Texas developed a statewide plan. The plan, referred to as *Closing the Gaps by 2015* (CTG), was designed to combat achievement gaps in the state of Texas as well as to narrow achievement gaps between Texas and other states such as California and Florida (Texas Higher Education Coordinating Board, 2014a, para. 1). Texas trails both of these states in terms of college completion: In 2012, Texas conferred 6.6% associate's degrees; California conferred 7.9% associate's degrees; Florida conferred 9.2% associate's degrees (Texas Higher Education Coordinating Board, 2014a, p. 6).

Enrollment patterns for the state of Texas were similar to ETCC, the local setting in this study. The percentage (5.0%) for fall 2011 and the percentage (4.5%) for fall 2012 of African American males in Texas who enrolled in college was significantly smaller than the percentage (17.8%) for fall 2011 and the percentage for fall 2012 (18.4%) of European American males in Texas who enrolled in college (Texas Higher Education Coordinating Board, 2013a, p. 7). In addition to racial inequality in Texas, gender inequality can be documented; fewer males than females are enrolled in the state's colleges. In 2013, statewide enrollment by gender was 5.2% male and 6.8% female

(Texas Higher Education Coordinating Board, 2014a, p. 15). For African American males, the gender gap is more pronounced than other races: for 2012, 8.8% African American females were enrolled in college versus 5.4% African American males (Texas Higher Education Coordinating Board, 2013a, p. 7). As in the case of ETCC, the need for remediation or developmental education was also identified as a barrier for college completion in the state of Texas. More than half (51.5%) of the students who enrolled in public, 2-year community colleges in the state needed remedial or developmental education courses (Texas Higher Education Coordinating Board, 2014a, p. 13). The majority of the students who were not college-ready attended public, 2-year community colleges in the state, and those first-time-in-college students who entered in the fall 2008 demonstrated that the greatest demand for remediation in the state was for mathematics: 41.5% of the students did not meet the standard for math; 26.4% did not meet the standard for reading; 19.1% did not meet the standard for writing (Texas Higher Education Coordinating Board, 2013a, p. 15). Furthermore, in Texas, African Americans completed a disproportionate amount of college credentials. In 2013, the state awarded 242,823 undergraduate degrees and certificates; 29,687 to African Americans, 76,686 to Hispanic Americans and 106,330 to European Americans (Texas Higher Education Coordinating Board, 2014a, p. 16). For the United States to produce more highly-credentialed and highly-skilled people to contribute to the nation's economic prosperity, the state of Texas will need to continue to address achievement gaps between African Americans and other college students.

National trends of racial and gender disparity, with regard to college completion, mirrored the state and the local setting in this study. The United States' ability to compete in the global workplace had diminished due to the decline in the number of citizens who completed college credentials (Carnevale & Rose, 2011; Complete College America, 2011). The U.S. percentage of 25-year-old to 34-year-old citizens with an associate's degree or higher is listed as 40.4% as compared to other countries like Canada (55.8%), Korea (55.5%), and Japan (53.7%; Symonds, 2011, p. 25). One reason that the United States fell behind other countries in college completion is the lack of enrollment in institutions of higher education by minorities. Aud, Fox, and Ramani (2010) documented that 44% of European American 18- to 24-year-olds were enrolled in colleges and universities as compared to 32% of African American 18-to 24-year-olds. Another factor that impacts U.S. ranking is the gender gap in postsecondary enrollment, especially for African Americans. African American males are not proportionately represented on college campuses as African American females constitute 64% of undergraduate enrollment by African Americans (Aud et al., 2010). There is the need for remediation or developmental education, especially in mathematics, for U.S. college students. The U.S. Department of Education (2013) indicated that 24.0% of first-year undergraduates in public, 2-year colleges were enrolled in at least one remedial or developmental course, and the highest percentage of remedial course enrollment was for African American males. The most significant factor to cause the United States to trail behind other countries in the global economic race was the lack of conferred college credentials, especially by minorities. In 2010, African Americans represented 13% and European

Americans represented 63% of the total U.S. population (United States Census Bureau, 2010) In 2011, African American students earned 12.9% of the nationally awarded associate's degrees; whereas, European American students earned 66.4% of the nationally awarded associate's degrees (National Center for Education Statistics, 2011). Comparatively, the European American population showed a higher degree completion rate than African Americans in terms of population representation. Too many minorities who entered the nation's community colleges exited without earning a 2-year college credential or without transferring to a 4-year university, which created the lack of academic success and the college completion gap between African Americans and others (Bahr, 2010; Complete College America, 2011; Symonds, 2011; Walker, Pearson, & Murrell, 2010). With respect specifically to African American males, the U.S. Department of Education pointed out that only 73% of African American males who enroll in community college will complete their first year (as cited in Wood, 2012, p. 57). Although minority enrollment in higher education institutions is of importance to reach President Obama's 2020 goal to revitalize the U. S. economy, and to ensure future U.S. economic prosperity, actual college completion by minorities is the most meaningful component in the global knowledge race (Achieving the Dream, 2014c, para. 1).

Rationale

Evidence of the Problem at the Local Level

To meet the 2020 challenge of producing an additional 5 million college graduates, most community colleges began performing data reviews, identifying completion obstacles and implementing research-based resolutions to resolve disparities

that were keeping community college students from completing credentials (American Association of Community Colleges, 2012). The community college in this study, ETCC, was one such community college. Making an institution-wide commitment to student success and to increasing completion rates, especially for African American males, ETCC joined the Achieving the Dream (ATD) initiative in 2010.

ATD is a national nonprofit organization on a mission to eliminate gender, minority, and socioeconomic achievement gaps among community college students (Achieving the Dream, 2014a, para. 1). ATD accomplishes its objectives by assisting community colleges in developing institutional priorities and strategies generated from data analysis to help low-income students and students of color earn a college certificate or degree (Achieving the Dream, 2014a, para. 1). ETCC's membership in ATD began with adhering to the initiative's data-driven mission. Following the ATD requirements, in 2010, ETCC formed a CORE Committee, a Data Committee, and a Communication Committee that examined its student success data (e.g., course pass rates, persistence rates, retention rates, and graduation rates). In the initial 2010 student success data review, the ETCC revealed an area of concern with regard to the percentage of students who needed remediation or developmental education and those students' college completion rates. At ETCC, the fall 2009 cohort 3-year graduation rate for first-time, full-time, undergraduate students requiring developmental education was 32.8%. In comparison, the fall 2009 cohort 3-year graduation rate for first-time, full-time, undergraduate students requiring developmental education for ETCC's state accountability peer group was 37.0%. Comparatively, ETCC graduated 4.2% fewer

students who required remediation than its state accountability peer group (Texas Higher Education Coordinating Board, 2014b). The bigger area of concern for ETCC was the need for and enrollment in developmental mathematics and the lack of developmental mathematics course completion and college completion of African American males (Achieving the Dream, 2014b).

ETCC data revealed developmental mathematics enrollment and completion disparity among ethnicities. Include a topic sentence. In fall 2010, European American males comprised 17% and African American males comprised 24% of the developmental mathematics enrollment at ETCC. Of the 17% European American males who enrolled in developmental mathematics, 20% completed with a grade of C or better (Achieving the Dream, 2014b). In comparison, of the 24% African American males who enrolled in developmental mathematics, only 13% completed with a grade of C or better (Achieving the Dream, 2014b). Comparatively, the African American male completion rate of developmental mathematics for fall 2010 was 7% lower than the European American male completion rate of developmental mathematics for fall 2010.

In fall 2011, ETCC documented a similarly low percentage of African American male developmental mathematics completers. During fall 2011, European American males encompassed 16% and African American males encompassed 23% of the developmental mathematics enrollment at ETCC (Achieving the Dream, 2014b). Of the 16% European American males who enrolled in developmental mathematics, 24% completed developmental mathematics with a grade of C or better while only 12% of African American male students completed with a grade of C or better (Achieving the

Dream, 2014b). The African American male completion rate for fall 2011 was 12% lower than the European American male completion rate of developmental mathematics for fall 2011.

For a 2-year period, African American males completed developmental mathematics at a lower success rate when compared to other students like European American males (Achieving the Dream, 2014b). After contemplation of the data submitted to ATD, the ETCC ATD Committees moved to seek a solution to reduce the postsecondary achievement gap between African American males and other college students in terms of completion of remedial or developmental mathematics and completion of college credentials. ETCC decided to implement a new instructional mode, modular mathematics, in order to improve successful completion of developmental mathematics to remove a significant barrier to college completion, especially for African American males (Achieving the Dream, 2014b).

Evidence of the Problem from the Professional Literature

Due to the present state and uncertain future of the national economy, much attention is being focused on the U.S. community college system. Community colleges are being viewed as the United States' solution for a globally competitive workforce. Pressure is being placed upon community colleges to increase the number of highly skilled and appropriately credentialed graduates (American Association of Community Colleges, 2012). Meeting these workforce-ready graduate goals is going to be a challenge for most community colleges.

The need for remediation or developmental education is acknowledged as a barrier in the production of more college-credentialed workforce participants for both community colleges in the state of Texas and in the nation. A high percentage of students needing remediation corresponds to a low percentage of students graduating on time, if at all (Bailey & Cho, 2010; Bailey, Jeong, & Cho, 2010; Fowler & Boylan, 2010; Silva & White, 2013). The state of Texas affirmed the national remediation statistics. In fall 2009, 54.6% of the full-time, first-time-in-college students in Texas did not meet state college readiness standards in at least one area, thus requiring enrollment in developmental education or remedial courses (Texas Higher Education Coordinating Board, 2012b). First-year undergraduates' enrollment in remedial or developmental courses, disaggregated by race and gender, as 49.7% African American male; 32.7% European American male; 44.9% Hispanic American male (U.S. Department of Education, 2012).

The problem of college-credential completion disparity between races and ethnicities is as evident on a larger educational level as it is at the local level. In the state of Texas, a degree completion gap between racial groups is present. In 2010, African Americans represented 12% and European American represented 70% of the total Texas population (United States Census Bureau, 2010). However, African American students represented 12% in comparison to European American students who represented 54% of the associate's degrees completed in Texas (Eklund, 2012; Texas Higher Education Coordinating Board, 2012a). Comparatively, the European American population showed a higher degree completion rate than African Americans in terms of population representation.

Academic achievement disparity in the form of degree attainment exists among ethnicities in the United States. In 2010, African Americans represented 13% and European American represented 63% of the total U.S. population (United States Census Bureau, 2010). African American students earned 12.9% of the nationally awarded associate's degrees; whereas, European American students earned 66.4% of the nationally awarded associate's degrees (National Center for Educational Statistics, 2011). Comparatively, the European American population showed a higher degree completion rate than African Americans in terms of population representation. For African American males, the achievements gaps among other races and genders were documented in national postsecondary education statistics as well. In 2011-2012, for all fields of study in the United States, associate's degrees were conferred upon 46,124 African American males and 95,762 African American females; 250,994 European American males and 381,808 European American females; 57,840 Hispanic American males and 93,781 Hispanic American females (U.S. Department of Education, 2013).

The prevalent minority college completion disparity in higher education is further evidenced in terms of gender both at a national and state level. Levin et al., Tale, and Jackson and Moore noted that African American males "experience the poorest educational outcomes" in comparison to other U. S. ethnicities and races (as cited in Palmer et al., 2010, p. 107). Strayhorn (2010) elaborated on the educational outcomes of African American males stating that they have the lowest degree completion rate of all racial groups and both sexes because more than two-thirds of these students who start

college leave before graduating (p. 311). Furthermore, only 26% of African American males hold an associate's degree or higher (Dunn, 2012).

Reviewing national, state, and local data provided insight to the dilemma of college completion that has hindered economic growth and sustainability in the United States. There are postsecondary achievements gaps between African American males and other college students. An annual gain of over $2 trillion in gross domestic product is at stake if African American males continue not to participate in postsecondary study and do not attain the necessary credentials required for employment and thus perpetuate the economic racial inequality in the United States (Treuhaft et al., 2014). If African American males are not prepared to pursue college-level courses, are required to enroll in remedial or developmental education courses and do not acquire the mathematical skills needed for the 21st century workforce, it is likely that few of those men will make it to graduation day, earn a college degree or certificate, and thus significantly contribute to the U.S. economy.

The purpose of this study was to explore the relationship between the mode of developmental mathematics instruction, lecture versus modular, and African American male developmental mathematics completion as well as the relationship between the mode of developmental mathematics instruction, lecture versus modular, and African American male college credential completion at ETCC.

Definitions

Achievement gap: A term used to describe academic disparity that exists among student ethnic groups like African Americans and Latinos/Latinas in comparison to European American counterparts (Caldwell & Obasi, 2010).

College-readiness: A term used to describe a college student's ability to complete college-level courses with the need for remediation or developmental education (McCormick & Lucas, 2011).

Developmental education: A term used to describe a system that consists of academic courses and support services to strengthen academic success of adult learners (National Center for Developmental Education as cited in Boylan, 1999).

Modular mathematics: A term used to describe competency-based, individualized instruction, of mathematical concepts, usually via a technology-based delivery mode (Edgecombe, 2011).

Persistence: A term used interchangeably with *retention* to measure and to describe college students staying enrolled in college in sequential semesters until graduation (Barbatis, 2010).

Remediation: A term used to describe the process of developmental education, including precollege coursework (National Center for Developmental Education as cited in Boylan, 1999).

Student engagement: A term used to describe students' participation in meaningful activities and experiences including in-class discussions, faculty-student collaborations, peer interactions, and deep active learning (Strayhorn & DeVita, 2010).

Significance

Although it is an accepted belief that earning a college degree fortifies economic prosperity, one sector of the U.S. population is not fully participating in higher education in order to ensure affluent outcomes at national, state, and local levels: African American males (U.S. Department of Education, 2013). The achievement gaps between African American males and other college students is a persistent issue for institutions of higher education. When these young men repeatedly fail and ultimately leave college without obtaining a credential, the student and the college as well as local, state, and national economies suffer (Autor, 2011; Carnevale & Rose, 2011; Palmer et al., 2010; Treuhaft et al., 2014). In fact, postsecondary credential completion is directly linked to economic vitality, power and position, and global competitiveness (Berlin, 2011; Gallard et al., 2010; Mullin, 2011; Rutschow & Schneider, 2011).

The college credential completion gap between African American males and other student groups at ETCC that is leading to low completion rates for the college is significant because this discrepancy ultimately prevents ETCC from substantial participation in its state's higher education plan as well as the nation's college completion agenda. Both the United States and the State of Texas have created higher education plans and strategies in order to remain economically relevant and competitive. President Obama launched the *College Completion Agenda*, which is a commitment to "produce 50% more students with high-quality degrees and certificates by 2020" to guarantee the United States' global position in relation to rival nations, to revitalize the nation's economy, and to preserve the social health of the nation (McPhail, 2011, p. 2). Likewise,

the State of Texas established the CTG initiative to safeguard Texas's position as a leader in comparison to other large and leading states such as California and Florida to ensure overall well-being of the state and to improve quality of life for its residents (Eklund, 2012).

In order for the United States to be ranked as the highest educated nation in the world, college credential completion must be increased. Symonds (2011) noted that to be able to fill future job openings, the United States will need to confer "22 million" more degrees by 2018 (p. 7). In comparison, CTG Goal 2 illustrated Texas mimicking the nation's ambition to proliferate degree attainment. The statewide goal proposes that 210,000 undergraduate degrees and/or certificates be awarded by 2015 (Eklund, 2012).

Both the United States and Texas recognize minority college credential completion disparity as a barrier to individual, state, and national prosperity. In response to this inequality, President Obama signed an Executive Order to begin the White House Initiative on Educational Excellence for African Americans in order to "strengthen the nation by improving educational outcomes for African Americans" (The White House, 2012, para. 1). Furthermore, acknowledging the national trend that African American students lag behind European American students in college credential completion, Texas's CTG Goal 2 delineated an African American success target: increase the number of African American students completing bachelor's degrees, associate's degrees, and certificates to 24,300 by 2015 (Eklund, 2012). The problem of college credential completion disparity among racial and ethnic groups exists at the local, state, and national level, and each level is creating strategies and programs to address the inequality in order

to ensure U.S. economic prosperity. It is hoped that this study will be beneficial to help resolve the lack of developmental mathematics completion and the lack of college credential completion of African American male community college students.

Guiding/Research Question

At ETCC, an initial investigation that focused on diversity, equity, and college credential completion was conducted in order for the college to participate in the ATD initiative. During this initial investigation, developmental mathematics emerged as a significant barrier to college credential completion, especially for African American males. As a response to the initial ATD proposal findings, a new mode of instruction for developmental mathematics, modular math, was implemented at ETCC. The new instructional mode transformed the developmental mathematics classroom from one with a professor who lectures to all students simultaneously to a classroom with a professor who facilitates a competency-based, computerized curriculum to individual students (Edgecombe, 2011). It was the intent of this study to determine if a statistically significant relationship, as indicated by a p value of $<.05$, existed between the modular mode versus the lecture mode of instruction for developmental mathematics and for college credential completion rates for African American males at ETCC.

In order to address the postsecondary achievement gap problem between African American males and other students in relation to developmental mathematics completion and college credential completion at ETCC, this study was guided by the following research questions:

Research Question (RQ1)

Is there a relationship between the mode of developmental mathematics instruction, lecture versus modular, and African American male community college students' developmental mathematics completion?

Null Hypothesis (H_0):

The relationship between the mode of developmental mathematics instruction, lecture versus modular, and African American male community college students' developmental mathematics completion is independent.

Alternative Hypothesis (H_1)

The relationship between the mode of developmental mathematics instruction, lecture versus modular, and African American male community college students' developmental completion is not independent.

Research Question (RQ2)

Is there a relationship between the mode of developmental mathematics instruction, lecture versus modular, and African American male community college students' college credential completion?

Null Hypothesis (H_0):

The relationship between the mode of developmental mathematics instruction, lecture versus modular, and African American male community college students' college credential completion is independent.

Alternative Hypothesis (H_1)

The relationship between the mode of developmental mathematics instruction, lecture versus modular, and African American male community college students' college credential completion is not independent.

Review of the Literature

To conduct the literature review for this project study, I researched the following broad topics: (a) community colleges, (b) college completion agenda, (c) community college graduation rates, (d) race and ethnicity, (e) African American males and/or African American male achievement gap, (f) developmental education and/or remediation, (g) developmental/remedial mathematics, and (h) modular mathematics curriculum.

I specifically addressed broad topics with a variety of Boolean combinations of the following search terms using the EBSCO databases and Google Scholar at Walden University Library: *higher education, community college(s), completion agenda, national completion agenda, college completion agenda, degree completion, degree attainment, college-readiness, remediation, remedial education, developmental education, developmental mathematics, remedial mathematics, student retention, student persistence, race, ethnicity, minority male achievement gap, achievement gap, underachievement, educational attainment, and academic success, modular instruction, curriculum modules,* and *modular math*.

Additionally, I consulted the following public data sources for this literature review via online Google searches: The White House, United States Department of

Education, Association of American Colleges and Universities, American Association of Community Colleges, The League for Innovation in Community Colleges, Center for Community College Student Engagement, The College Board, Complete College America, Community College Research Center, National Institute for Staff and Organizational Development, National Association for Developmental Education, National Center for Education Statistics, National Center for Higher Education Management Systems, HigherEdInfo, MDRC, The Texas Higher Education Coordinating Board, Pew Research Center, Bill and Melinda Gates Foundation, and Lumina Foundation for Education. Furthermore, the use of peer-reviewed journals, current national reports, academic databases, and educational websites allowed saturation to be reached for this study.

It is important to note the need to use public, national databases like the National Center for Education Statistics to study community college African American male achievement gaps as most African American male higher education degree completion/graduation disparity research studies concentrated on the 4-year or university setting, resulting in a literature deficiency for African American males in the community college setting (Bush & Bush, 2010; Wood & Turner, 2011). From 1971 – 2009, there were only 50 studies on African American males in the community college: 38 dissertations, eight journal articles, and four book chapters (Wood & Turner, 2011). This scarcity in the research literature is puzzling because a significant percentage (63.1%) of these students enters higher education via the community college (Wood & Turner, 2011). Although the peer-reviewed publications for community college-level

studies are relatively small in comparison to university-level studies, this body of research is growing as scholars begin to place renewed emphasis on the contributions of African American males to the degree completion agenda and ultimately, to the U. S. economy. Nevertheless, the college credential completion disparity for African American males continues to exist.

The theoretical framework used in this research study was Ogbu's cultural-ecological theory of minority school performance (CE theory). Furthermore, a non experimental, quantitative research approach with a correlational research design combined with a nonparametric statistical test, the chi-square test for independence, for hypothesis testing was used in order to draw conclusions about the variables in this study.

Since the early 1980s, college credential completion or moreover, the lack of degree completion by African American male students in higher education, has been a consistent research subject. Researchers have focused on African American male college students' low level of enrollment, preparedness, persistence, success, and graduation rates in comparison to other college students (Caldwell & Obasi, 2010; Dancy, 2011; Harper, 2012; Lewis, Simon, Uzzell, Horwitz, & Casserly, 2010; Palmer et al., 2010; Strayhorn, 2010; Wood & Turner, 2011).

Although there is a noteworthy amount of literature on the degree completion disparity of African American males, the majority of the race and ethnicity and academic achievement research studies, both internationally and nationally, are focused on the K-12 setting (Brown & Brown, 2012; Kingdon & Cassen, 2010; Mocombe, 2011;Stinson, 2011). In spite of high enrollments of African American males at the community college

level, the research and literature is noticeably sparse (Bush & Bush, 2010). Even though there is not an abundance of literature, what writing and studies that do exist confirm the presence and persistence of a degree completion disparity for African American male community college students.

To begin, the most obvious reason for an African American male degree completion disparity in higher education, as detailed in the literature, is low enrollment in higher education institutions. If African American male students are not on college campuses, they cannot contribute to eliminating the college credential completion gap. A greater percentage of African American males, ages 18 and older, were counted on prison rolls (36%) rather than on college rosters (5%; Lewis et al., 2010, p.88). If African American male students are missing from college campuses, they are going to be unable to achieve higher education degree completion success.

Another factor that attributes to a degree completion disparity for African American male college students noted in the literature is their lack of preparedness for college-level work. Palmer and Davis (2012) showed that African American males possess a need for postsecondary remediation. The performance of African American male students during their first semester of college is plagued by issues such as being twice as likely to drop out of high school as European American males, not graduating on time from high school, being the lowest percentage to participate in advanced placement (AP) courses while in high school, and having SAT and ACT scores lower than the average European American scores (Harper, 2012; Lewis et al., 2010).

Retention or persistence rates are an additional impediment for African American male college students' academic achievement (Strayhorn, 2010). Persistence rates of African American male community college students for 2 year have been noted at 73.6% (Wood & Turner, 2011). African American, non-Hispanic male students have the lowest 3-year graduation rate documented among all minority male community college students (Wood as cited in Esters & Mosby, 2007). Further research is warranted and needed at the community college level in order to address and narrow the degree completion disparity of African American males.

Overall, the current literature that addresses African American male college students concentrated on two ideologies: failure and success. The deficit model was the most common belief that was documented in studies, and it traced the failures of African American males all along the educational pipeline (Dancy, 2011; Terry, 2010). The emerging model in print, however, is one that authenticates the academic success of African American male college students (Harper, 2012; Jett, 2011; Stinson, 2011; Wood & Turner, 2011). The message in the literature, regardless of a negative or a positive focus, was that scholars of various ethnicities and genders seek a buoy to free African American males from the abyss of academic failure and lack of degree completion. This study continued that quest.

Theoretical Framework

In the 1970s, Ogbu developed cultural-ecological theory of minority school performance (CE theory), laying the foundation for decades of research to study ethnicity and race and academic achievement (Brown & Brown, 2012; Caldwell & Obasi, 2010;

Conway, 2010; Dancy, 2011; Harper & Davis, 2012; Palmer & Davis, 2012; Stinson, 2011).CE theory brings to light an African American "attitudinal response to a history of oppression" towards European American U.S. institutions (Caldwell & Obasi, 2010, p. 351). CE theory was used to frame this study because it provided the best venue for understanding African American male beliefs and, more importantly, their behaviors with regard to education (Ogbu & Simons, 1998). CE theory was an appropriate framework for this study because understanding how groups function, create, and maintain a cultural identity within a society may be a key component to understanding minority academic achievement gaps or degree completion disparity.

CE theory is an established theory that has guided the majority of minority academic degree completion disparity studies for the past 2 decades. For the past 20 years, Ogbu's standpoint has dictated the minority versus nonminority educational attainment discussions (Mocombe, 2011). Using CE theory allowed for a foundation to study ethnicity and academic achievement gaps in the community college setting. There are two parts to CE theory: the treatment of minorities in an educational setting and the minorities' response to that education as a result of the treatment those minorities received (Ogbu & Simons, 1998). To summarize, CE theory explains society in the United States as one constructed of majority and minority groups. The majority group achieves success and dominates the minority group. As a response to domination, the minority group develops its own culture (beliefs, language, dress, music, etc.) in opposition to the majority group (Ogbu & Simons, 1998). Historically, education and academic success have been a cultural representation of the White majority group;

therefore, it is often opposed by minorities like African Americans who are, likewise, then unsuccessful in education (Harper, 2012; Mocombe, 2011; Palmer et al., 2010; Woldoff, Wiggins, & Washington, 2011). Moreover, some researchers refer to CE theory as 'Acting White' theory, explaining that African Americans "disengage" from academia due to forming an "oppositional culture" in response to past experiences of "oppression, enslavement, and discrimination" (Palmer & Maramba, 2011, p. 436). These same researchers said that it is almost as if African Americans agree to "devalue" education in order to make a bold cultural and/or political statement such as: Embrace African American Cultural Identity; Do Not Act White (Palmer & Maramba, 2011).

A deeper explanation of CE theory involved the opposition between voluntary minorities and involuntary minorities. An example of voluntary minorities was immigrants such as Hispanics, Vietnamese, and Nigerians who willingly chose to come to the United States in hopes of a better life; likewise, research demonstrated that this group performed better academically because they accepted and adapted the White culture that dominated education. In contrast, involuntary minorities or nonimmigrant people were defined as those who have been subjugated, such as African Americans and American Indians, and did not willingly choose to become a part of United States society nor willingly accept their status of being dominated by the White culture, and therefore, these minorities rejected the dominant culture's values including education (Ogbu & Simons, 1998; Williamson, 2010).

No matter the name, CE or Acting White theory, it is clear that the basis for opposing education is rooted in the concept of racism. Some scholars, in fact, have

documented that minority opposition to education originated from a belief that racism is prevalent especially in those institutions that have created and/or perpetuated cultural mistrust. Caldwell and Obasi, (2010) asserted that a common response to discrimination by African Americans may be "withdrawal and lack of effort" (p. 351). Examining the lack of academic achievement by African Americans, particularly males, through the lens of racism and/or discrimination is an imperative process for understanding the gap between races and ethnicities.

Other studies that embraced the cultural opposition stance of CE theory indicated that lack of academic achievement, specifically by African American males, stems from the notion of masculinity. Masculinity, or the concept of maleness, is generally accepted or viewed as a learned behavior. Davis (2002) and Kivel (1999) contended that to learn how to act like a man means that a boy must cultivate a detached nature and adopt a tough and aggressive disposition (as cited in Jaggers & Iverson, 2012, p. 188). Furthermore, scholars are careful to emphasize that "what it means to be male" needs to be disaggregated by ethnicity because being an African American male does not necessarily represent what it means to be a Caucasian male (Jaggers & Iverson, 2012, p. 188). It is easy to conclude that the experience of being male is different among races or ethnicities. Likewise, these diverse experiences of being male may create or lead to separate academic experiences as well.

Research suggested that, all too often, media such as television shows, movies, and music videos portray the African American man as a *cool man* if he is one who made it to the top of a gangster life, used drugs, glorified money, objectified women, and

disrespected authority. As a result, many African American young males express manhood and maintain pride and respect by adopting a cool front or pose (Palmer & Maramba, 2011). As further described by Jaggers and Iverson (2012), the *cool pose* of acting tough, emotionless, and hostile can be used as an African American male identity strategy in order to increase the visibility of these men (p. 189). It is reasonable to conclude that if African American men use this pose to establish their identity and their masculinity, it could stifle their potential as a successful college student.

Expanding on this idea of masculinity identity, several studies indicated that the lack of academic achievement by African American males actually originated from embracing the cool pose and ultimately receiving greater social and psychosocial rewards from family and peers for rejecting academic success (Harris, Palmer, & Struve, 2011; Palmer et al., 2010). The internal struggle for African American males with regard to academic achievement and masculine identity is best stated by Palmer and Maramba (2011), citing Holmes (2008), about how an African American man 'is perceived in the public consciousness, interpreted in the dominant media [is] ultimately how he comes to see and internalize his own role' (p. 442). Perhaps, the best explanation of a minority male degree completion disparity is that there is a common belief that "exercising an African American cultural ethos and striving for academic success diametrically oppose one another" (Macombe, 2011, p. 85). One explanation for the binary opposition of embracing African American culture while achieving academic success stems from the reality of African American males having to cope with numerous realms of life.

Research seemed to imply that it is common for an African American male on a college campus to have to negotiate relationships in varied groups to which he belongs where some groups embody negative perceptions of African American males (classroom contributions) and other groups embrace positive perceptions (athletic contributions) (Noble, 2011). Reconciling these worlds to find a true sense of belonging seems to be a challenge for most African American male students (Bush & Bush, 2010; Jett, 2012). No matter the possible cause for a minority academic achievement gap, research suggested that it is of utmost economic importance to find a way to not just narrow, but to eliminate this disparity in higher education.

College credential completion disparity is a popular research topic that can be supported with various theories like student development theory, stereotype threat, and self-fulfilling prophecy; however, for this study which focused on ethnicity and college credential completion disparity in the community college setting, a theory that specifically illuminated minorities and academic performance was needed. If Ogbu and Simons (1998) were correct, resistance to school culture is historically rooted in past experiences of African American males which will direct their future behavior in regard to higher education. So, African American males may actually consciously choose to reject academic behaviors which they characterize as White to intentionally choose social acceptance over academic success.

Employing CE theory, thus allowed a solid theoretical foundation to frame and support this study in order to determine if a statistically significant relationship, as indicated by a p value of $<.05$, existed between African American male students'

developmental mathematics completion and college credential completion and the mode of developmental mathematics instruction in which they received instruction.

Barriers to College Credential Completion

The postsecondary achievement gap of African American males is an ever-evolving research topic (Harper, 2012; Strayhorn & DeVita, 2010; Wood, 2012). For this study, the topics of gender and ethnicity in developmental education, specifically developmental mathematics, are discussed as significant barriers to college credential completion.

Developmental education. At community colleges, all students are granted access and an opportunity to pursue a degree regardless of high school grade point average or standardized test scores. This open-door policy exists to encourage the pursuit of higher education by all U.S. citizens (American Association of Community Colleges, 2014c, para. 5). One reason that community colleges can welcome all students is that these institutions also offer developmental education courses in reading, writing, and math. Boylan (1999) defined developmental education as "the integration of academic courses and support services guided by the principles of adult learning and development" (National Center for Developmental Education, 2012, "Developmental Education," para. 1). It is also important to note that these courses are considered institutional credit or non-credit courses that do not count toward earning a degree or a credential (Pretlow & Wathington, 2012, p. 5). Remediation needs are prevalent and increasing across the United States: Researchers approximate a national rising trend which varies from state-to-state and documents that from 33% up to 60% of all students entering community

colleges for the first time will require placement in at least one developmental or remedial course (Barbatis, 2010; Collins, 2010; Rutschow & Schneider, 2011; Silva & White, 2013).

A common practice for most community colleges is a developmental education sequence that typically consists of two to four levels of remedial courses that must be completed in order to remediate basic skill deficiencies (Bailey & Cho, 2010; Bailey et al., 2010). Contrary to its intent, developmental education or remediation, unfortunately, seems to be a barrier rather than an open pathway to college credential completion. Research revealed that for those who require developmental education courses, fewer than 25% will actually complete a community college degree and/or certificate within eight years of the first day of enrollment (Bailey & Cho, 2010; Silva & White, 2013). It is understandable that many students who enroll in developmental education will likely end up not completing a degree. Issues with negative impacts upon successful degree completion associated with remediation such as debt accumulation, excessive time and money, and loss of financial aid eligibility have also been noted in recent studies (Brothen & Wambach, 2012; Pretlow & Wathington, 2012).

Consequently, although developmental education courses create an opportunity for those students who are not ready for the rigor of college-level coursework to enter higher education, that same opportunity requires courses that add extra time and extra expenses. These developmental or remedial courses also increase student frustration which can lead to low retention that directly hinders college credential completion and entrance to the workforce.

The majority of research literature in relation to developmental education pertains to the discipline's effectiveness. The proponents of developmental education view it as an educational equalizer and a pathway that allows all students access to higher education. There are studies that demonstrate the effectiveness of developmental education courses (Brothen & Wambach, 2012; Bruch & Reynolds, 2012, Pretlow & Wathington, 2012,). Brothen and Wambach (2012), referencing a "high quality study" by Schoenecker, Bollman, and Evens (1998), accentuated that "community college students who were recommended for remedial, nondegree courses but did not take them (noncompleters) had lower average GPAs and lower subsequent registration (persistence) rates than students who completed remediation" (p. 35). Many students who participate in developmental or college preparatory programs cite those experiences as foundations for future academic success. In a recent study, students indicated that they gained confidence and insight into college-level expectations via completion of a developmental program (Bruch & Reynolds, 2012, pp. 14-15). Although these courses may prolong a student's time in college, there is evidence that developmental education courses are an effective tool in increasing the academic success of an underprepared college student. Pretlow and Wathington (2012), quoting Bahr (2010), stressed that "community college students who successfully complete their developmental sequence go on to graduate or transfer to a four-year institution at comparable rates to students who began at college-level" (p. 4). It is clear in the literature that supporters of developmental education did not view it as a contributing factor in the problem of college credential completion.

In contrast, the opponents of developmental education view it as a barrier to academic success and ultimately, to college credential completion. The literature hosts studies that indicated that developmental education is costly, time-consuming, and ineffective (Bailey & Cho, 2010; Barbatis, 2010; Rutschow & Schneider, 2011). The bottom line in most of this literature seems to conclude that developmental education prohibits graduation or degree completion (Rutschow & Schneider, 2011). In the literature, those who opposed developmental education contended that students who enter a postsecondary setting underprepared for the rigor of higher education and engaged in remediation reduced the likelihood of completing a credential. With two-thirds or more of community college students enrolling in a minimum of one developmental education course, research showed that college success like graduation is significantly decreased (Bahr, 2010; Barbatis, 2010). In fact, studies showed that "within eight years of enrollment in college" fewer than 25% of community college developmental education students finish their degree or certificate requirements and earn a credential (Bailey & Cho, 2010, p.1; Silva & White, 2013).

Developmental or remedial education consists of courses that are designed for underprepared college students. These courses are meant to remediate any basic skill deficiencies (mathematics, reading, and/or writing) that exist and will prevent students from successfully completing college-level, freshman or gateway courses (Bahr, 2010; Bailey & Cho, 2010). College-readiness or the possession of academic skills that are necessary in order to successfully complete college-level courses is a defining factor in higher education academic achievement gaps. Because by nature community colleges

embrace an open-door policy for their students, many of those first-time-in- college students enter higher education without the required skill sets to be successful.

Today's underprepared community college student can be characterized as a first-generation college student, a student for whom English is not his or her first language, a recent high school graduate who chose easier senior year courses rather than rigorous college preparatory courses, a returning adult, and/or a veteran (Osterholt & Barratt, 2012, p. 23). Typically, a variety of community college student types are referred to remedial or developmental education courses; these students vary from older adults whose skill sets are out of practice from lack of use to students with limited English proficiency to students with a range of learning problems (Barbatis, 2010).

Ethnicity and race is a trending topic with regard to examining academic success in the educational pipeline. As documented by Kingdon and Cassen (2010), important facets of accomplishment like "motivation and culture" can be illuminated and studied via a lens of ethnicity (p. 404). For the majority of minorities in the United States, the open-door policy of community colleges represents the best option for pursuing a college degree as evidenced by the 44% enrollment of African American undergraduates as of fall 2008 (American Association of Community Colleges, 2010). While this open-door policy is intended to increase access and equity for all students, it often leads to inequities, especially between ethnicities, in terms of college-readiness and graduation rates (Saenz, Hatch, Bukoski, Kim, Lee, & Valdez, 2011). Palmer and Davis (2012) reported, "African Americans are most likely to enroll in remedial courses during their college career compared to students from all other racial and ethnic backgrounds" (p.

410). Their findings were substantiated as other research showed an ethnic and racial gap between first-year undergraduate students who took remedial education courses in the Academic Year 2007-2008: The data indicated that 8.8% of White students versus 11.3% of African American students were required to take at least one remedial course (National Center for Education Statistics, 2012).

In addition to ethnicity, gender is an important factor with regard to developmental education and college credential completion. For African American males, the community college can be the only gateway for higher education participation (Bush & Bush, 2010; Wood, 2012; Wood & Turner, 2011). However, the majority of these young men who begin their higher education career at the community college tend to not be college-ready and thus, they require remediation or developmental education. This requirement is yet another barrier for college credential completion among African American males.

In addition to college-readiness, graduation rates in community colleges are ethnically and racially disproportionate, especially for African American males. For example, Digest of Education Statistics (2010) stated that 12% African American males as compared to 22% Caucasian males completed a community college degree in a three-year timeframe (as cited in Harris & Wood (2013). Other research indicated community college graduation rates for white males and females as well as African American females are higher than graduation rates of African American males. For the Year 1999 Cohort, the percentage of students seeking a certificate or associate's degree at 2-year institutions who completed a certificate or degree within 150 percent of the normal time

required to do so was as follows: White males (23.7%); White females (26.8%); African American females (16.1%); African American males (14.1%; (National Center for Education Statistics, 2012). Similarly, as shown in the same report/table, for the Year 2005 Cohort, the percentage of students seeking a certificate or associate's degree at 2-year institutions who completed a certificate or degree within 150 percent of the normal time required to do so was as follows: White males (22.1%); White females (23.8%); African American females (12.1%); African American males (12.0%; (National Center for Education Statistics, 2012). Furthermore, in addition to a college credential completion gap for African American males, the aforementioned data showed a 2.1% decline in African American male degree completion; hence, over a six year period, statistics illustrated an inequality for African American males in relation to their white peers, both male and female, in postsecondary academic achievement (National Center for Education Statistics, 2012). Although developmental education as a whole seems to be a barrier for college credential completion for African American males, one subject area in particular, mathematics appears to be the most significant obstacle for these students.

Developmental mathematics. For many students, overcoming the obstacle of remediation, particularly in mathematics, is so great that the result is failure and consequently, withdrawal from the institution without achieving their educational goals (Bahr, 2010; Bonham & Boylan, 2011; George, 2010; Silva & White, 2013). Many scholars agreed that developmental mathematics is the culprit that robs community college students' ability to complete a degree (Bahr, 2013; Bonham & Boylan, 2011;

George, 2010; Howell, 2011; Mesa, 2012). Developmental mathematics has, in fact, been described as "the graveyard of dreams and aspirations" (Merseth, 2011, p. 32). It is of no surprise then as Bahr (2013) noted that an intense launch of research aimed at developmental mathematics in community colleges was begun and has remained consistent for the past decade.

The equation of math equals the death of a college degree is hard to solve. The issue seems to be that an overwhelming number of students need remediation in mathematics, and unfortunately, the majority of those who enrolled in such courses either dropped the courses or did not successfully complete (earn a passing grade) them. George (2010), stressed that "three out of four students who enrolled in remedial mathematics courses did not remediate successfully" (p. 83). Another study identifying developmental mathematics as a "stumbling block in the path of graduation" indicated that "25.5% of students" repeated these courses and "less than half of those students actually passed the course eventually" (Mireles, Offer, Ward, & Dochen, 2011, p. 12). One reason for students not completing their developmental mathematics courses seemed to be time. Bonham and Boylan (2011) elaborated, "A student placing in the lowest level of developmental mathematics at a community college must take approximately 10 hours of mathematics courses before even having an opportunity to attempt college-level mathematics" (p. 2). Sadly, developmental mathematics students do not seem to be successful at course completion or college credential completion.

As in the case for overall developmental education, ethnicity and gender seem to play a prevalent role in developmental mathematics as well. The most frequently needed

developmental education or remedial course for African Americans is mathematics. Adelman cited in Bahr (2010), estimated that "62% of African Americans" as opposed to "36% of Whites" need remedial mathematics courses (p. 211). The need for remedial mathematics is directly linked to the K-12 mathematical experiences of African American students, especially males (Jett, 2012; Terry, 2010). Jett (2012) explained that "from the onset" African American male students are "viewed as mathematically incompetent" (p. 27). Furthermore, other studies disclosed that mathematics classrooms do not fortify the educational experiences of African American male students, and could be characterized as "racialized spaces" that "perpetuate inequality" (Harper & Davis, 2012; Jett, 2012; Terry, 2010). Thus, these negative K-12 experiences in a mathematics classroom are carried forward to the college setting and resulted in the need for developmental education in mathematics.

Supporting previous studies of the mathematics classroom as a negative experience for students, a recent study attributed the developmental mathematics crisis to "socio-emotional" and "psychological hurdles" that must be surpassed in order for developmental mathematics students to achieve success (Silva & White, 2013, p. 5). It has furthermore been concluded that in order for developmental mathematics students to be successful, faculty must create a classroom where all students feel a sense of belonging, increase student engagement with one another as well as the professor, teach students how to learn, and connect mathematics to real-world problems (Silva & White, 2013). Not only is developmental mathematics education a barrier for college credential completion, it is also a significant contributing factor to the disparity in postsecondary

ethnicity and academic achievement. The amalgamation of the rapidly increasing necessity for developmental education courses and the escalating decreasing graduation rates is perpetuating academic achievement gaps for African American males in community colleges.

Instructional Modes for Developmental Mathematics

The need for an educationally-advanced workforce and for diminished racial and gender postsecondary achievement gaps are commonly acknowledged (Boatman & Long, 2010; Palmer et al., 2010; Treuhaft et al.,2014). A major area of concern for both the workforce and the classroom that is consistently identified as a barrier for success is mathematics. The lack of mathematical skills in the workforce can prevent job acquisitions and promotions, and this deficiency in higher education can thwart the conferment of a degree or certificate (Autor, 2010; Miller, 2010). To combat this barrier, many institutions of higher education have implemented new approaches to the teaching and learning of mathematics, especially developmental mathematics, as it has been ranked as having the highest failure rate of all courses in higher education (Bassett & Frost, 2010; Bettinger, Boatman & Long, 2013; Boatman, 2012; Bonham & Boylan, 2011; Cullinane & Treisman, 2010; Hodara, 2011; Le, Rogers & Santos, 2011; Twigg, 2011).

The traditional delivery mode of mathematics instruction, college-level or developmental, has been lecture. With a traditional approach, the professor talks to the students and the students listen to the professor who works the problems to demonstrate how to achieve the correct answer (Bonham & Boylan, 2011; Hodara, 2011)

Furthermore, with a traditional approach, all students are expected to move at the same pace whether they are bored because they already know the information or are overwhelmed because they do not understand the information (Twigg, 2011). With regard to developmental mathematics via a traditional delivery mode, students have to listen to lectures in a 16-week progression of multiple courses in a sequence in order to complete their remediation (Bailey & Cho, 2010). In contrast, the more modern delivery modes of mathematics instruction engage the individual student at his or her own skill level and pace. Through the use of technology, accelerated courses, and/or modularized courses, the modern instructional delivery modes have improved developmental mathematics student outcomes (Boatman, 2012; Edgecombe, 2011; Twigg, 2011).

Although there are several studies that address developmental mathematics course redesign, one study in particular will be discussed individually due to its relevance to this study. Bassett and Frost (2010) documented the success of a developmental mathematics course redesign at a community college in the state of Tennessee. This course redesign implemented modularized mathematics; three separate levels/courses of developmental mathematics were combined into one course with 12 modules. Through technology-driven instruction, instructors became facilitators who provided individualized, on-demand assistance to students who worked at their own pace to achieve mastery of specified competencies. The modular concept was quite successful for this community college. From the fall 2008 to fall 2009, 60% of the 1324 students passed developmental mathematics which constituted a 45% course pass rate increase (Bassett & Frost, 2010, p. 873). With regard to this study, the research conducted by Bassett and Frost (2010)

confirmed that the modular method is a sound postsecondary instructional approach to developmental mathematics. This concentration on individualized developmental mathematics could also be a sensible solution for reducing the African American male achievement gaps in higher education.

African American Male Achievement Gaps

The two most prevalent approaches to African American male college credential completion disparity are studies that examine individual factors (Harper, 2012; Milner, 2012; Terry, 2010; Thomas, Smith, Marks, & Crosby, 2012; Strayhorn, 2010) and institutional factors (Jett, 2011; Strayhorn & DeVita, 2010; Wood & Turner, 2011) related to these gaps.

Individual factors of African American male achievement gaps. The most predominant African American male college credential completion disparity research studies focus on individual factors. Individual factors can be defined or categorized as inherited traits like low socioeconomic status and non-college educated parents (Strayhorn, 2010) or as acquired traits like low grade point averages, minimal academic skills, and marginal test scores (Bush & Bush, 2010; Strayhorn, 2010; Williamson, 2010). Individual factors reported in research studies tend to be deficit-oriented (Dancy, 2011; Harper, 2012; Harper & Davis, 2012; Milner, 2012; Terry, 2010). In other words, these studies concentrated on and perpetuated the shortfalls of African American male students in academia and rarely provided any suggestions or solutions to remedy their underperformances.

While several studies address individual factors that perpetuate postsecondary achievement gaps for African American males, one study in particular connects these factors to achievement gaps in mathematics and will be discussed individually due to its relevance to this study. Realizing that most research concentrated on interventions that focused on improving teaching rather than learning, Terry (2010) conducted a critical ethnographic study that was also supported with quantitative data to understand the African American male's experience in mathematics. A six-week summer seminar with African American males who were recruited to develop critical math literacy was held in Los Angeles, California. This study turned students with minimum mathematic skills into researchers by facilitating the collection and analysis of data (African American males in prison versus African American males in college) in order to develop mathematical literacy. African American male students who self-identified as needing assistance with math developed and honed their skills; these students used Microsoft Excel to calculate averages and percentages and to create graphs and figures for analysis. These students used their mathematical understanding of a subject (incarceration versus education for Black males in Los Angeles) to construct an academic identity. The students found that their assumptions as well as statements in the media about 18-24 year old African American males in prison versus in college were contradictory. The study showed that out of the seven years (2000-2007) of data that was analyzed, data for only one year (2000) confirmed a higher percentage of African American men in prison than in college in California. This study concluded with a recommendation for mathematics educators to take a lead role to design curricula that embeds relevance and meaning to

allow African American males to develop an academic identity. With regard to this study, the work done by Terry (2010) confirmed that individual immersion in mathematical practices can lead to success in mathematics for African American males.

Institutional factors of African American male achievement gaps. A fairly new trend in postsecondary African American male achievement gap research is categorized as institutional factors. Institutional factors can be identified as issues like faculty interaction and student engagement. Scholars now believe that institutional factors that affect and/or prohibit the academic success of African American males should be investigated rather than focusing on individual factors (Jett, 2011; Strayhorn & DeVita, 2010; Wood & Turner, 2011).

Wood and Turner (2011) pointed out that such a research strategy "avoids the use of a deficit approach which places the blame of poor success on the students, their families, and communities as opposed to the educational system and its affiliates" (p. 137). Many institutional factors exist and can be examined to determine their relationship to a student's academic success and degree attainment; however, most researchers believe that the interaction between students and faculty both inside and outside of the classroom is the pivotal component for African American male students' success (Jett, 2011; Noble, 2011; Palmer, Maramba, & Holmes, 2012; Strayhorn, 2010; Walker et al., 2010). If an African American male student perceives his campus and professors do not value his presence, he is more likely to not stay, or if he stays, he is more likely to be less successful. Furthermore, other studies suggested that constant exposure to negative labels for African American males in academia has made the

college environment seem threatening and sometimes, actually hostile toward African American males. This hostility ranges from an aloof and unwelcoming classroom environment, to hearing derogatory remarks, to an indifferent reception by professors who do not hide their belief that African American male students are not capable of succeeding in their courses, to receiving unfair grades, to outright apprehension that African American male students are on campus to pilfer rather than learn (Palmer et al., 2012; Thomas et al., 2012). In addition, research indicated that many African American males feel that they are viewed as criminals and "must always guard against being seen as threatening by Whites," so on a college campus, a primary response or coping strategy of African American males towards an unwelcoming college environment is to distance themselves from Whites (Bridges, 2011, p. 162).

To combat a real or a perceived antagonistic campus environment, an authentic, caring, and culturally-responsive relationship between an African American male college student, even one who is academically unprepared, and his professor can lead to meaningful campus engagement (i.e. student organization participation and class attendance), successful career preparation, and ultimately, degree attainment (George, 2010; Jett, 2011; Noble, 2011; Palmer et al., 2012; Walker et al., 2010).

Several studies address institutional factors that perpetuate postsecondary achievement gaps for African American males; one study in particular connects these factors to achievement gaps in mathematics and will be discussed individually due to its relevance to this study. Jett (2011) completed a case study that highlighted the undergraduate mathematical experiences of an African American male. The study

revealed how stereotypical experiences with mathematics for an African American male became atypical. As expected, based upon most discussions in the literature, the student's journey began with negative K-12 interactions with math; the student played football, concentrated more on sports than his education, failed his math class and ended up in summer school to repeat the course. The negative mathematical experiences continued for the student during his first year of college. However, all of the stereotypical behavior changed for the student when a mathematics professor took the time to work with him one-to-one to help the student "see himself as a doer of math" (Jett, 2011, p. 1135). The study concluded with recommendations for more mathematics professors, especially African American male professors, to become mentors to African American male college students and to collaborate with others (math educators, families, and communities) to model the success and achievement of African American males in mathematics. With regard to this study, the work conducted by Jett (2011) demonstrated that personal contact and connection by mathematical professors with their students can lead to mathematical success for African American males.

Implications

A project that could be employed to address this study's research problem may be a Policy Recommendation with Detail developed for community college administrators to institute requirements and processes for developmental mathematics that ultimately may foster college credential completion, especially for African American males.

If data analysis and results indicate a relationship between mode of instruction and developmental mathematics completion and a relationship between mode of

instruction and college credential completion for African American males, this study could be presented to The Board of Trustees, The Executive Cabinet, The Academic Affairs Committee, and the Achieving the Dream Steering Committee at ETCC in order to provide the foundation for creating and implementing new developmental mathematics policies that promote college credential completion success and aid the College's participation in the state's *Closing the Gaps by 2015* plan as well as in the nation's *College Completion Agenda*.

Summary

To summarize, Section 1 consisted of five key points: (a) the future well-being and economic prosperity of the United States in relation to the needed increase in workforce-ready graduates; (b) the role of community colleges in college credential completion increase; (c) the problem of a postsecondary African American male academic achievement gap; (d) defining factors that contribute to an African American male academic achievement gap; (e) individual and institutional factors that affect an African American male academic achievement gap.

In summary, there is a shortage of highly-skilled college graduates able to enter the workforce; therefore, the United States is at-risk of losing its global rank and position. Taking action to ensure continued economic growth and leadership, President Obama launched the *College Completion Agenda*, vowing that the United States will have the most college graduates in the world by 2020. To meet this large-scale aspiration, President Obama chose to increase professional and technical degrees that are earned in community colleges as the solution to the workforce shortage that is threatening the

vitality of the American economy. Although Associate's degrees are an excellent resolution, there is a persistent college credential completion disparity in higher education, especially with regard to African American males.

Furthermore, Section 1 identifies and discusses the two defining factors, college-readiness (the need for remediation or developmental education) and graduation rates (college credential completion), that impact achievement gaps in higher education. Numerous studies showed that a majority of community college students are not college-ready, and therefore, require remediation in the form of developmental education courses. This need is especially high in terms of a specific subject, mathematics, and in terms of a specific race/ethnicity and gender, African American males. Research also revealed that failure to complete developmental education/remediation in order to progress to college-level courses had a direct impact on college credential completion, especially for African American males.

In addition, Section 1 addressed the specific individual and institutional factors that cause an African American male achievement gap. Individual factors such as minimum academic skills and institutional factors like faculty engagement can be identified and rectified in order to help African American males succeed in college courses and ultimately complete college. Research suggested that supportive outreach programs could assist African American male college students to overcome any type of barrier to educational success.

Finally, Section 1 concluded with the acknowledgement that even though there is much research regarding the African American male achievement gap in higher

education, there is insufficient research regarding academic achievement disparity of African American males in the community college. Section 1 also established the goal of this project study which was to add to the body of literature that is emerging for the community college setting with an original contribution, determining if there is a relationship between the mode of developmental mathematics instruction, lecture versus modular, and African American male developmental mathematics completion and college credential completion.

The following section, Section 2, describes the methodology of the project study, including research design and approach, setting and sample, instrumentation and materials, data collection and analysis, research findings, assumptions, limitations, scope and delimitations, and steps taken for participant protection.

Section 2: The Methodology

Introduction

The postsecondary achievement gaps between African American males and other college students with regard to the need for developmental mathematics and the lack of college credential completion and the impact of those gaps upon ETCC's ability to meet the *College Completion Agenda* goals as well as the nation's capability to ensure economic prosperity compelled me to pursue this study (Carnevale & Rose, 2011; Palmer et al., 2010; Texas Higher Education Coordinating Board, 2014a). The purpose of this study was to explore the relationship between the mode of developmental mathematics instruction, lecture versus modular, and African American male developmental mathematics completion as well as the relationship between the mode of developmental mathematics instruction, lecture versus modular, and African American male college credential completion at ETCC.

In this section, I discuss my rationale for employing this quantitative approach. I describe the study's setting, population, and sampling procedure that I used. I define the sample size along with the eligibility criteria and characteristics for this study's participants. I explain the use of archival records to collect data as well as the data collection and analysis process that I used to discover the results or findings for this study. I present the findings in narrative and statistical table format to aid the reader in a clear and concise understanding of the results. Assumptions, limitations, and scope and delimitations are addressed, and the steps that I took to ensure the protection of the participants conclude this section.

Research Design and Approach

The intent of a research study often drives the researcher's decision to employ a qualitative approach versus a quantitative approach. Qualitative researchers make observations, interview people, and analyze documents, and then they formulate hypotheses (Lodico, Spaulding, & Voegtle, 2010). Quantitative researchers, however, tend to use a deductive approach by beginning with a theory, forming a hypothesis, collecting data, and then making a decision based on that data to either reject or fail to reject the hypothesis (Lodico et al., 2010). Quantitative researchers summarize data using numbers rather than interpreting themes or patterns like qualitative researchers (Creswell, 2012).

For this study, a quantitative approach was the most appropriate method to use because it was my intent to either reject or fail to reject a hypothesis that was based upon numerical data analysis. I wanted to determine if there was a significant statistical relationship ($p = <.05$) between the mode of developmental mathematics instruction, lecture versus modular (independent variable), and the developmental mathematics completion status as well as the college credential completion status of African American males (dependent variable). The study's setting indicated that a lack of developmental mathematics completion and of college credential completion by African American males was an on-going problem for the institution. In addition, developmental mathematics was determined to be a prominent barrier for African American males' college credential completion.

A correlational research design was employed in this study. Correlational researchers examine a relationship between two things; however, correlational studies are not to be interpreted as causation (Creswell, 2012; Lodico et al., 2010; Reinhart, Haring, Levin, Patall, & Robinson, 2013). The correlational research design chosen for this study was an appropriate choice because it was my intent to examine two categorical variables to consider whether or not a relationship existed between those two categorical variables (Creswell, 2012; Lodico et al., 2010; Reinhart et al., 2013).

As documented in the literature, the chi-square test of independence is a standard hypothesis test for categorical data analysis (Agresti, 2011; Franko & Tirrell, 2012; Hershkovitz & Nachmias, 2011). While several scholars employed the chi-square test of independence to test association of two categorical variables, one study in particular connected these factors to achievement gaps in higher education and will be discussed individually due to its relevance to this study. Stephens, Fryberg, Markus, Johnson, and Covarrubias (2012) used this approach to investigate the relationship between the higher education system in the United States and the inequalities between groups' academic performance within this system.

Stephens et al. (2012) concentrated on college achievement gaps using cultural mismatch theory as its framework. According to this theory, the roles of self, identity, and culture are critical factors that create individual experience, motivation, and performance in a setting such as higher education. Stephens et al.(2012) emphasized the individual and institutional factors related to academic achievement, concentrated on exploring the relationship between the middle class norms used to construct the U.S.

postsecondary education system, and addressed the academic disadvantages for specific groups of students created by such a system. Outcomes from the chi-square test of independence, represented in percentages, were depicted both in narrative and in tables. This format provided comprehension of results for its readers.

In order to determine if a statistical significant relationship existed between independent and dependent variables, I chose an appropriate research design and approach. For my study, I used a quantitative approach with a correlational research design and conducted data analysis using a chi-square test of independence.

Setting and Sample

The setting for this study was a community college located in east Texas (ETCC). During the years that data were retrieved from archival records, the college employed approximately 270 full-time faculty members, enrolled approximately 12,000 degree- or certificate-seeking students, and offered over 60 associate degree options. The student population during this time period disaggregated by gender was 59% female and 41% male; disaggregated by ethnicity the student population during this time period was 60% European American, 22% African American, 11% Hispanic American, and 6% other (Texas Higher Education Coordinating Board, 2013).

My research study began due to my interest in the developmental mathematics completion rates and in the college credential completion rates of African American male community college students. Because of the enormity of such a study, I chose to define my population as African American male community college students enrolled in

developmental mathematics at ETCC; likewise, my sample was drawn from this particular population.

The determination of a sampling method is a component of a research study. The overall purpose and the use of results of a research study are factors to consider when selecting a sampling method. If a study is conducted at one site and results are used to impact that one site, convenience sampling is an appropriate method to employ (Creswell, 2012; Lodico et al., 2010). To defend the use of convenience sampling of students, Druckman and Kam (2011) argued that the aim of a study, the timing of a study, and the opportunity for future study of conceptually equivalent relationships justify this sampling method.

Using Druckman and Kam's (2011) defense as a basis for my sampling method choice, I chose to employ a convenience sample for my study because the aim of my study was a single setting, ETCC, and the timing of my study was crucial due to the implementation of a new instructional mode for developmental mathematics. In addition, as noted by other research methods experts, the results from this sample were used to aid this specific setting to review policy and to produce a recommendation plan (Creswell, 2012; Druckman & Kam, 2011; Lodico et al., 2010).

Sample size plays a role in a study's credibility. For this study, an online sample size calculator was used to ensure an appropriate sample size (RaoSoft, 2014). I estimated a population of 20,000 full-time, first-time-in-college, African American male students enrolled in developmental mathematics. Furthermore, I set a standard 5% margin of error and 95% confidence level that estimated the minimum sample size for this study

as 377 participants (RaoSoft, 2014, para. 1). I extracted my study's sample from archival records, and the data set yielded a sample (N = 819) that exceeded the minimum number of required participants (N = 377).

The eligibility criteria for this study's participants followed the cohort policies used at ETCC that were established by and mandated by the Integrated Postsecondary Education Data System (IPEDS) reports (National Center for Education Statistics, 2014). These criteria included enrollment status, placement test score, course enrollment, and course completion. In order to be included in this study, participants needed the following characteristics: (a) full-time, first-time-in-college student enrollment status; (b) developmental mathematics placement test score; (c) at least one developmental mathematics course enrollment; (d) developmental mathematics course completion status achieved between Academic Year 2011 through Academic Year 2014; and (e) college credential completion status achieved between Academic Year 2011 through Academic Year 2014. Any participant who did not meet these specific criteria was excluded from this study.

The characteristics of the selected sample for this study included: ethnicity, gender, developmental mathematics mode of instruction, developmental mathematics completion status, and college credential completion status. All sample participants were African American males who completed developmental mathematics via either a lecture or a modular mode of instruction as well as completed college credentials. For this study, college credential completion was defined as being awarded a credential in the form of a

certificate and/or an Associates of Arts, Associates of Science, or an Associates of Applied Science degree.

Instrumentation and Materials

For this study, data were collected from archival records. After written permission was granted, these student records were obtained directly from the Director of Institutional Research of this study's setting, ETCC, a community college in east Texas. The developmental mathematics mode of instruction, lecture versus modular, completion data and the college credential completion data of African American male students from Academic Year 2011 through Academic Year 2014 were requested for analysis. The college's archival data were utilized for this study due to its accuracy and completeness; these records were certified by the study setting's Director of Institutional Research and had been previously submitted to ETCC's state reporting agency.

Data Collection and Analysis

A written petition was sent to the Chief Academic Officer/Provost and to the Director of Institutional Research at the setting of this study, ETCC, a community college in east Texas, asking for permission to collect and analyze data. Once permission was granted to collect and analyze data (Appendix B), I emailed a detailed request for the exact archival records that I needed for my study to the Director of Institutional Research. When I was notified by the Director that the data set had been extracted from the College's database, I went in person to the Director's office with a flash drive and received a direct download of the data set to that flash drive. All data that I received had been de-identified and placed in Excel spreadsheets. I used the data from the Director's Excel spreadsheets to

code participants in my own Excel spreadsheet according to their instruction mode (Lecture = *0*; Modular = *1*), to their developmental mathematics completion status (Yes, completed = *1*; No, did not complete = *0*) and their college credential completion status (Yes, earned an award = *1*; No, did not earn an award = *0*). The coded data were directly imported from Excel into the computer software package Statistical Package for the Social Sciences (SPSS) for data analysis.

I chose to conduct a nonparametric, chi-square test of independence to address the following research questions and to determine if I would reject or fail to reject my hypotheses based on the results of that test:

Research Question (RQ1)

> Is there a relationship between the mode of developmental mathematics instruction, lecture versus modular, and African American male community college students' developmental mathematics completion?

Null Hypothesis (H_0):

> The relationship between the mode of developmental mathematics instruction, lecture versus modular, and African American male community college students' developmental mathematics completion is independent.

Alternative Hypothesis (H_1)

> The relationship between the mode of developmental mathematics instruction, lecture versus modular, and African American male community college students' developmental completion is not

independent.

Research Question (RQ2)

Is there a relationship between the mode of developmental mathematics instruction, lecture versus modular, and African American male community college students' college credential completion?

Null Hypothesis (H_0):

The relationship between the mode of developmental mathematics instruction, lecture versus modular, and African American male community college students' college credential completion is independent.

Alternative Hypothesis (H_1)

The relationship between the mode of developmental mathematics instruction, lecture versus modular, and African American male community college students' college credential completion is not independent.

Via SPSS, a nonparametric, chi-square test of independence was employed "to determine if there was a significant relationship between two categorical variables" (Lani, 2014, para. 1). This study examined the relationship between an independent variable and a dependent variable. Developmental mathematics mode of instruction, lecture or modular, represented the independent variable. A developmental mathematics modular mode of instruction addresses a student's individual educational deficiencies, allows a student to progress at his own pace, and reduces time in remediation as the student completes assignments and tests that only he needs in order to progress to credit level

courses (Brown, 2011; Edgecombe, 2011). A developmental mathematics lecture mode of instruction is a traditional style of college teaching in which the professor talks while the students listen and take notes. In this mode of instruction, there is little to no interaction and/or individualized conceptual understanding because generalized content is presented to an audience in mass (MacIsaac, 2013). Developmental mathematics completion status and college credential completion status of community college African American males represented the dependent variable for this study. Developmental mathematics completion status was defined as course completion with a grade of D or higher. College credential completion status was defined as being awarded a credential in the form of a certificate and/or an Associates of Arts, Associates of Science, or an Associates of Applied Science degree by ETCC.

As is the case with SPSS and a chi-square test of independence, the values of the variables were represented in a two-by-two contingency table to show the statistical significance output for this study. For this study, it was important to note that there are two key assumptions to observe when using a chi-square test: independence and sample size (Deshpande, 2011, "Analytics," para. 1). With respect to independence, in a chi-square test of independence, correlated data cannot be tested (Deshpande, 2011, "Analytics," para. 3). It was expected that the data in this study would comply to the assumption of independence as only one measurement from each participant was obtained, and all observations were independent or non-aligned. With regard to sample size, the chi-square test of independence works well with large datasets, but if sample sizes are small, or if more than 20% of expected values in the contingency cells have

values <5, then a different test like Fisher's Exact Test may be more suitable (Deshpande, 2011, "Analytics," para. 2). It was expected that the data in this study would comply with the assumption of sample size as N =819.

Among researchers, there is a belief that both statistical significance testing and practical significance testing are needed in order to determine if relationships between variables are valid or are due to chance (Maher, Markey & Ebert-May, 2013; Nandy, 2012; Nye & Drasgow, 2011). In this study, the chi-square test of independence was used to determine statistical significance based on the p value of < .05 as moderate evidence needed to reject the null hypothesis (Maher et al., 2013, 2013; Nandy, 2012; Stephens et al., 2012). Additionally, the practical significance test, Cramer's V (also known as Cramer's phi) was conducted to determine effect size based on value ranges from *0* (no association between the variables) to *1* (complete association). The purpose of effect size is to measure the strength or magnitude of the relationship or association in a contingency table between variables (Maher et al., 2013; Nandy, 2012; Nye & Drasgow, 2011).

Research Findings

The purpose of this study was to explore the relationship between the mode of developmental mathematics instruction, lecture versus modular, and African American male developmental mathematics completion as well as to explore the relationship between the mode of developmental mathematics instruction, lecture versus modular, and African American male college credential completion at ETCC. A nonparametric, chi-square test of independence was performed to determine if there was a statistical

significant relationship (p = <.05) between the mode of developmental mathematics instruction, lecture versus modular, and African American male community college students' developmental mathematics completion and to determine if there was a statistical significant relationship (p = <.05) between the mode of developmental mathematics instruction, lecture versus modular, and African American male community college students' college credential completion.

In addition to the chi square test of independence test to measure statistical significance, adhering to preferred research practices (Maher et al., 2013; Nandy, 2012; Nye & Drasgow, 2011), I also used a Cramer's V test to measure the practical significance or strength of the relationship among the levels of the row and column categorical variables performed in the chi-square test of independence. Utilizing a Cramer's V to measure the strength of association is significant to any study because even if a chi-square test of independence showed statistical significance between two variables, the relationship between those two variables may not be substantively important (Sullivan & Feinn, 2012). Botsch (2011) provided guidelines to determine the strength of association: very weak (0 to 0.10); weak (0.10 to 0.19); moderate (0.20 to 0.29); strong (0.30 or above).

As illustrated in Table 1, 819 African American males attempted to pass or to complete developmental mathematics, but only 272 achieved successful completion of developmental mathematics at ETCC during the designated years of this study. Of the 272 African American males who successfully completed developmental mathematics,

162 (40%) achieved completion via the lecture mode of instruction and 110 (27%) achieved completion via the modular mode of instruction.

Table 1

African American Male Developmental Mathematics Instruction Mode Completed/Not Completed

		Completed/Not Completed					
		Completed		*Not Completed*		*Total*	
		N	*Percent*	*N*	*Percent*	*N*	*Percent*
Mode	Lecture	162	40%	245	60%	407	100%
	Modular	110	27%	302	73%	412	100%
Total		272	100%	547	100%	819	100%

A chi-square test of independence analysis, as illustrated in Table 2, revealed that there was a significant statistical relationship, as indicated by a p value of <.05, between the mode of developmental mathematics instruction and the completion of developmental mathematics for African American males, X^2 (1, N = 819) = 15.851, p = .000. Based on this statistical analysis outcome, I rejected the null hypothesis and concluded that these two categorical variables were not independent.

To test the strength of association for mode of developmental mathematics instruction and developmental mathematics completion for African American males at ETCC, I performed a Cramer's V. The value results of 0.1391 that represented the strength of the relationship between developmental mathematics mode of instruction, lecture versus modular, and African American male developmental mathematics

completion were determined to represent weak association based upon guidelines as detailed by Botsch (2011).

Table 2

Chi-Square Test of Independence for African American Males' Developmental Mathematics Course Completion

	Value	*df*	*Asymp. Sig. (2-sided)*	*Exact Sig. (2-sided)*	*Exact Sig. (1-sided)*
Pearson Chi-Square	15.851[a]	1	.000		
Continuity Correction[b]	15.266	1	.000		
Likelihood Ratio	15.923	1	.000		
Fisher's Exact Test				.000	.000
Linear-by-Linear Association	15.832	1	.000		
N of Valid Cases	819				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 135.17.

b. Computed only for a 2x2 table

During the designated years of this study, as illustrated in Table 3, 819 African American males attempted to complete a college credential at ETCC; however, only 19 (2%) actually completed a college credential. Of the 819 African American male students who attempted to complete a college credential, 407 attempted to complete developmental mathematics via a lecture mode of instruction. Of these 407 students, only 8 (2%) African American males who completed developmental mathematics via a lecture mode of instruction completed a college credential. Of the 819 African American male students who attempted to complete a college credential, 412 attempted to complete developmental mathematics via a modular mode of instruction. Of these 412 students,

only 11 (3%) African American males who completed developmental mathematics via a modular mode of instruction completed a college credential.

Table 3

African American Male Developmental Mathematics Instructional Mode and College Credential Completion

		Completed Credential					
		Yes		*No*		*Total*	
		N	*Percent*	*N*	*Percent*	*N*	*Percent*
Mode	Lecture	8	2%	399	98%	407	100%
Mode	Modular	11	3%	401	97%	412	100%
Total		19	2%	800	98%	819	100%

A chi-square test of independence analysis, as illustrated in Table 4, revealed there was not a significant statistical relationship, as indicated by a p value of <.05, between the mode of developmental mathematics instruction and college credential completion for African American males at ETCC during the designated years of this study, X^2 (1, N = 819) = .448, p = .503. Based on this statistical analysis outcome, I failed to reject the null hypothesis and concluded that these two categorical variables were independent.

Table 4

Chi-Square Test of Independence for African American Males' College Credential Completion

	Value	*df*	*Asymp. Sig. (2-sided)*	*Exact Sig. (2-sided)*	*Exact Sig. (1-sided)*
Pearson Chi-Square	.448[a]	1	.503		
Continuity Correction[b]	.191	1	.662		
Likelihood Ratio	.450	1	.502		
Fisher's Exact Test				.644	.332
Linear-by-Linear Association	.448	1	.503		
N of Valid Cases	819				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 9.44.

b. Computed only for a 2x2 table

Summation of the Results

The initial results of this study were expected. It was not surprising that the data supported the existence of the problem of a postsecondary achievement gap between African American males and other college students (Saenz, et al., 2011; Palmer & Davis, 2012). The results were consistent with the numbers and the percentages that have been presented in national and state reports and published in research journals. Thus, the data concluded that the same crisis exists at ETCC as it does for the rest of the nation with regards to unacceptable college completion rates for African American males.

The results for determining if the mode of instruction, lecture versus modular, had a significant impact upon the successful completion of developmental mathematics by African American males (RQ1), however, were surprising. As determined by chi-square

analyses, there was a relationship between mode of instruction and completion of developmental mathematics for African American males at ETCC. The data revealed that at this study's setting, more African American male students, 52 (13%), completed developmental mathematics with the lecture mode of instruction than with the modular mode of instruction. This outcome was unexpected because recent studies at other community colleges have indicated that individualized instruction with one-to-one faculty interaction as well as use of technology, which is the basis of modular instruction, could positively impact African American male course completion (Boatman, 2012; Edgecombe, 2011; Twigg, 2011). It was quite disappointing to learn that the efforts made by the college to implement a new method of instruction designed specifically to combat the lack of developmental mathematics completion by African American males had not been a successful strategy for this student population.

In addition, the results for determining if the mode of instruction, lecture versus modular, for developmental mathematics had a significant impact upon the successful completion of college credentials by African American males (RQ2) were even more perplexing. As determined by chi-square analyses, there was not a relationship between mode of instruction and completion of college credentials for African American males at ETCC. This outcome was unexpected especially since the literature has consistently documented that the lack of developmental mathematics completion is a prominent barrier for African American male college credential completion (Jett, 2011; Jett, 2012; Wood, 2012). The data revealed, however, that more African American males, 3 (1%),

who completed developmental mathematics with the modular mode of instruction completed a college credential at ETCC during the designated years of this study.

Although the results of this study contradicted the literature on developmental mathematics completion and on college credential completion, they confirmed that the postsecondary achievement gap between African American males and other college students is an extremely complex issue for community colleges to eradicate. Regardless of the difficulty, this racial and gender postsecondary achievement gap is a serious issue that directly impacts the nation's global rank and economic prosperity.

Even though the data concluded that more African American males, 52 (13%), completed developmental mathematics with the lecture mode of instruction, it also showed that more, 3(1%), of those male students who completed developmental mathematics with the modular mode of instruction completed a college credential. Since the modular mode of instruction is a new approach to developmental mathematics instruction and has only been utilized for a few semesters at ETCC, this information could suggest that the modular mode of instruction may be a promising strategy that needs time to be honed and developed in order to help more African American males succeed in completing developmental mathematics and college credentials.

The most important revelation illuminated by the results of this study was that ETCC must do more to address the issue of lack of developmental mathematics completion and lack of college credential completion by African American males; an instructional method is not a sufficient solution. The college must organize more

research studies, conduct more policy and practice analysis, and lead more discussions with stakeholders to improve African American male completion rates.

A first step in doing more was begun with the culminating project for this study. The project, a Policy Recommendation with Detail, as an outcome for Section 2 results and findings, will be ruminated in Section 3 with Appendix A displaying the entire project.

Assumptions, Limitations, Scope and Delimitations

Assumptions

This study is based on the assumption that valid and reliable data existed and could be obtained. A further assumption was based upon the belief that sufficient data existed in order to determine statistical significance.

Limitations

The following limitations impacted this study: Data sets were only available for one institution, so the ability to generalize the study's results was limited.

Scope of the Study

The scope of this study only included African American male developmental mathematics students who were enrolled at the study's setting from 2011-2014.

Delimitations

The following delimitations were included as a part of this study: Data from only one community college in east Texas (ETCC) was utilized in the study.

Protection of Participants' Rights

To ensure the protection of the participants, I completed The National Institutes of Health (NIH) Office of Extramural Research training course "Protecting Human Research Participants" (Appendix C) and will follow all guidelines set forth by NIH. I obtained archival data in an electronic media format that was stored on a flash drive. Security provisions were ensured by receiving the requested raw data via a direct download from the Director of Institutional Research to the flash drive. The accuracy of data collection was ensured with the utilization of a direct download of data from the institution to the researcher. All archival data requested and received was anonymous; there were no identifiers such as names, addresses, phone numbers, or email addresses of participants or the institution. The flash drive containing all data necessary for this study was stored in a locked, fire proof box within a locked file cabinet in my office. I am the only person who possesses keys to the file cabinet as well as to the lock box. After receiving the data, the only individuals who had access to the data were me and my supervising faculty at Walden University. After the five year minimum requirement for keeping raw data has passed, the flash drive will be deleted of all files and content.

Conclusion

In conclusion, Section 2 described the methodology of this project study, including the research design and approach, setting and sample, instrumentation and materials, data collection and analysis, research findings, assumptions, limitations, scope and delimitations, and steps taken for participant protection.

The following section, Section 3, is a description of the project, a Policy Recommendation with Detail, a rational for the project, literature review, implementation of the project, evaluation of the project, and implications for local and far-reaching social change.

Section 3: The Project

Introduction

In Section 1, I identified the problem of postsecondary achievement gaps between African American males and other college students with regard to the completion of developmental mathematics and to the completion of college credentials. In a review of current literature, guided by Ogbu's CE theory, I highlighted research that pertained to the variables of mode of instruction, developmental mathematics completion by African American males, and college credential completion by African American males that were explored in this study.

In Section 2, I revealed results from a chi-square test of independence analysis that indicated that the mode of instruction, lecture versus modular, practiced in developmental mathematics at the setting of this study was statistically significant, as indicated by a p value of $<.05$, for African American male developmental mathematics completion but was not statistically significant for African American male college credential completion. As is appropriate, the results and analysis of the chi-square test of independence, which is the most commonly used statistical test procedure to determine whether a significant association exists between two categorical variables (Creswell, 2012), performed in Section 2 provided the rationale for the project of this study which was the generation of a policy review and recommendation plan for developmental mathematics with the goal of improving African American male completion rates in developmental mathematics and college credentials.

Description and Goals

For this project, postsecondary developmental education policies at the state of Texas and at the local level at ETCC, the setting for this study, were reviewed with five objectives as the focus. The objectives were (a) to comprehend state policy, (b) to understand local policy, (c) to measure local policy against state policy, (d) to identify any discrepancies between state and local policy, and (e) to determine need for new local policy. Particular attention was directed to the way that policy drives practice on the college campus and how such practice can be used to narrow the achievement gaps that were identified in Section 1 and analyzed in Section 2 of this study between African American males and other college students.

The overarching goal of this project was to recommend policy to change and to improve practice to increase the African American male developmental mathematics completion rates and ultimately to increase college credential completion rates for African American males at the setting of this study. Appropriately, the resulting project of this study was a Policy Recommendation Plan with Detail offered to the college's executive administration and its governing board of trustees.

Rationale

The educational practice of continuous improvement is vital for institutions of higher education. Creswell (2012) asserted, "Educators strive for continual improvement" (p. 4). The philosophy and practice of continuous improvement has long been embedded in postsecondary institutions (Aggarwal & Lynn, 2012; Bass, Burger, Besenski, & Wttewaall, 2013; Franklin, 2014; Ruben, 2014). Continuous improvement calls for

periodic review and analysis of current policy and practice followed with recommendations for improvement (Clark, 2011). The cycle of continuous improvement is never-ending; it is intended to ingrain a mindset to perform observations of processes and practices, to assess processes and practices, to analyze pertinent data (qualitative and quantitative) related to processes and practices, and to discuss and reflect upon analyses of processes and practices in order to generate new and improved policy (Bass et al., 2013; Dougherly & Reddy, 2011; Hernandez, Roberts, & Menchaca, 2012). The acceptance of and assigned value to the continuous improvement model by the educational community prompted the choice of a Policy Recommendation Plan with Detail for this project.

Since the launch of President Obama's *College Completion Agenda*, the postsecondary climate is concentrated on continuous improvement. A spotlight has fixated attention from various stakeholders, whether it is the general public, state agencies or nonprofit foundations like the Lumina Foundation for Education and the Bill and Melinda Gates Foundations, on institutions of higher education effectiveness (Bragg & Durham, 2012; Engberg & Allen, 2011). Likewise, the theme of accountability has become a central focus for postsecondary policy and practice (Darling-Hammond, Wilhoit, & Pittenger, 2014; Rothstein & Mathis, 2013; Ruben, 2014; Teeters, Cleary, Doherty-Restrepo, & Odai, 2013). Accountability studies are a key component to analyze developmental education and college credential completion variables and to provide answers to stakeholders' questions. Furthermore, educational practitioners learn new ideas and new practices; gather data-based evaluations and recommendations for

classroom approaches; and accomplish recurrent enhancement of policies, processes, and practices from such research (Creswell, 2012). Developmental education accountability has garnered heightened significance in recent years due to its escalated need among postsecondary students, increased costs to deliver the instruction, and expanded time commitment as compared to college-level courses (Bragg & Durham, 2012; Dougherly & Reddy, 2011; Engberg & Allen, 2011). Stakeholders want to know the developmental education data and want the answers to developmental education questions for their institution of higher education. Based on work by Bettinger, Boatman, and Long (2013), stakeholder questions could include ones such as (a) How many students required remediation? (b) What are the disaggregated demographics for remediation? (c) Which subject garnered the highest enrollment in remediation? (d) How many students completed remediation? (e) Does remediation work; is it effective in facilitating college-level skills? (f) How many students completed college credentials after remediation? and (g) How many students who completed college credentials after remediation were subsequently employed in the field? For institutions of higher education to respond to stakeholder questions and provide proof of striving to adhere to accountability standards as well as implementing change when such standards have not been met, adopting and implementing the mindset and practice of continuous improvement is crucial to address accountability issues.

The problem of postsecondary achievement gaps between African American males and other students with regard to the completion of developmental mathematics and college credentials was addressed in the project for this study. Data outcomes that

were identified in Section 2 were considered to guide policy recommendations. Findings generated from data analysis and results presented in Section 2 of this study concluded, as indicated by a p value of <.05, that there was a significant relationship (p = .000) between mode of instruction for developmental mathematics and African American male completion of developmental mathematics but not a significant relationship (p = .503) between mode of developmental mathematics instruction and college credential completion for African American males. As the data outcomes indicated, there was some need for change in processes and/or practices in order to improve both developmental mathematics and college credential completion at the institution. Results prompted a question in my mind, "Is there a deficiency in processes and/or practices at ETCC in relation to developmental education that should be identified and rectified in order to improve achievement gaps between African American males and other students at the college?"

After conducting a review of the college's developmental education guidelines, The Policy Recommendation with Detail project was written to help ETCC, the study's setting, review current processes and practices as measured against required state policy to make changes and improvements in order to increase African American male completion of developmental mathematics and college credentials.

The Policy Recommendation with Detail project could be acknowledged as a starting point for acknowledging and addressing the problem of postsecondary achievement gaps between African American males and other students with regard to the completion of developmental mathematics and college credentials. After all, the end

result of this project was suggested changes that were based on research and data outcomes for the sole purpose of improvement.

Review of the Literature

To conduct the literature review for the project of this study, I employed a search strategy to use EBSCO databases and Google Scholar at Walden University Library to identify studies that included the following key words: (a) *continuous improvement*, (b) *higher education accountability*, (c) *higher education policy*, (d) *institutional effectiveness*, (e) *national higher education mandates*, (f) *policy recommendation*, (g) *state mandates for higher education*, and (h) *systems thinking*.

To reach saturation for the project literature review, I consulted peer-reviewed journals, current national reports, and academic databases. In addition, I accessed the following public, online data sources via Google searches: ATD, American Association of Community Colleges, Bill and Melinda Gates Foundation, Carnegie Foundation, Center for Community College Student Engagement, Community College Research Center, Complete College America, Completion Matters, Getting Past Go, Jobs for the Future, Lumina Foundation, MDRC, National Center for Developmental Education, National Center for Education Statistics, National Center for Postsecondary Research, National Center for Public Policy and Higher Education, Postsecondary National Policy Institute, State Higher Education Policy Database, The Texas Higher Education Coordinating Board, Texas Administrative Code, Texas Education Code, and The United States Department of Education.

To craft the project for this study, I chose the Policy Recommendation with Detail (position paper) genre to address the problem of postsecondary achievement gaps in developmental mathematics and college credential completion between African American males and other students. This genre is an appropriate choice for the project because it allows for the consideration of the data analysis results in Section 2 regarding a newly implemented mode of instruction in developmental mathematics and African American male performance, for review of campus level policy, processes and practices and for proposed solutions for change to those campus-level policy, processes and practices with the goal of improvement for student outcomes.

To situate the project within a scholarly frame, I embraced the continuous improvement model as a conceptual framework that is illustrated in systems thinking theory (Senge, 1990; Senge & Sterman, 1992). Senge (1990) introduced the world to the concept of the *learning organization* to conduct business. Using the concepts of engagement and reflection to create systems thinking, he advised a business model that involved growing the capacity of all employees in order for the group to work collectively toward a common goal. Additionally, Senge and Sterman (1992) applied the systems thinking concept to policy change in organizations, stating "one reason core policies remain unchanged is that the thinking underlying such policies remains unchanged" (p 1007). Embracing Dewey's full learning cycle (discover – invent – produce – reflect), systems thinking produces an approach to policy change that uses mental models for simulation decision-making experiences which allows for the development of the skills needed to assess the impact of those decisions well into the

future (p. 1008). Quoting Stata (1989), Senge and Sterman (1992) reiterated that learning may be the only sustainable competitive advantage for an organization (p. 1007). The systems thinking approach is a sound theory for institutions of higher education to empower employees to become change agents who make collaborative decisions, generate strategic plans and change policy to intentionally create the desired future. Invoking this method of thought could easily support the practice of continuous improvement for higher education policy reform.

Systems Thinking

As is with any belief, there are always opposing views. While many support the 1990 work of Senge (Bass, 2012; Fazey, 2010; Marshall, 2010; Stephens & Graham, 2010; Vincent & Focht, 2011; Wang & Wang, 2011), others like Caldwell (2012) dispute its relevance and effectiveness. Caldwell (2012) insisted that the concept of systems thinking is an invalid theory that began as a moral promise and has become disillusionment for scholars and practitioners. The resistance to the systems thinking model stems from the idea that learning is a complex action that involves the capacity to learn as well as psychological and cognitive behaviors; therefore, the question of motive arises: Can learning be detached from individual self-interests in order to make decisions and facilitate change for the good of the whole organization? Directly paraphrasing Caldwell (2012), the systems thinking model is problematic because the individual and the organization cannot be truly linked; in this hierarchal model, learning and knowledge acquisition is defined and controlled by leaders (p. 159). Although Caldwell is not a fan of Senge's learning model for decision making, I do believe that it is a valuable practice

for implementing the cycle of continuous improvement and policy reform for institutions of higher education.

One study (Marshall, 2010) contributed to my support of the systems thinking model, especially with regard to the use of technology in relation to policy reform and to the learning process at institutions of higher education. In this study, a visual approach known as e-Learning Maturity Model (eMM) is demonstrated as a method for determining the sustainability of technology-driven instruction so that stakeholders can make "systemic and targeted" change and improvement (p. 183). The study further acknowledged that the concept of change is synonymous with the use of instructional technology and posed the question of change as a response to external forces like new technology, accountability, and stakeholder demands. Finally, the study posited that institutional decisions change the nature of the student experience, so leadership is vital to enable a collaborative decision-making system that encourages innovation and change.

The theoretical framework of systems thinking (Senge 1990; Senge & Sterman, 1992) along with the research of Marshall (2010) guided my project. ETCC is undergoing external pressure from stakeholders with regard to developmental education, especially developmental mathematics performance and racial and gender achievement gaps. Changes in policy, processes and practices are necessary in order for the institution to meet and exceed stakeholder expectations. Using an approach that celebrates continuous improvement followed by policy reform for the good of the whole organization is a wise practice for postsecondary institution leadership.

Implementation

To implement my project, a Policy Recommendation with Detail, on my campus, it must be presented to the governing bodies, policy makers and decision makers. The first step will be to submit a request to the Provost and Vice President of Student Affairs to discuss the project at one of the weekly Academic and Student Affairs Leadership Team meetings. Discussing the project at this meeting will provide information to Deans and Directors of the college. Feedback from my peers will be solicited and used to make any revisions deemed necessary by this leadership. Next, a request will be submitted to make a presentation to the Executive Cabinet, which consists of Vice Presidents and Executive Directors of the college, at their weekly meeting. Again, feedback will be solicited and used to make any revisions deemed necessary by this leadership. The third step to execute the project will be securing permission from the Executive Cabinet to appear before the Board of Trustees at the college's monthly meeting in either the open or closed session to present the project and answer questions. Once again, feedback will be welcomed and implemented. Finally, after ensuring that the project and its policy recommendations have the support of my peers, the executive leadership team and the Board, formal paperwork will be completed and submitted to request the adoption of the project and its recommended changes as policy beginning the following fall semester.

Potential Resources and Existing Supports

Support and resources exist to implement my project. The strongest support is the Texas Higher Education Coordinating Board (THECB). This board governs policy and practice of postsecondary institutions in the state. Recently, the THECB mandated

success-based funding for community colleges which requires institutions to accumulate success or momentum points in order to receive state appropriations. The completion of developmental mathematics is now a funding source, so my project will be viewed as a venue to uphold the new state mandate. The Board of Trustees and campus administration will also be potential resources if they interpret my project as a way for the college to comply with the state as well as secure financial support for the college. Additionally, the greatest campus level resource that can provide support for successful and sustained implementation of my project is TRiO, a federally-funded student support services grant that has been renewed consistently for over 20 years at ETCC. TRiO is designed to assist low income students, first generation students, and students with disabilities in the completion of college credentials. The TRiO Director and staff on my campus are experts with using a college student case management style to provide instruction with meaningful student-faculty interaction that elicits academic success.

Potential Barriers

After careful consideration, I have identified two potential barriers that could impede the successful implementation of my project. The first barrier pertains to the recommendation to mandate first semester enrollment in developmental mathematics for those students whose assessment scores place them in developmental education. State policy says that local institutions *may refer* students to developmental education *as considered necessary*. The college may see this recommendation as more forceful than the state intended institutions to be and then be hesitant to take the stance of mandating enrollment; furthermore, students who place into developmental education may resist,

protest, and appeal the mandate of first semester enrollment in developmental mathematics in order to avoid the course out of fear and/or disdain for the subject.

The second potential barrier to successful implementation of my project on my campus concerns funding. The college will have to give institutional priority for the needed financial commitments in the annual budget to fund the recommended changes. There will be monetary increases required in the following areas: (a) human resource advertising in national diversity venues for faculty recruitment, (b) personnel costs to establish a new department for equity and diversity, (c) personnel costs to add teaching assistants as well as peer tutors to the developmental mathematics classrooms and Math Center, (d) professional development costs to train faculty and advisors in the creation and use of individual student success plans and (e) special event costs to host African American male initiatives that promote inclusion and belonging.

Proposal for Implementation and Timetable

The time required to implement the project is estimated to be six months with a timetable beginning in the month of March of a spring semester. One month will be required to complete the presentations of the project to the policy and decision makers on campus: The presentation to the Academic and Student Affairs Leadership Team will be scheduled for the first week of the month. The presentation to the Executive Cabinet will be scheduled for the second week of the month. The third week of the month will be utilized to make any revisions to the project that are needed and to request an appearance before the Board of Trustees. The presentation to the Board will take place during the fourth week of the month at their regular monthly meeting. One month will be required

to receive an official position from the Board for their adoption of the recommended changes in policy and to publicize the changes in printed and online materials. Three months will be required for advisor and faculty training to be completed before the spring semester ends in order for the new policy, processes and practices to be in effect for the beginning of the fall semester.

Roles and Responsibilities of Student and Others

Several groups on campus must accept their roles and responsibilities for successful and lasting implementation of the project. The groups include administrators, advisors, faculty and students. Administrators must provide financial support for the new practices and enforce the new policy. Advisors must develop a well-defined understanding of the new policy, processes and practices and be able to clearly explain them to students. Faulty must commit to professional development and training to embrace diversity, cultural sensitivity and inclusiveness in the classroom. Students must comply with policy and enroll in developmental mathematics during their first semester on campus, seek assistance in the classroom, in the Math Center, during faculty office hours and/or at the Tutoring Center, and attend social campus activities intended to boost African American male success.

Project Evaluation

To fully embrace the concept of continuous improvement, a plan to evaluate the success and effectiveness of my project is necessary. As overviewed by The University of Texas at Austin (2011), evaluation is important because it can ensure quality, conclude the impact on participants, determine the continuance of funding and provide for future

recommendations for improvement. To assess the effectiveness of my project, I will conduct an outcomes based evaluation on a semester-by-semester basis.

At the end of each semester, I will submit a request for data to the Director of Institutional Effectiveness and Research in order to quantitatively measure the outcomes of the project. Specifically, I will examine placement versus enrollment numbers of first-time-in-college students. I will compare the number of students whose assessment test scores placed them in developmental mathematics to the number of students who actually enrolled in developmental mathematics to determine if students are complying with the mandatory first semester enrollment policy. In addition, I will examine the semester course pass rates for developmental mathematics and compare them to previous course pass rates that were documented before the implementation of the new policy. Finally, I will examine 3-year, 4-year and 6-year college credential completion or graduation rates and compare them to previous completion rates that were documented before the implementation of the new policy. Being able to quantify an increase, a decrease or no change in enrollment, course pass and graduation rates should provide valuable feedback to judge the effectiveness of the project.

Implications Including Social Change

Local Community

Social change begins in one's own community. In my local community, employment opportunities are more diverse and readily available than ever. The local economy is driven by industries such as communications, engineering and health care as well as advanced manufacturing and processing. All of these industries require education

and knowledge above a high school diploma. My project can be significant to the local community because it recommends policy, processes and practices to assist all community members, regardless of race or gender, to complete the college credentials that are needed to secure rewarding employment. Furthermore, the project is significant to ETCC, the setting of this study, because it will afford the college the ability to meet state mandates and goals as well as receive funding opportunities that are now performance-or success-based. Finally, the project will be important to instructors and administrators because it will instill a sense of pride knowing that we will be doing our part, starting in our own community, to eradicate educational and economic disparity.

Far-Reaching

Racial and gender inequality in institutions of higher education is a social injustice. These institutions and their hallowed halls are supposed to be advocates for enlightenment and personal growth. If equality is not found here, then where can it be expected? It is common knowledge that postsecondary access followed by success in the form of a college credential is not only the pathway to enlightenment, but also to prosperity for individuals in the U.S. Today, the American and the global labor market demands technical as well as industry-specific specialized skill sets and aptitudes. Both of these required competencies for gainful employment are honed in a higher education setting; therefore, it is imperative that in this setting, above all others, that racial and gender disparity be eliminated. If one sector of the United States population, such as African American males, does not succeed in achieving college credentials, then the entire country is put at risk socially and financially. With regard to far-reaching

implications for this project, it is sincerely hoped that the policy recommendations that were made will be significant to other college administrators who seek to purge academic achievement gaps between African American males and other students.

Conclusion

Section 3 was devoted to the project or actual deliverable of this study: A Policy Recommendation with Detail. This section began with a description of the project and included the project goal which was to change and to improve African American male developmental mathematics completion rates, since these rates have been directly linked to college credential completion. The rationale of embracing the continuous improvement model and practice was explained as a tool to address stakeholder accountability and expectations. The conceptual framework for the project which incorporated systems thinking theory was detailed. A six month implementation plan was itemized including resources, barriers, and roles and responsibilities. An outcomes-based evaluation plan was noted to ensure the effectiveness of the project. Finally, Section 3 concluded with comments on local and far-reaching implications for social change that were a possibility for this project. The following section, Section 4, provides reflections on the project, on my experiences and thoughts as a research practitioner, on social change and on implications for future research.

Section 4: Reflections and Conclusions

Introduction

In this study, I addressed the postsecondary achievement gaps between African American males and other students at a community college in East Texas by collecting and analyzing developmental mathematics performance data and college credential completion data. A chi-square test of independence was performed to determine if a statistically significant relationship, as indicated by a p value of $<.05$, existed between the two categorical variables: mode of instruction versus developmental mathematics completion and mode of instruction versus college credential completion. In turn, results from this data analysis along with the conceptual framework of systems thinking theory provided the rationale to craft a Policy Recommendation with Detail project with the intent of instituting policy change and improving African American male student outcomes.

Section 4 concludes this study by discussing the strengths and limitations of this project study and the considerations for alternative approaches to the problem. A significant part of Section 4 is devoted to personal reflections and lessons learned, and the section is finalized with implications for social change and future research considerations related to the problem of postsecondary racial and gender achievement gaps that were explored in the study.

Project Strengths

The greatest strengths of this project deliverable, a Policy Recommendation with Detail, are its timely and relevant nature and its solid demonstration of the continuous improvement model in higher education.

First, the foundational strength of this project study is its timely and relevant nature. Racial and ethnic demographics have changed in the United States. A country that was once predominately Anglo is now much more diverse, and population forecasts have predicted that Anglos will make up less than 50% of the U.S. census by 2050 (Ortman, Velkoff, & Hogan, 2014; Palmer et al., 2010). Racial equity is more important now than ever in U.S. history, especially in regard to employment in the labor market. Gender equity has become as important as racial equity in relation to the U.S. economy and growth. A mathematically-competent and technically-advanced workforce is essential for the United States to remain a global leader among nations and an international economic competitor (Autor, 2011). Men and women of all races are needed to complete college credentials in the form of a certificate or a degree, depending on the industry requirements, for the well-being and the future of the United States; however, this postsecondary achievement is not occurring in equal proportions among gender or race. African American male college credential completion and labor force participation is far less than African American females and males and females of all other races (Carnevale & Rose, 2011). Furthermore, the majority of African American males use the public, 2-year community college path to higher education because it is an open admissions route that also provides developmental education or remediation in basic skills that are required

to successfully complete college-level coursework to earn a certificate or degree (Wood, 2012). Moreover, developmental education (developmental mathematics, in particular) has been identified as one of the principal barriers to college credential completion (Bonham & Boylan, 2011; Davidson & Petrosko, 2015).

There are running debates in the literature, as well as in public media, as to whether developmental education is effective and whether it should continue as a discipline in higher education (Bailey & Cho, 2010; Bruch & Reynolds, 2012; Crisp & Delgado, 2014; Wolfle & Williams, 2014). As a result, several philanthropic and nonprofit organizations such as the Bill and Melinda Gates Foundation, the Carnegie Foundation, and the Lumina Foundation have sponsored studies and nationwide initiatives like ATD to address the issues of developmental education as well as racial and gender inequity in college credential completion (Bragg & Durham, 2012). As a result, many community colleges, like ETCC in this study, have instituted policy and practice reforms in order to address inequities. A study like this one is, therefore, timely and significant for those who are searching for practices that successfully remediate African American males in developmental mathematics and thus eliminate one of the barriers to college credential completion for this group of students and potential employees who are needed in the workforce.

Additionally, the most important strength of this project is that it is a solid example of the continuous improvement model in higher education. The continuous improvement model as applied to higher education is an infinite cycle of periodic review of policy, process, and practice; data analysis related to policy, process, and practice; and

recommendations for change and improvement to policy, process, and practice (Clark, 2011; Dougherly & Reddy, 2011; Hernandez, et al., 2012). Historically, the practice of continuous improvement by institutions of higher education is not only valued but expected (Bass, et al., 2013; Franklin, 2014). Public institutions such as these are responsible for equipping citizens with the necessary and needed skill sets to participate in the growth and sustainment of the economy; therefore, institutions of higher education such as community colleges must not become stagnate in the ways in which they operate. In the higher educational climate, stakeholders demand accountability and want information in relation to academic achievement as well as solutions for gaps in academic achievement (Darling-Hammond, et al., 2014; Rothstein & Mathis, 2013; Ruben, 2014; Teeters et al., 2013). This demonstrates the key components for continuous improvement: a clear and straightforward analysis of policy, the need for change driven by data, and policy revision recommendations rooted in research as well as a commitment to stakeholder accountability.

Although the project has several strengths, one weakness that can be noted is the lack of national policy analysis along with the state and local policy analysis. In the past 2 to 3 years, developmental education effectiveness and accountability has received amplified attention on a national level (Bragg & Durham, 2012; Dougherly & Reddy, 2011; Engberg & Allen, 2011). To support this project with a more national perspective, information from national agendas, legislation, and organizations could have been included. Furthermore, states such as California, Connecticut, and Virginia have engaged in policy, process, and practice analyses and made changes to developmental education at

their institutions of higher education (Quint, Jaggers, Byndloss, & Magazinnik, 2013; Venezia & Hughes, 2013). In order to situate this project in a nationalized viewpoint, comparisons of other states' policies and recommendations for change could have been addressed.

Recommendations for Remediation of Limitations

One limitation in addressing the problem of postsecondary achievement gaps between African American males and other students in this project study is the research method that was used. This study was a quantitative study, so it only provided numerical data results. As noted by Creswell (2012) and Lodico et al. (2010), quantitative researchers summarize data using numbers rather than interpreting themes or patterns as qualitative researchers do. Because the quantitative method was used, there were no in-depth emotions and no student voices to be heard as would have been present in a qualitative study. If I were to complete the study again, or if someone else were to replicate my study, I would suggest a mixed methods approach. I would follow up the numerical data analysis with interviews and focus groups to be able to include a verbal prospective to the study. As explained by Lodico et al. (2010), a mixed method research study combines the strengths of qualitative and quantitative studies by providing a narrative that provides rich descriptions and context with precise numerical outcomes (p. 282).

Another aspect of this study that could be viewed as a limitation by some researchers is the correlational research approach and statistical test that were used. If I were to conduct the study again, or if another researcher were to replicate my study, I

might suggest using a causal-comparative approach and use statistical controls for extraneous variables such as the use of multiple regression or analysis of covariance (ANCOVA; Creswell, 2012; Lodico et al., 2010). The causal-comparative approach would be appropriate because it addresses research questions about experiences that have already occurred such as course pass rates and tests groups that cannot be randomly assigned (Lodico et al., 2010, p.212). Likewise, the use of ANOVA or multiple regression would be appropriate to evaluate the effect of the mode of instruction implemented in developmental mathematics against the completion rates of African American males as statistical controls could account for the size of effects on the independent variable and the presence of extraneous variables on the dependent variable (Lodico et al., 2010, pp. 212-213). Some researchers may feel that this suggestion for limitation remediation is preferable to the original methodology of this study.

Scholarship

When I began my doctoral journey at Walden, I did not comprehend the academic transformation that I would undergo. Having been a professional in the field of education for over 20 years, I was confident about the workplace decisions that I had made first as a faculty member and later as an administrator. As my doctoral journey progressed, however, I came to the realization that I had primarily formed opinions and made decisions based upon knowledge gained from experience rather than from experiments. As the writing began for the Prospectus for this project study, I suddenly realized that although I considered myself established in my field, I had not been engaged in the scholarship of my field.

As a typical adult learner who exhibited Knowles' characteristics and assumptions as outlined by Ross-Gordon (2011), I began this doctoral project as a self-directed learner who brought prior experience to a learning environment that I viewed as problem-centered (p. 28). I needed to solve the problem of lacking a doctorate and thus was motivated to learn. However, when the research and hours of reading and reflecting began, the idea that I should base my opinions and actions upon previous and published studies that had been peer-reviewed became cemented in my thought processes. Asking, "What does the literature say?" will now be second nature for me. After the Proposal defense, I came to understand that professional worth and merit are solidified through scholarship. Being able to explain what you believe and how those beliefs are supported in the literature is the key to becoming trustworthy as a scholar. That being said, where I began this doctoral journey, and where I ended it are very different places. After completing this project, I feel justified to say that I am a scholar and an educational practitioner. I understand that this project study should just be the beginning of my scholarly publications and contributions.

Project Development and Evaluation

By completing this study, I have learned that project development is an arduous process. I now know that it is imperative to construct a schedule to ensure adequate time for research, reading, reflecting and writing and that organization of the research findings is vital. As noted by Brookfield (2013), critical thinking, especially taking informed action, is essential to the end product. Most importantly, I learned that to survive the project development process and produce a laudable project, it is imperative to have a

step-by-step plan. The plan that I devised to complete this project had six steps: (a) conducted review of state policy, (b) conducted review of local policy, (c) measured local policy against state policy and identified discrepancies, (d) conducted review of local processes and practices, (e) measured local processes and practices against policy, (f) generated Policy Recommendation with Detail that also included an evaluation plan. To create the deliverable of this study, I followed Creswell's (2012) instruction for writing a policy report including highlighting key findings, summarizing with bullet points, using graphs and adding an executive summary to make sure that my project adhered to industry standards (pp. 271-272). Finally, I became aware that the evaluation plan should not be an afterthought in the process; it should be designed to encourage the scholarly practice of continuous improvement.

Leadership and Change

The knowledge and skills with regard to leadership and change that I developed while completing this project were the most exciting and relevant part of this journey. These skills will serve me well in my administrative position at my community college. I will embrace the theory of systems thinking (Senge 1990) that I learned as I lead my area of the college. I believe that motivating and leading the group to work toward a common goal will be more productive for faculty and staff, for students and for the college itself. I have learned to base the need for change on data. As a leader, I will model the development and utilization of a data-driven mindset to effect change as a purposeful approach that is logical for others to follow. It will now be my practice to present the data to faculty and staff, have conversations about the data and work collaboratively to

generate a plan for policy and practice reform. Using a scholarly style to fulfill the responsibilities and complete the duties that come with my position will garner respect for my area of the college and for my leadership abilities. With regard to leadership and change, the greatest lesson learned while completing this study was that theory and practice are best when combined to accomplish professional goals.

Analysis of Self as Scholar

My experience of completing this doctoral project study is articulated by Wilkins (1954), quoting Joseph Addison who posited, "What sculpture is to a block of marble, education is to the human soul." This process has molded me into a scholar. I believe that the endless days and nights of reading and writing for the past five years developed the permission to identify myself as a scholar with expertise in the field of higher education. I have broadened the scope and depth of my theoretical knowledge in different areas such as adult learning, higher education, developmental education, race, gender and educational policy which I will use as I continue my professional growth. I have honed my critical thinking skills, increased my vocabulary and developed my voice for academia. I have also learned while completing this process to be more rational and less emotional, to get the work done—no excuses, to not take criticism personally, to see issues from varying perspectives, and to squash self-doubt. I have developed the confidence to defend my decisions and thoughts because they are now research-based. Most importantly, as a scholar, I have learned the art of resilience and perseverance, and I am proud of completing this lifelong goal.

Analysis of Self as Practitioner

I have reached the conclusion that the most significant part of the doctoral process at Walden is the project or actual deliverable that originated from the research. Unlike a traditional dissertation, the added component of having to produce an example of your work that is designed to be presented to and to be utilized by the institution provides a concrete opportunity to immediately demonstrate your scholarly knowledge and skill. The production of the project will promote me as a practitioner. This experience has groomed me for my role as a community college leader; I am now ready as a practitioner of theory and research to take action. I am prepared to plan, to strategize, to operationalize, to account for setbacks, to have a plan B and a plan C, to analyze statistics, to make research-based decisions and to implement plans and new projects to improve lives in my community. After commencement, I will continue to use the knowledge gained from this experience to establish myself as a practitioner who, defined by Lodico et al. (2010), will influence and change practice, improve teaching and learning and enhance the lives of others (p. 329). I have learned that a practitioner can make a real difference in the world.

Analysis of Self as Project Developer

Binet, translated by Heisler (1975), asserted, "With practice, training, and, above all, method, we manage to increase our attention, our memory, our judgment and literally to become more intelligent than we were before" (quoted by Dweck, 2006, p. 5). Through the experience of writing this study and creating the project, my intellect was amplified, and I was empowered as a project developer. While navigating and

comprehending state legislative rulings, statutes and laws in order to write the policy recommendation with detail, I discovered that I am quite analytical. I was also able to confirm that my research skills were above par as I was consistently able to find resources that I needed. I reached the conclusion that I enjoyed the process of project development because it facilitated growth and change through application and experience and thus cultivated what Dweck (2006) calls a growth mindset. More importantly, the ability to advance my talents as a project developer coincided with an opportunity for me to embrace and demonstrate the American Association of Community Colleges' six core competencies of community college leaders documented by Nevarez, Wood and Penrose (2013) as (a) organizational strategy, (b) resource management, (c) communication, (d) collaboration, (e) advocacy and (f) professionalism. Thanks to this experience, I am not only confident that I am ready to accept the challenge to lead initiatives and develop projects in a scholarly manner on my campus, but also see it as my responsibility to the institution, the faculty and staff and the students to do so. This experience truly gave new meaning to the old saying practice what you preach.

The Project's Potential Impact on Social Change

Developmental education has existed in the junior or community college setting since these doors of academia opened to the public (American Association of Community Colleges, 2014c, para. 5). Although developmental education has been a vital component for open access to higher education, there is recurring debate about the value and effectiveness of these programs especially in comparison to their cost and their ability to advance those in need of remediation to college credential completion (Bailey & Cho,

2010; Barbatis, 2010; Rutschow & Schneider, 2011). Consequently, national, state and local policy makers continually suggest reforms to existing policy, processes and practices for developmental education. A survey of the literature for this study revealed that current national and state trends support the elimination of developmental education or at the very least the acceleration of it (Boatman, 2012; Edgecombe, 2011; Twigg, 2011). Oddly enough, the literature showed that developmental education, especially developmental mathematics, tends to be a barrier to, rather than a pathway to foster, college credential completion (Bahr, 2013; Bonham & Boylan, 2011; George, 2010; Howell, 2011; Mesa, 2012). The importance of developmental mathematics completers in the state of Texas is undeniable; the state legislature attached financial significance in the form of funding to its community colleges based on completion rates of these courses. In addition to financial significance, developmental education, especially developmental mathematics, is documented as perpetuating racial and gender inequities; a higher percentage of African American males in comparison to all other college students require at least one developmental mathematics course and are unsuccessful at completing it (Wood, 2012). Reflecting on the overall importance of this project study, I am proud to have contributed to the body of research that appreciates developmental education and values its worth in the life of an individual student.

The potential impact of this project on social change at the local level is great. First of all, it can serve as a much-needed conversation starter on the need for diversity and cultural sensitivity on the campus. The project could promote a meeting of the minds (administration, faculty, staff, and students) to positively address inequities of gender and

race on campus. It has the ability to foster an atmosphere of inclusion for African American males which could lead to fewer disciplinary issues between students as well as between students and faculty being referred to the Dean of Students and to the Judicial Board. Less disciplinary issues lead to higher retention rates of African American male students and higher retention rates lead to more credentialed African American males to join and to boost the local economy as employable workers. Finally, this project will foster the complexity of meeting state goals and mandates in order to receive maximum state funding for the college. Beyond the ETCC campus, the potential impact of this project is promising for other community colleges who seek a best-practice solution to challenge postsecondary achievement gaps between African American males and other college students.

Implications, Applications, and Directions for Future Research

Future research is warranted based upon the outcomes of this project. Although the data showed a statistically significant relationship between the modular mode of instruction and African American male completion of developmental mathematics, it did not show a statistically significant relationship between the modular mode of instruction and African American male college credential completion. Research literature has concluded that college credential completion by African American males is one of the most critical factors for the economic prosperity of the United States. Treuhaft, Scoggins and Tran (2014) stressed that economic racial inclusion could add $2 trillion to the annual U.S. economy (p. 4). For the social and financial well-being our the nation, future research should include replicating this study and adding a qualitative to the existing

quantitative approach; a mixed methods approach would allow for African American males to tell their own story and to give testimony as to the reasons for leaving the community college setting before securing their college credentials. A mixed methods approach could give birth to new ideas, projects, practices and policies needed to remedy the travesty of postsecondary achievement gaps between African American males and other students.

Conclusion

Section 4 afforded the opportunity for scholarly reflection of this project study. The project's strengths and limitations were addressed and recommendations for alternative studies were discussed. I performed an analysis of self through various lenses including leader, change agent, scholar, practitioner, and project developer. I reflected on the overall importance of this project study as it related to higher education with special emphasis on developmental education, race, and gender. I concluded this section with applications that can be made to the field of education and suggestions for future research. I hope that this project study has inspired others to pursue the doctoral journey for personal and professional growth and to give thoughtful consideration for taking action to be a catalyst for social change.

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Appendix A: Policy Recommendation with Detail

Policy Recommendation with Detail

A Review of Developmental Education Instructional Policy and Practice to Increase African American Male Developmental Mathematics and College Completion Rates

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July 2015

Executive Summary

Over a decade ago, Callan (2002) asserted, "College has become the gateway to full participation in American life, and the stakes in maintaining and enhancing college opportunity have never been greater" (p. 20). In order for all Americans to participate in college, however, developmental education has been a required component of postsecondary education because not all of the students who enrolled in college possessed the requisite skill sets to complete college-level coursework. In the current decade, developmental education has emerged as a prominent postsecondary educational policy issue. There is no denying that developmental education is a major responsibility for community colleges and a major concern for stakeholders such as tax payers, state governments, and philanthropic organizations (Boylan & Saxon, 2012). Debate continues over the effectiveness of these courses, and more importantly, over whether these courses should continue to be offered at institutions of higher education (Bailey & Cho, 2010; Barbatis, 2010; Rutschow & Schneider, 2011). The impact of college credentials on the U.S. economy, however, has directed attention to the need for effective and efficient developmental education for any man or woman regardless of race or ethnicity. In the global race for knowledge, technological advancement, and economic power, the U.S. has fallen behind (Brenneman et al., 2010; Dougherty et al., 2014; Southern Regional Education Board, 2010). The shortage of mathematical and critical thinking skills has been identified as an obstacle for many citizens to secure gainful employment. Public reports and data have shown that African American males more than any group in the U.S. lack mathematical skills to the degree that they require

remediation (Autor, 2010; Wood, 2012). Likewise, the need for more workforce-ready graduates has driven efforts to reform developmental education, especially developmental mathematics for African American males, in order to decrease postsecondary achievement gaps and increase college credential completion.

Introduction

This report, a Policy Recommendation with Detail, fulfilled the capstone project requirement at Walden University for a Doctorate of Education in Higher Education with a specialization in Adult Learning.

The research study at Walden required doctoral students to identify a local problem, provide evidence of the problem, explain the significance of the problem, situate research within a theoretical framework, develop questions to guide research, and conduct a literature review of the problem. Additionally, students were required to choose a research method and design, collect and analyze data, and develop a project based upon results from data analysis that would promote social change on the local and far-reaching levels. This report was the project that was derived from the data analysis of the approved study (Walden IRB Approval 07-18-14-0023788) entitled, "The Relationship between Developmental Mathematics Instructional Mode and African American Male Completion Rates."

The local problem that prompted this project study was identified in a data review that was conducted in order to submit an application for [redacted] to join Achieving the Dream (ATD). ATD is a national initiative that is designed to eliminate gender, minority, and socioeconomic achievement gaps among community college students (Achieving the Dream, 2014a, para. 1). In the college's review, data revealed racial and gender achievement gaps: It was discovered that African American males had the highest placement and the lowest completion rates in developmental mathematics. This type of postsecondary achievement gap, as documented in state reports, ultimately led to

diminished college credential completion by African American males at [redacted] (Texas Higher Education Coordinating Board, 2012).

In the fall of 2010 the total male, full-time, first-time-in-college population was 6% Caucasian and 4% African American (Texas Higher Education Coordinating Board, 2012). The degree completion rate for full-time, first-time-in-college, Caucasian males who enrolled at ETCC in fall 2010 and completed a credential in spring 2014 was 12% compared to only 3% for their African American counterparts (Texas Higher Education Coordinating Board, 2012). Data demonstrated that smaller proportions of African American male students completed credentials at [redacted] when compared to other students, thus documenting that African American males had the lowest college credential completion rates at the college.

Accepting the gravity of the data and its academic achievement discrepancy among races and gender, in 2010, the [redacted] Board of Trustees approved the college's request to join ATD. The first ATD requirement was the development of a student success plan that featured interventions for areas of concern as identified by data. College efforts were concentrated on improving the outcomes for developmental mathematics; likewise, curriculum redesign became ATD Priority 1. [redacted]'s efforts are documented in the ATD Interventions Showcase:

> The DMTH 0301/0302 developmental math curriculum redesign included: (1) alternative instructional design methods, (2) diagnostic testing for placement into specific content modules. Redesigned and expanded math

> lab facilities staffed by math instructors provided students with technology access and academic support for module based learning. (ATD, 2014b)

For Intervention 1 of Priority 1, [redacted] implemented a new mode of developmental mathematics instruction: modular. Modular instruction is designed to be individualized and competency-based, usually via a technology-based delivery mode (Edgecombe, 2011). Furthermore, to support the new modular mode of instruction, the college converted four of the traditional lecture classrooms to computer-assisted classrooms. [redacted] took measures needed to improve developmental mathematics completion, and ultimately, college credential completion in order to be able to contribute to the nation's 2020 college completion agenda goals as well as to be able to supply competent employees to secure the nation's economic future.

The purpose of this project study was to explore the relationship between the mode of developmental mathematics instruction, lecture versus modular, and African American male developmental mathematics completion as well as the relationship between the mode of developmental mathematics instruction, lecture versus modular, and African American male college credential completion at [redacted] to determine if the mode of instruction was associated with increased success for this group of students.

For this study, the developmental mathematics mode of instruction, lecture versus modular, completion data and the college credential completion data of African American male students from Academic Year 2011 through Academic Year 2014 were requested from archival records for analysis. Data were coded and directly imported from Excel

into the computer software package Statistical Package for the Social Sciences (SPSS) for data analysis. Next, a nonparametric, chi-square test of independence was conducted to address the following research questions and to determine if the hypotheses would be rejected or fail to be rejected based on the results of that test:

Research Question (RQ1)

Is there a relationship between the mode of developmental mathematics instruction, lecture versus modular, and African American male community college students' developmental mathematics completion?

Null Hypothesis (H_0):

The relationship between the mode of developmental mathematics instruction, lecture versus modular, and African American male community college students' developmental mathematics completion is independent.

Alternative Hypothesis (H_1)

The relationship between the mode of developmental mathematics instruction, lecture versus modular, and African American male community college students' developmental completion is not independent.

Research Question (RQ2)

Is there a relationship between the mode of developmental mathematics instruction, lecture versus modular, and African American male community college students' college credential completion?

Null Hypothesis (H_0):

> The relationship between the mode of developmental mathematics instruction, lecture versus modular, and African American male community college students' college credential completion is independent.

Alternative Hypothesis (H_1)

> The relationship between the mode of developmental mathematics instruction, lecture versus modular, and African American male community college students' college credential completion is not independent.

Data analysis indicated that there was a statistically significant relationship, as indicated by a p value of <.05, between mode of instruction and developmental mathematics completion (p = .000), but there was not a statistically significant relationship between mode of instruction and college credential completion (p = .503) for African American males.

The initial results of this study supported the existence of the problem of a postsecondary achievement gap between African American males and other college students (Saenz, et al., 2011; Palmer & Davis, 2012). The data concluded that the same calamity exists at [redacted] as it does for the rest of the nation with regards to disparity in college completion rates for African American males in relation to their college counterparts.

The results for determining if there was an association between the mode of instruction and the successful completion of developmental mathematics by African American males (RQ1), however, were unanticipated. As determined by chi-square analyses, there was a relationship between mode of instruction and completion of developmental mathematics for African American males at [redacted]. The data revealed that more African American male students, 52 (13%), completed developmental mathematics with the lecture mode of instruction than with the modular mode of instruction. This outcome was unexpected because recent studies at community colleges nationwide have indicated that technology-infused, individualized instruction and one-to-one faculty interaction (the core of modular instruction) positively influenced African American male course completion rates (Boatman, 2012; Edgecombe, 2011; Twigg, 2011).

In addition, the results for determining if there was an association between the mode of instruction for developmental mathematics and the successful completion of college credentials by African American males (RQ2) were puzzling. As determined by chi-square analyses, there was not a relationship between mode of instruction and completion of college credentials for African American males at [redacted]. This outcome was unforeseen because the literature has consistently detailed that a prominent barrier for African American male college credential completion was the lack of developmental mathematics completion (Jett, 2011; Jett, 2012; Wood, 2012). Notably, the data disclosed that more African American males, 3 (1%), who completed developmental mathematics with the modular mode of instruction completed a college credential at [redacted] during the designated years of this study. This result could suggest that the modular

method of instruction may be a promising practice and should continue to be utilized by the college with future studies to be conducted in order to evaluate effectiveness.

Overall, what the results of the project study did expose is the reality that the postsecondary achievement gap between African American males and other college students is an extremely complex issue for community colleges to eradicate. A method of instruction is only a starting point to address the issue of lack of developmental mathematics completion and lack of college credential completion by African American males.

As a result of the findings, a policy review and recommendation report seemed prudent to seek multiple resolutions to focus campus efforts on reducing gender and racial academic achievement gaps and on improving African American male completion rates at [redacted].

Postsecondary Education Policy

Educational policy can be defined as the rules and regulations or the laws that govern teaching and learning and that establish institutional structure (McDonnell, 2013). Postsecondary educational policy typically establishes structure by defining rules, roles, and responsibilities for college employees and for college students. Furthermore, postsecondary educational policy drives campus-level operational processes and procedures. As such, the campus-level policies should reflect and uphold both national and state policies as well as address individual campus's student characteristics and culture to ensure student success.

Over the past four decades, postsecondary education policy concentration has shifted from topics such as access, curriculum, and success to issues like funding, diversity, developmental education, and completion (Collins, 2014; Dougherty et al., 2014; Treuhaft, Blackwell & Pastor, 2011; Venezia & Hughes, 2013). Recently, collective concern for the economic future of our country and the role that higher education has in producing an increased number of appropriately-credentialed, gender-inclusive, and racial/ethnic-inclusive citizens who can participate in a growing technological and global workforce has directed policy development (Treuhaft et al., 2011). Collaborative entities such as The Postsecondary State Policy Network and nonprofit, nonpartisan organizations such as The National Center for Public Policy and Higher Education have emerged as resources to assist in the development of the

relationships between policy agendas, legislation, and daily operations on college campuses.

As noted by The National Center for Public Policy and Higher Education (2011), stakeholder scrutiny and increased success and accountability expectations have prompted policy review and reform at most postsecondary institutions. Now more than ever in the U.S., for institutions of higher education, it is common understanding that because policy directs organizational structure, funding, and daily operations of educational institutions, it should be reviewed and updated periodically in order to ensure the most effective and efficient structure and operations (Brenneman et al., 2010; Collins, 2014; McDonnell, 2013).

Developmental Education Policy

Developmental education policies exist at the national, state, and local levels. The main focus of the majority of developmental education policy today is to ensure student success and college completion (Dougherty et al., 2014; The National Center for Public Policy and Higher Education, 2011; Jobs for the Future, 2014).

This report concentrated on developmental education policy at the state level in Texas and on the local level at [redacted]. These policies were reviewed on both levels with five objectives as the focus: (a) to comprehend state policy, (b) to understand local policy, (c) to measure local policy against state policy, (d) to identify any discrepancies between state and local policy, (e) to determine need for new local policy. The goal of this project was to recommend policy to change and to improve educational processes and practices in order to increase developmental mathematics completion and college credential completion rates for African American males at [redacted].

The State of Texas

To gather the state level policies for review and analysis, two sources were consulted: *The Texas Education Code* and *The Texas Administrative Code*. The Texas Constitution is comprised of statutes such as Agriculture, Business and Commerce, and Education that were enacted by the state legislation; these statutes are referred to as codes. *The Texas Education Code* (TEC) contains six titles that are regarded as the law; Title 3 pertains to all rules for Higher Education. Subtitle B, Chapter 61 Texas Higher

Education Coordinating Board and Subtitle G, Chapter 130 Junior College Districts governs the operations of all community college in the state (TEC, 2014).

Free public access of all official state rules, regulations, and records is obtainable from the Capital Building in Austin, Texas at the office of the Secretary of State. The records, commonly known as the *Texas Administrative Code* (TAC) are available for quick retrieval via an electronic format from the Secretary's webpage. The TAC is comprised of 16 titles that represent subject categories and related agencies. Title 19 denotes Education; Part 1 Texas Higher Education Coordinating Board, Chapter 4, Subchapter C Texas Success Initiative houses all pertinent information regarding remediation or developmental education (TAC, 2014).

[redacted] College

To gather local level policies for review and analysis, the following source was consulted: *The Community College Policy Reference Manual* that is produced by Texas Association of School Boards (TASB) in agreement with the Texas Association of Community Colleges (TACC). At the local level, the manual is referred to as *The Board Policy Manual*; it is organized into seven sections such as Local Governance, Instruction, and Students. All legally referenced polices are noted as (LEGAL) and any local policy adopted by the Board to meet Southern Association of Colleges and Schools (SACS) Commission on Colleges (COC) is noted as (LOCAL).

Findings

Research studies provide information to policy makers and inform policy decisions at national, state, and local levels (Creswell, 2012). This project study, a comparison of state and local developmental education policy, was conducted to determine if [redacted] was compliant with the state of Texas' laws and rules, to identify any gaps in the college's policy, and to ascertain the need for new institutional policy.

It is important to keep in mind that this study only reviewed and compared policy; college practices were not addressed as the task would have been laborious. Since the college does not publish a formal written developmental education plan, campus information sources such as the college catalog, college website, departmental documents, and departmental websites would have needed to be consulted in order to ascertain information and documentation regarding operational practices.

As shown in Table 1, [redacted] adheres to state law as defined by Texas Education Code (TEC), Chapter 51. Provisions Generally Applicable to Higher Education. Subchapter F. Required and Elective Courses., Section 51.3062. Success Initiative. through the utilization of five campus documented policies: EGA (REGULATION); EGA (LOCAL); EFAC (LEGAL); EI (LEGAL); FD (LEGAL):

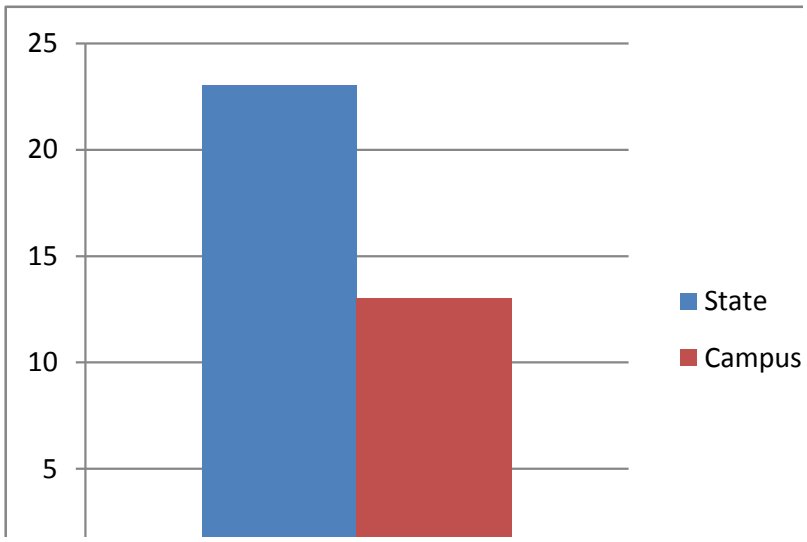
Table 1
Campus Policy Measured Against State Law to Determine Compliance

TEC Law Section 51.3062	Evidence of Compliance with State Law	Campus Compliance Document
1(a)	No; a definition	Not Applicable
1(b)	Yes	EI
1(c)	Yes	EI
1(d)	No; expired law	Not Applicable
1(e)	No; repealed law	Not Applicable
1(f)	YES	EI
1(g)	Yes	EI
1(h)	YES	EI
1(i)	Yes	EFAC; FD
1(j)	Yes	EI
1(k)	Yes	EI
1(l)	Yes	FD
1(m)	No; a definition	Not Applicable
1(n)	No; a definition	Not Applicable
1(o)	No; a definition	Not Applicable
1(p)	Yes	EI
1(q)	Yes	EFAC
1(r)	Yes	EI
1(s)	Yes	EI
1(t)	No	Needs to be addressed
1(u)	No; expired law	Not Applicable
1(v)	No; expired law	Not Applicable
1(w)	No; expired law	Not Applicable

At first review, it appeared that the college had only a 57% compliance rate with state policy. However, of the ten state policies that were not found in local policy, nine of those policies in question were not applicable to a compliance comparison because six of the state policies had been repealed or had expired, and three of the state policies simply established the state's definitions of funding formulas, reporting, and evaluation. A second and closer review and comparison of the state and local policies demonstrated

over a 96% compliance rate as illustrated in Figure 1. Only one law (Sec.51.3062. 1(t)), which prescribed the type of developmental education course that should be implemented on community college campuses, was not represented in [redacted]'s local policy.

Figure 1. [redacted] College Compliance with State Law



As shown in Table 2, [redacted] adheres to state rules as defined by Texas Administrative Code (TAC), Title 19. Education. Part 1. Higher Education Coordinating Board. Chapter 4. Rules Applying to All Public Institutions of Higher Education in Texas. Subchapter C. Texas Success Initiative., through the utilization of four campus documented policies: EGA (REGULATION); EGA (LOCAL); EFAC (LEGAL); EI (LEGAL):

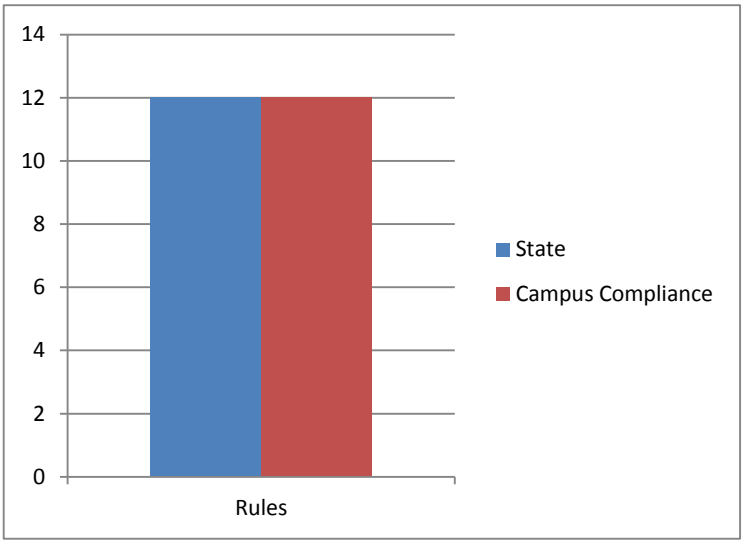
Table 2
Campus Policy Measured Against State Rule for Compliance

TAC Policy Rule Reference Number	Evidence of Compliance with State Rule	Compliance Document
4.51	No	Not applicable; only establishes THECB purpose
4.52	No	Not applicable; only establishes THECB Authority
4.53	Yes	EFAC
4.54	Yes	EI
4.55	Yes	EI
4.56	Yes	EI
4.57	Yes	EI
4.58	Yes	EI; EGA Regulation
4.59	Yes	EI; EGA Regulation
4.60	Yes	EI
4.61	No	Not applicable; only establishes limited waivers
4.62	Yes	EFAC; EGA Local

At first review, it appeared that the college had only a 75% compliance rate with state rules or policy. The local campus was compliant with all state rules except in three areas: Rule 4.51; Rule 4.52; Rule 4.61. However, of the three state rules that were not found in local policy, all three of those rules or policies in question were not applicable to a compliance comparison because all three of those state rules or policies just established the purpose and the authority of the Texas Higher Education Coordinating Board's (THECB) responsibility to govern institutions of higher education in the state through the adoption of and implementation of policy rules. Likewise, as illustrated in Figure 2, a

second and closer review and comparison of the state rules and campus level policies demonstrated a 100% compliance rate for [redacted].

Figure 2. [redacted] College Compliance with State Rules



Recommendations

The policy recommendations that follow are educationally-sound and research-based. The recommendations that are contained in this report were based upon information detailed in the work of the following sources: (a) Boylan & Saxon (2012) developmental education research and best practices experts; (b) Harper (2012), Harris & Wood (2013), Jett (2011) Strayhorn (2010) and Terry (2010) who are all research and practitioner experts with regard to African American male student success; (c) Texas Education Code (2014) and Texas Administrative Code (2014) which govern the policies and practices in institutions of higher education in the state.

In order for [redacted] to make significant progress toward the improvement of African American male developmental mathematics and college credential completion outcomes, the following recommendations, listed in alphabetical order, are suggested:

Communication

- A formal written developmental education plan is needed to clearly communicate the requirements (policy and practice) that must be completed in order to achieve a Texas Success Initiative (TSI) Met status and to emphasize the importance of that status in achieving success in college level courses and college credential completion. This plan should be housed in PDF format on the college's webpage as well as in printed format in the Student Handbook and Employee Handbook.

- A review of printed materials like the catalog and syllabi is needed to ensure that there is no negative phrasing or derogatory statements used when describing developmental education.
- Developmental education success stories should be publicized via avenues such as the college's webpage, reports to the Board of Trustees, the college newspaper, the college's alumni newsletter, and the local newspaper.

Curriculum and Instruction

- Redesign the developmental education curriculum to move from My Math Lab to My Foundations Lab, so the curriculum will be generated from the students' individual diagnostic that is created directly from the TSI Assessment. This redesign will ensure that students only study the deficiencies identified in their individual diagnostic profiles.
- Increase classroom interaction and assistance by adding teaching assistants for high-touch, on-demand assistance.
- Designate course sections of Learning Framework specifically for developmental education students; the use of a learning community to pair EDUC 1300 with developmental mathematics is highly suggested.
- Designate course sections of EDUC 1300 specifically for African American males.

Enrollment

- To expedite the path to completion, for those students who place into developmental mathematics, there should be mandatory enrollment in the course during the first semester.
- To facilitate the completion of college credentials, there should be mandatory enrollment in the college level gateway course immediately after the successful completion of the developmental education course.

Inclusion and Cultural Sensitivity

- To acknowledge the high percentage of minority enrollment in developmental education and to demonstrate commitment to equity and diversity, a Department of Equity and Diversity should be established in The Center for Student Success.
    - The new department should help recruit African American male professors, especially in mathematics.
    - The new department should help recruit African American male peer tutors and teaching assistants, especially in mathematics.
    - The new department should sponsor an African American male Commit to Complete signing ceremony.
    - The new department should model academic success of African American males with special events, speakers, website, print material, videos, etc.
    - The new department should sponsor campus groups like My Brother's Keeper to mentor African American males in our community.

Organizational Structure

- To ensure commitment and dedication to the success of developmental education students, the department should remain centralized and housed in The Center for Student Success (CSS).
- To ensure success of developmental education students, a new case management advising approach (TRiO model) should be implemented.
    - CSS faculty and staff should be trained to advise and register developmental students and then be assigned a case load of students to supervise from entrance in and exit out of developmental education
- To ensure seamless transitions from developmental education to college level courses, CSS faculty and staff should host orientations, pre-assessment study sessions, etc.

Resource Allocation

- Fund advertising in national diversity venues for faculty recruitment.
- Fund personnel costs to establish a new department for equity and diversity.
- Fund professional development for developmental education faculty and adjuncts.
- Fund addition of teaching assistants in developmental mathematics classroom.
- Fund increase for more peer tutors.

Conclusion

Policy review is a worthwhile endeavor for institutions to perform on a regular basis in order to make judgments about performance and to initiate change and improvement. This report documented excellence exhibited by [redacted] College with regard to state laws and rules compliance. The results of this policy review yielded only one area of improvement. Based on the documented evidence, it is recommended that the college generate a formal written developmental education plan to document campus practice and to clearly communicate that plan to all of the stakeholders. This plan should identify answers to the following questions: (a) Who is required to participate in developmental education? (b) What data signals student requirement for developmental education? (c) When is a student required to enroll in developmental education? (d) Why is developmental education necessary? (e) Where is law or rule associated with the requirement of developmental education located for review?

Based upon current adherence to state law and rules and implantation of those guidelines into daily operations and practice, [redacted] is poised to do its part in the world of higher education to help community college students succeed in finalizing more college credentials by quickly increasing basic skill competencies and completing developmental education in an expedited manner.

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Appendix B: Data Use Agreement

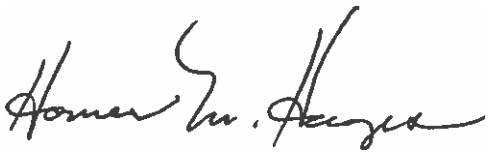
July 7, 2014

IRB Review Committee
Walden University
1001 Fleet Street
Baltimore, Maryland 21202

To Whom It May Concern:

In accordance with the IRB recommendation made by [redacted] (Protocol #2014-05 IRB), Lisa Harper is authorized to use [redacted] data for her dissertation as requested.

Sincerely,



Homer M. Hayes, Ph.D.
Provost

Appendix C: NIH Certificate

Certificate of Completion

The National Institutes of Health (NIH) Office of Extramural Research certifies that **Lisa Harper** successfully completed the NIH Web-based training course “Protecting Human Research Participants”.

Date of completion: 10/30/2011

Certification Number: 796256