

ACADEMIC TRAJECTORIES OF COMMUNITY COLLEGE STUDENTS:
A COMPARATIVE STUDY OF GED RECIPIENTS AND
TRADITIONAL HIGH SCHOOL GRADUATES

by

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Abstract

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The purpose of this study is to examine the effects of secondary education credential on the academic trajectories of community college students enrolled in courses and programs at a large urban community college in the Dallas/Fort Worth area. The study is based on the assumption that academic capital acquired at college level, and evident in student outcomes, is built on pre-college academic preparedness and affected by one's college trajectory, being qualified by student's demographic characteristics. The results indicate that GED recipients required more remedial coursework than high school graduates, especially in mathematics. In addition, the GED recipients were less likely to complete a program of study and earned a lower number of college credits than high school graduates. This study provides some answers about how GED recipients succeed in community colleges, but also demonstrates the need to conduct more research as to learn what are their needs and what are the appropriate and adequate support services to help these students complete degree programs.

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Chapter 1

Introduction

Students who do not complete high school requirements face extreme challenges both in the work force and in experiencing a lesser quality of life (Patterson, Song, & Zhang, 2009; Tyler & Lofstrom, 2009). These individuals, without improvement of their educational status, will be more likely to be unemployed over long periods of time, will earn less when they are employed, and will be more dependent on Medicaid/Medicare than their peers who complete high school (Cao, Stromsdorfer, & Weeks, 1996; National Center for Education Statistics, 2011; Tyler & Lofstrom, 2009). For example, in the United States, high school completers earned \$17,000 more per year in 2009 as compared to individuals who did not complete high school (Goodall, 2009). In addition, over the span of one's lifetime, a person who does not complete high school will cost the U.S. economy a minimum of \$240,000 in social support services such as welfare and Medicaid/Medicare, in lost tax contributions, and in the cost of state and federal services to curb his or her criminal activity (National Center for Education Statistics, 2011; Tyler & Lofstrom, 2009). Therefore, high school completion has become an uncontested necessity for both the individual and the U.S. society.

For a variety of reasons, including lack of a strong academic background, health issues, or having to work rather than go to school, some students do not complete the high school requirements on time or do not follow the traditional route in order to earn a K-12 credential (high school/secondary diploma) (Bickerstaff, 2009/2010; Entwisle, Alexander, & Olson, 2004). The U.S. education system offers them a second chance at

high school completion through the General Educational Development (GED) program (Weston, Koller, & Dunham, 2002; Zajacova, 2012). The GED is one way individuals can alter their academic, social, and economic status at various ages by earning the equivalent of a K-12 credential (high school diploma) and then pursue post-secondary education, if they want to, later in life (Hansman, 2010; Heckman & Rubinstein, 2001; Maralani, 2011). Although the GED credential does not result in as much of an economic reward as a traditional high school credential (Roderick, 1993), Reder (2007) states that “the GED has increasingly been seen not only as an alternative marker of a high school education, once an end in itself, but now as a gateway to post-secondary education as well” (p. 3).

Competition in the job market warrants higher employment chances to the better educated and more skilled candidates; therefore, more than a K-12 education (high school/secondary education) is beneficial (Hansman, 2010; Reder, 2007). Logically, people view post-secondary education as one way to raise their standard of living and provide for their families (Crellin, Kelly, & Prince, 2012; Rosenbaum, 2001; Tokpah & Padak, 2003). An increasing number of the U.S. population believes that post-secondary education is essential to their economic success (Conley, 2007; Schneider, 2013). Grubb and Lazerson (2007) indicate that “economic returns to college graduation relative to high school graduation” is substantial (p. 181). According to Carneval, Jayasundera and Cheah (2012), workers with at least some post-secondary education earn approximately 20% more annually than workers with no more than a high school diploma. As they note, “in jobs at every skill level and in many different occupations, the better-educated

applicant has the edge” (Carneval et al., 2012, p. 35). From 2007 to 2012, the portion of the U.S. population who lost their jobs due to the economic recession were primarily those who did not obtain a formal education post high school; alternatively, the bulk of the employment growth since 1989 “has been driven entirely by workers with education beyond high school” (Carneva et al., 2012, p. 11). Generally, the people with higher levels of educational attainment have access to more employment opportunities and higher wages (Baum, Ma, & Payea, 2010; Grubb & Lazerson, 2007; Tyler, Murnane, & Willett, 2000). Therefore, it is important for those who complete the U.S. K-12 education, regardless of the type of acquired credential (GED or high school diploma), to pursue and complete post-secondary education at universities, community colleges, or technical and vocational institutions, in order to increase their employment opportunities (Fonte, 2011). However, even if access to post-secondary education is open to all students who obtained a high school credential, it is important to understand what institutions are in fact affordable to students who hold different secondary education credentials and whether these institutions accommodate different categories of students and lead them to successful degree completion.

Since its inception, the U.S. community college has been viewed as a viable educational option for students with varied academic preparation and coming from diverse backgrounds who cannot afford to enroll in university studies or who have a more vocational orientation (Bailey, Calcagno, Jenkins, Leinbach, & Kienzl, 2006; Rosenbaum, 2001). Mina, Fulmer, and Smith (2010) note that “community colleges also offer entry-level training programs for low-literate, low-income, and low-skilled citizens”

(p. 16). Students who attend the community college are all ages and have career interests ranging from technical fields such as welding, computer aided design and drafting, and criminal justice, to university transfer programs such as pre-medical studies, psychology, and foreign languages. In addition, attending a community college is convenient because students tend to live close to the campus and appreciate that community college education offers a more affordable route to obtaining a degree through flexible programs and courses that accommodate working students (Bremer et al., 2013; Goodall, 2009; Patterson, Zhang, Song, & Guison-Dowdy, 2010).

According to Bozick and DeLuca (2005), “the growth in two year colleges has expanded the range of educational possibilities available to young adults” (p. 530). The community college has become the primary educational provider to update skills, get additional training, or obtain advanced education for many U.S. youth who want to quickly improve their employment opportunities (Clotfelter, Ladd, Muschkin, & Vidor, 2013; Gonzalez, 2010). Community colleges offer customized training such as certificate programs in specific computer software, Microsoft Suite 2013 for example, and medical assisting/coding; these and other employer driven programs are very popular ways to learn needed skills quickly to increase job mobility (Mina et al., 2010). As noted by Grubb and Lazerson (2007), employment for those who earn a two year associate degree is more promising than for those who do not pursue an education past high school. Acquiring job skills and completing certificate and degree programs provide students with an advantage in the job market (Baum, Ma, & Payea, 2010).

Between 2000 and 2010, two-year institutions of higher education (i.e., community colleges) in the U. S. experienced an increase in enrollment by 1.8 million students (Aud et al., 2012). In Texas, almost 92,000 students were enrolled in public two-year post-secondary institutions for the 2009-2010 academic year (Texas Educational Agency & Texas Higher Education Coordinating Board, 2014). The community college is the focal point for this study as attending 2-year institutions is particularly the path to post-secondary education for GED recipients (Patterson et al., 2010; Zafft, 2006), although it is also the choice made by many traditional high school graduates (Aud et al., 2012). Community colleges have an open door admission policy for all students meaning that a student can enroll in classes even if he or she is a traditional high school graduate, a GED recipient, or has no secondary education credential (Bailey & Alfonso, 2005; Cohen & Brawer, 2008; Rosenbaum, 2001). It is not surprising that Patterson et al. (2009) found that 81% of the GED recipients in their study chose 2-year colleges as the starting point for their higher education journey.

However, not all traditional high school graduates and especially GED recipients who begin programs at the community college or at other institutions of higher education, complete the requirements to earn a credential (Bailey et al., 2006; Garvey, 2011; Zafft, 2008). Less than 50% of the students who enrolled in post-secondary classes for the first time in 2007 completed a degree or even a certificate after six years (Mangan, 2014). These trends continue today, and community college completion rates, in general, average at 36% (Bailey & Alfonso, 2005). In terms of GED recipients, reports indicate that students who pursue post-secondary credentials are largely unsuccessful. One data

source (Patterson et al., 2010) indicates that the general post-secondary graduation rate for a 2003 cohort of GED recipients was only 11.8%. According to Heckman and LaFontaine (2010), “the GED opens education and training opportunities, but GED recipients do not reap the potential benefits of these options because they are unable to finish the skill enhancement programs that they start” (p. 245). Post-secondary program completion is a concern for all students and for GED recipients in particular.

Problem Statement

Most jobs in the U.S. labor market require that candidates for hire obtain some post-secondary education which cannot be accessed without completing at least a secondary education (Tyler & Lofstrom, 2009). Since not all high school students in the United States can earn a traditional high school diploma for a variety of reasons, the GED program offers a second chance to complete secondary education (Bickerstaff, 2009/2010; Maralani, 2011; Murnane, Willett, & Boudett, 1997). However, of the 500,000 individuals who earn the GED credential annually, many indicate that they want to attend college (Tyler, 2004). Therefore, a GED diploma is not only a goal in itself, but allows the individual to access post-secondary education and thus increases his/her career opportunities (Maralani, 2011). Of the GED recipients who do continue higher education, many enroll in community colleges because of the proximity to their homes and jobs, the lower tuition cost, the available support services, and possibly because they lack academic preparedness needed for university attendance (Patterson et al., 2009).

Unfortunately, research has consistently shown that GED recipients continue to experience barriers to complete their education during their post-secondary journey (Nix

& Michalak, 2012) and the number of GED recipients who obtain a college certificate or degree is minimal (Buchinsky & Leslie, 2010). Some research suggests that in general, GED recipients are not college ready (Garvey, 2011). Although many studies show college readiness is also an issue for traditional high school graduates, by comparison, college readiness continues to be more problematic for the GED recipients even though a GED is supposed to be equivalent to a high school diploma (Clark & Jaeger, 2006). For those GED recipients who pursue certificates and degrees at the community college, there is limited research that investigates what factors affect program completion and to what extent GED recipients' college trajectories are different from those of traditional high school graduates (students who earned a high school diploma). This study will fill a gap in the current knowledge base about the effects of high school credential types on students' higher education attainment, and thus will help higher education policy makers and college administrators better support the GED recipients attending community colleges. The study will focus only on community colleges and their role in facilitating access to education for an academically diverse student population.

Researcher's Stand

As someone who has worked as a K-12 teacher and then taught adult remedial reading and math at a community college, I am acutely aware of issues pertaining to college readiness and academic attainment of students entering post-secondary institutions. Through my job, I interacted for over eight years with community college students and I noticed specific academic issues that appeared to be unique to students entering the college without a traditional high school diploma. Without any concrete

data, just based on my observations, it appeared that college readiness was an area of weakness for all students and that students who had not completed high school seemed to require more remedial courses. I wanted to know more about college readiness and the academic success of current high school students entering college.

When I started my doctoral work, my initial concern was related to K-12 students who had not completed high school. At the time, Texas Education Agency data indicated that the number of students dropping out of local high schools was substantial and I became concerned for the academic and economic future of these students. Changes in exit level testing for students in high schools in Texas also caused me pause. Student now had to pass specific content exams, even though they passed all courses each year, if they were to graduate from high school. Parents were being interviewed on the news as they voiced their outrage and sadness because based on the academic reports throughout the school years, they assumed their children would graduate. They had no idea of the consequences of exit level testing. When I contemplated the statistical evidence of high school dropout rates and the new testing requirements, and knowing that many of these students would not graduate, I decided to investigate the school dropout issue in greater depth.

What I learned is that many students who do not complete high school opt for the GED credential program which offers them a second chance to complete secondary education and keep options open for their future. Data indicates that this group is very large which reinforced my interest to conduct research on the GED recipients hoping that such research will inform institutions and create initiatives to potentially impact these

students academically. As an academic advisor and administrator at a community college, and accordance to FERPA, I really had no way of knowing if a student earned a GED credential, completed high school, or neither, based on the student information that I had access to. Interestingly, students often volunteered this information and it allowed me to learn more about their experiences. Most of the GED recipients that I spoke to said that they took classes to study for the GED credential; they did not study on their own. The students who did talk to me about the GED did not seem embarrassed or any less articulate than other students that I worked with but I continued to question whether or not GED recipients accumulated over time an academic disadvantage in preparedness for post-secondary education.

My job was to assist students in choosing appropriate coursework related to technical careers which included accounting, computer aided design and drafting, computer information technology, criminal justice, business/management, teaching, and welding. These programs of study are generally not transferable although some are. The GED students did not seem to choose a particular type of program of study (transferable or career/technical) more than the high school graduates did. In addition, GED recipients and high school graduates alike showed apprehension, in general, toward reading, writing, and math testing; typically, both groups required remedial coursework. It was rare for me to advise students who were deemed college ready based on entrance tests. Therefore, my overall experience working with community college students was that there were no noticeable differences between GED recipients and those who obtained

traditional high school diploma which would suggest all had similar chances of success at the community college level.

Without students self-identifying as GED recipients, I would clearly not have been able to tell the two groups apart based on my interactions with them, their program of study choices, or their college readiness. Therefore, I became interested in accessing more data and conducting systematic research that examined how the academic trajectories (e.g., need for remedial courses, program of study type) differ for the GED population compared to high school graduates and whether the community college system was openly addressing the academic support needs of GED recipients.

Purpose of the Study

With such a large number of GED students attending the community college and struggling to graduate, it is imperative that research examines in more detail the academic trajectories of this student population in order to understand their college experiences. There is ample data on student program completion at four year institutions, but the community college in general and GED recipients in particular, have been understudied (Bailey et al., 2005). Questions remain as to whether or not earning a GED in lieu of earning a high school diploma impacts student's academic trajectory and academic success at the community college. The purpose of this study is to contribute to the literature on program completion at community colleges by focusing specifically on the type of secondary education credentials and academic preparedness of students. The results of this study will open a dialogue to increase "the interaction between research and practice" where there is "a continuous conversation within and among the colleges,

and with outside researchers and policy-makers, as practitioners try to improve their performance in a constantly changing environment” (Bailey & Alfonso, 2005, p. 4).

Research Questions

As detailed in Chapter 3 of this paper, this study addresses the following three research questions:

1. Are there differences in pre-college academic preparedness (e.g., need to enroll in remedial courses in college) between all GED recipients and traditional high school graduates enrolled at the community college? Are these differences also controlled by demographic factors (e.g., gender, race/ethnicity, and age)?
2. What program of study types are GED recipients and high school graduates pursuing? Are there differences in student outcomes (i.e., college level GPA, total number of college credits earned, and program completion) between GED recipients and traditional high school graduates enrolled in degree programs? Are these differences also controlled by demographic factors (e.g., gender, race/ethnicity, age)?
3. What is the combined effect of demographic factors (e.g., gender, race/ethnicity, age), pre-college academic preparedness (e.g., secondary education credential, need to enroll in remedial courses in college), and college trajectories (e.g., program of study type) on student outcomes (i.e., college level GPA, total number of college credits earned, and program completion)?

Significance of Study

This study is important for both K-12 and higher education systems because “students are continuously and increasingly using the GED route to satisfy the requirements of secondary education” (Tokpah & Padak, 2003. p. 8) prior to pursuing higher education; and there is limited research that documents GED recipients’ college readiness and academic success in higher education institutions. It is well known that college readiness and program completion, in general, are both major issues for the institutions of higher education (Camara, 2013; Lipka, 2013), especially for community colleges, as state funding has become contingent on students’ grades and graduation rates (Dougherty, Jones, Lahr, Natow, Pheatt, & Reddy, 2014). What is less known is how GED recipients fit into the equation. We know that most students entering post-secondary education require remedial courses as they are not college ready (Venezia & Jaeger, 2013), but we do not know if the issue is more or less pronounced for GED recipients. We also know that students who are women, and/or students who attend college full time are more likely to graduate (Mangan, 2014). Data indicates that GED recipients tend to attend college part time and have families to support but there is no current, real data clarifying the program completion rate specifically for GED recipients.

This study also recognizes that GED recipients comprise a large group of people who come from diverse backgrounds with unique life course trajectories and have hopes of making life better for themselves and their families (Zafft, 2008). Moreover, an increasing number of GED recipients have post-secondary educational aspirations. When surveyed, 50% of GED recipients identified college completion as their reason for

obtaining the GED (Garvey, 2011; Zafft, 2008). Although GED recipients indicate a strong desire to complete college programs, very few actually persist (Tyler & Lofstrom, 2010). Based on data collected years ago, the number of GED students obtaining community college certificates or degrees is minimal compared to the number of GED students enrolled in courses (Buchinsky & Leslie, 2010). However, updated data needs to be collected and analyzed, and more background information on GED recipients needs to be made available for research. Most enrolment and completion data lumps all students together regardless of secondary education credential and no attempt is made to examine separately the populations of GED recipients and traditional high school graduates. This study attempts to fill in gaps in the literature as in this case, the GED recipients and the traditional high school graduates are viewed as two separate groups, being compared and contrasted to find similarities and differences, and to correctly evaluate their rates of college success.

Also of note, GED recipients have been the focus of research in the past but not specifically in terms of their academic trajectories at the community college—which is still their main pathway into higher education (Rosenbaum, 2001). The bulk of the information on GED recipients focuses on reporting the history of the GED program, determining if the GED provides financial benefits or not, and on understanding the personal experiences of GED instructors. Actual data specific to GED recipients is limited and accumulated many years ago. The majority of journal articles on the academics of GED recipients spans from the 1990s to present with most published in the late 1990s and early 2000s. The few recent articles focus on the new GED exam and

curriculum, and offer very little information on the pathways GED recipients take after they earn the credential. Therefore, this study contributes to the literature on GED recipients by focusing on their transition from high school to community college, by providing information on their academic trajectories during college, and by taking a comparative perspective in contrasting these trajectories to those of traditional high school graduates.

Lastly, this study looks at very specific factors to explain the academic trajectories of GED students and high school graduates at a community college. This is an uncharted territory, as previous research did not approach data collection and analysis in this manner. In this study, age, gender, and ethnicity were considered as potential factors affecting pre-college preparedness of GED recipients as well as high school graduates attending the same community college at the same time. Demographics and college readiness have been considered before by researchers but not in relation to secondary education credential (i.e., GED or a traditional high school diploma). In addition, this study examines the academic trajectory in terms of program of study pursued at a community college where previous research has only focused on program completion. Knowing the type of program of study illuminates the pathways of the GED recipients and high school graduates. For instance, through this research, there will be a clearer understanding of whether or not GED students tend to choose transferable programs of study, and how GED recipients' educational choices compare to high school graduates.

With more than 15 million GED recipients in the educational pipeline, it is imperative to understand their academic trajectories, and to inquire whether post-secondary institutions are prepared to serve this student population appropriately (National Center for the Study of Adult Learning and Literacy, 2003). For instance, this study takes into account the college level GPA and the total number of college credits earned for the GED students compared to high school graduates. Low GPA and low completion rates are red flags for policy makers and college administrators to evaluate their support services for students. Student support services are known to increase the academic success of specific groups of students (National Commission on Higher Education Attainment, 2013) so GED recipients should be no different. Programs have been developed to understand and serve first year college students, first-generation college students, international students, and students with low incomes (Gilroy, 2014); similar support services may be needed to assist GED recipients as they progress through academics and solid data is paramount to determine the need and scope of the services (National Commission on Higher Education Attainment, 2013).

Overview of Dissertation Chapters

The following chapter provides a literature review focused on empirical studies that inform on secondary education credentialing, college readiness, post-secondary program completion, and theoretical work related to academic capital and life course. Chapter 3 details the method of this study including the conceptual model, data collection procedures, the student population and sample, research design, variables and constructs, and statistical analysis. Chapter 4 presents the findings of this study organized by each of

the three research questions. Lastly, Chapter 5 includes discussion of specific findings of the research, limitations and strengths of the study, significance of the study, implications for practice and policy, and recommendation for further studies.

Chapter 2

Literature Review

The focus of this literature review is to present and critically discuss relevant research regarding two student populations in their pathways to higher education: students who complete high school and earn diplomas following a traditional route (attending classes, completing coursework and earning credits, and successfully passing state required exit exams) and those who earn GED credentials. Specifically, the literature review will illustrate the attempt of previous studies to illuminate the academic success, or lack thereof, of high school graduates and GED recipients who pursue post-secondary education, particularly in programs of study offered by community colleges.

- First, the review focuses on issues related to secondary education credentialing including potential explanations of why some students do not complete the traditional high school pathway and a brief history of the GED.
- Second, I will discuss research on college readiness, Hispanic Serving Institutions, assessment, and issues pertaining to academic preparedness for both high school graduates and GED recipients. For instance, research illustrates how GED recipients fare compared to traditional high school graduates with regard to remedial education.
- Third, issues related to program completion for both populations are detailed, with focus on community college graduation.
- Finally, I will present the theoretical framework guiding the study.

Secondary Education Credentialing

Traditional High School Pathway

Over the past 100 years, much of the U. S. population has benefited from a public school secondary education (Tyler & Lofstrom, 2009). According to Rosenbaum (2001), “High school is the main societal institution that could help students enter society. It is the last institution that serves nearly all youths” (pp. 5-6). Each state legislature indicates the age requirement for students to attend secondary school ranging from age 16 to 18 (Aud et al., 2012; Tyler & Lofstrom, 2009). Overall, states have the authority over 15,000 U.S. school districts who graduated in 2008 a total number of 2.9 million students (Venezia & Jaeger, 2013). High school graduation rates are improving over time: from 2000 to 2010, the U.S. high school graduation rate increased by 6% (Murnane & Hoffman, 2013).

In Texas, where this study takes place, a traditional high school graduate follows the requirements detailed in Texas House Bill 5, Subchapter B (2013): complete “Foundation High School” curriculum (§74.12) and pass the End of Course State of Texas Assessments of Academic Readiness (STAAR) in English I, English II, Algebra I, Biology, and U. S. History. In 2013, public schools in Texas reported over 280,000 graduates (Texas Education Agency, 2014) which corresponded to an increase in graduation rate. Still a large number of students are not graduating high school in Texas.

Unfortunately, many students are not completing high school requirements and this alters their life course. Tyler and Lofstrom (2009) use the phrases “high school dropout epidemic” and “dropout factory” to describe the situation in U. S. secondary

schools (p. 78). In 1993, Roderick reported that as many as 25% of students in the U. S. secondary education system will leave high school without completing graduation requirements. In Texas, over 21,000 students (6.6%) dropped out of high school in 2013 (Texas Education Agency, 2013). According to Tyler and Lofstrom (2009), the number of students graduating high school from early 1960s to 2009 has neither decreased nor increased; as such, the fact that an estimated one million students do not graduate from high school each year is an important issue that needs to be addressed.

Data used to ascertain why students stop attending high school is primarily obtained through interviews and surveys of high school dropouts (Tyler & Lofstrom, 2009). A study conducted by Meeker, Edmonson and Fisher (2008) surveyed 158 high school dropouts and found the following top ten reasons for dropping out of school to be (ordered from highest to lowest frequency):

pregnancy/parenting a child, bad attitude/poor choices, dysfunctional school/conflict with teachers, dysfunctional home, did not fit in, working too many hours, moved too often to earn credits, frequent discipline referrals, peer pressure to leave, substance abuse. (p. 41)

Some researchers argue that current high school students are academically disengaged and as a result, many drop out of school (Grubb & Lazerton, 2007). Rosenbaum (2001) lists “student disinterest, misbehavior, and alcohol use as among the greatest high school problems” (p. 10).

GED Pathway

For those who do not follow the traditional K-12 route (high school diploma), many obtain the GED credential. When introduced in 1942, the GED credential was intended as an alternative to attending high school for military personnel returning from

service (Cain, 2003; Meeker et al., 2008). In 1966, the U. S. federal government passed The Adult Education Act which allocated funds to each state specifically for GED preparation programs (Murnane, Willett, & Tyler, 2000). Now, the GED is widely recognized as a route toward secondary education credentialing obtained by a large population of students of all ages and from all walks of life (Murnane et al., 2000; Zafft, 2008). Students who participate in GED programs are tested over science, social studies, literature, math, and writing (Cain, 2003; Heckman, Humphries, LaFontaine, & Rodriguez, 2012). Overall, “the GED has been a great benefit to many people who are unable to obtain a high school diploma” (Meeker et al., 2008, p. 51).

College Readiness and Transitioning to College

Post-secondary education is a goal of many young people. However, research identifies lack of academic preparedness as a major concern in pursuing education after high school. “The vast majority of high school students aspire to some kind of post-secondary education, yet far too many of them enter college without the basic content knowledge, skills, or habits of mind they need to succeed” (Venezia & Jaeger, 2013, p.1). There is indication, supported by research, of a discrepancy between secondary education experiences and the expectations of higher education programs (Conley, 2007; Stern, 2013b; Venezia & Jaeger, 2013). One problem is that the high school completion standards correspond to a 10th grade level while students should perform at college level academics when they enter post-secondary education (Conley 2007; Perna & Armijo, 2014). Venezia and Jaeger (2013) state that “college readiness is commonly understood as the level of preparation a student needs to enroll and succeed in a college program

(certificate, associate's degree, or baccalaureate) without remediation" (p. 2) which is not the case for a vast majority of U.S. high school graduates.

Currently, the high interest in examining college readiness issues is a result of observing the large number of post-secondary students needing remediation coupled with their low completion rates (Camara, 2013; Gilroy, 2014; Perna & Armigo, 2014). As noted by Gilroy (2014):

At the institutional level, 66 percent of student enrolled in a community college and 24 percent of students at a four-year institution needed remediation. Most students required remediation in mathematics (51 percent), followed by writing (31 percent) and then reading (18 percent). (p. 28)

In general, students who are entering college needing remediation are unlikely to complete a program (Byrd & MacDonald, 2005; Kenner & Weinerman, 2011; Reder, 2007; Tokpah & Padak, 2003) so college readiness is widely associated with college persistence and program completion. As stated by Conley (2008):

The likelihood that students will make a successful transition to the college environment is often a function of their readiness-the degree to which previous educational and personal experiences have equipped them for the expectations and demands they will encounter in college. (p. 3)

Studies examining why students are not college ready after high school have identified both academic (e.g., low level of academic rigor experienced in high school classes) and nonacademic (e.g., social influences from family and peers) factors that affect their college preparedness (Venezia & Jaeger, 2013). Referring to students entering post-secondary education, Conley (2010) argues "it is no surprise that many struggle academically when they seek to advance their education beyond high school" (p. 6).

Measuring College Readiness

Measuring and improving college readiness has become a top priority in the United States as federal policymakers grapple with the apparent under-preparedness of students (Bailey & Alfonso, 2005; Byrd & MacDonald, 2005; Conley, 2010; Roksa, 2010). This main concern is particularly noticeable at the state level. For instance, as states determined how to meet the challenge of preparing students for post-secondary education, College and Career Readiness Standards and the Texas Success Initiative were developed (Conley, 2007; Texas Higher Education Coordinating Board & Texas Education Agency, 2009). In fact, Texas law requires that the state developed P-16 council maintain the College Readiness and Success Strategic Action Plan (Texas Education Agency & Texas Higher Education Coordinating Board, 2010). The emphasis of the plan is on increasing student knowledge and skills deemed essential for success in higher education and in the workforce while decreasing the number of students who are required to enroll in remedial courses (Conley, 2010; Texas Education Agency & Texas Higher Education Coordinating Board, 2010). “What’s at stake here is the ability of high school graduates to advance and handle post-secondary work, graduate from college, and then succeed in their career” (Stern, 2013b, p. 20).

Even though the limits of standardized testing in assessing students’ knowledge and skills are generally accepted, college entrance exams continue to be the main way higher education practitioners and researchers measure college readiness (Venezia & Jaeger, 2013). In Texas, higher education institutions must assess every undergraduate student, with a few exceptions, as they are accepted for enrollment. Prior to August

2013, approved college enrollment assessments used to determine college readiness have included use of standardized assessments such as the high school Texas Assessment of Knowledge and Skills (TAKS), the Accuplacer, and the Scholastic Aptitude Test (SAT) (Venezia & Jaeger, 2013). In fact, the SAT has been used by colleges as an entrance exam since 1941 (Mondale & Patton, 2001). Generally, students who attend the community college earn on average lower SAT scores than the “norm for all college students” (Cohen & Brawer, 2008, p. 51) which demonstrates their lower level of college readiness.

As of August 2013, students are evaluated for college readiness via a new Texas Success Initiative (TSI) assessment after they complete a Texas legislative mandated pre-assessment activity. The pre-assessment activity includes sample test questions and an explanation of the importance of the TSI assessment. The TSI assessment includes a diagnostic printout (once the students complete the assessment) that aids students and college staff in identifying specific areas of remediation required (Texas Education Agency & Texas Higher Education Coordinating Board, 2010). There is hope that remedial coursework can then be streamlined to address the specific needs of each student (Texas Education Agency & Texas Higher Education Coordinating Board, 2010).

Though imperfect, the measures of college readiness used by post-secondary institutions provide useful information about the academic preparedness of students entering the system. All higher education institutions in the U. S. have put in place remediation programs to help students learn the reading, writing, and math skills needed

to succeed in college level courses. Community colleges in particular are involved in providing remediation programs.

Hispanic Serving Institutions

Students in particular subpopulations appear to face even more academic preparedness challenges (Golden, 2003). The number of post-secondary institutions enrolling minority students (Minority-Serving Institutions, MSI) is increasing. In particular, the increase in the Hispanic students' participation became 146% since the 1980s (Flores & Park, 2013; Sciarra & Ambrosino, 2011). Cooper (2012) states that “there is not doubt that community colleges still represent the most accessible gateway to higher education for minority, low-income, Hispanic, and first-generation post-secondary education students” (p. 32). In fact, as seen in the community college examined in this study, since 2013, Hispanic students have been the largest minority population at U. S. post-secondary institutions (Flores & Park, 2013). Institutions whose undergraduate enrollment is at least 25% Hispanic, with no less than 50% of those students labeled as low income, are considered Hispanic Serving Institutions (HSI) and receive federal funding to support college readiness and academic success for Hispanic students (Higher Education Act, 1998). In fact, the community college from which data is collected for this research is an HSI.

Hispanic students, in general, represent a growing population on college campuses; many of them are academically unprepared for college (Musoba, Collazo, & Placide, 2013; Page, 2013). Gilroy (2014) presents data from 2012 from community colleges in Colorado in which over 75% of the Hispanic students enrolled required

remedial education. Stern (2013b) reports that approximately 50% of the Hispanic students tested for college readiness require remediation. In her report published in 2014, Gilroy provides data that “45.1 percent of undergraduate Hispanics took remedial English and mathematics courses” which she characterized as a “remedial crisis” (p. 28).

College Readiness and GED Recipients

In regard to GED recipients, Reder (2007) states, “Although the role of the GED as an alternative to high school credential is reasonably well accepted, it is less clear how the GED should serve as a marker to college readiness” (p. 3). Garvey (2011) points out that 75% of GED test takers pass the test but “far fewer pass with the knowledge and skills they need in college” (p. 1). While more and more high school students are enrolling in advanced science and math courses in high school, GED recipients have limited exposure to higher level mathematics, advanced writing, and general cognitive skills, which potentially contributes to their lack of academic success in post-secondary education (Aud et al., 2012; Golden, 2003).

Consequently, research indicates that GED recipients are more likely than the traditional high school graduates to require remedial college coursework, as their poor level of college readiness is indicated by college entrance exams (Tokpah & Padak, 2003). One study by Tokpah and Padak (2003) contributes to the dialogue concerning GED recipients by examining how they fare on college reading, writing, and math placement tests. Tokpah and Padak’s analysis shows that the GED and traditional students’ average scores were not significantly different on the reading placement test. Alternatively, the traditional high school graduates scored higher on average than the

GED recipients on the writing and algebra placement tests. As a result, GED recipients required more remedial classes than the traditional high school graduates. Remedial coursework has the potential to increase the academic skills of underprepared students although using one assessment to mandate coursework is questionable to some (Byrd & MacDonald, 2005).

Support for improving college readiness

Some common ways used to improve college readiness for students consist of providing accurate information to students about financial aid, offering academic support services such as tutoring and test preparation, consolidating remedial courses, and teaching students time management, organization, and perseverance skills (Gilroy, 2014; Venezia & Jaeger, 2013). Federal programs such as Upward Bound/TRIO and GEAR UP allow middle school and high school students to obtain scholarships, access college readiness classes, and participate in tutoring (Gilroy, 2014; Venezia & Jaeger, 2013). In addition, Middle College High Schools (MCHSs) and Early College High Schools (ECHSs) offer minority students or students with low family incomes the opportunity of dual enrollment in high school and college classes (Venezia & Jaeger, 2013). For example, ECHSs began in 2012 in the U.S., and students who graduated “earned a high school diploma and either an associates degree or college credits” (Kaniuka & Vickers, 2010. p. 166). MCHSs and ECHSs allow students to learn at college level while still in secondary education (high school), which in turn lessens the likelihood that they will be required to participate in college-readiness and/or remedial courses. Unfortunately, budget cuts are jeopardizing the future of all of these interventions (Gilroy, 2014).

Post-Secondary Program Completion

College Retention and Graduation

The U. S. federal government, via the Department of Education, has shown an increased focus on understanding the low post-secondary program completion as measured by college graduation rates (Bailey et al., 2006; Lipka, 2013; Mangan, 2014; Roksa, 2010). According to Zhang (2009), at college level,

graduation rates remain to be one of the most popular measures of institutional performance and continue to draw an increasing amount of attention from policy makers in light of the rising issues of institutional accountability. (p. 716)

Luca, Verdyck, and Coppens (2013) directly relate completion rates to institutional accountability. Talbert (2012) calls the declining graduation rates in post-secondary institutions “vexing” (p. 22) and suggests that institutional leaders “increase enrollment, enhance retention, and support students with graduating” (p. 27).

Nationally, groups including Complete College America, Education Commission of the States, Jobs for the Future, and the Charles A. Dana Center at the University of Texas at Austin, collaborated to produce the Core Principles for Transforming Remedial Education. This document attempts to change higher education remedial education policies and practices by providing suggestions for actions meant to decrease the need for remediation (Gilroy, 2014). In addition, non-profit groups such as Complete College America (founded in 2009), the Gates Foundation (funded Achieving the Dream in 2007) and Completion by Design (investment over five years), and the Lumina Foundation for Education (USA Group Foundation, founded in 2000) are collecting data on college completion and college funding (Morris, 2012; Sturgis, 2013). More and more students

with low income backgrounds and/or who are the first in their families to attend college are entering post-secondary education without graduating, so policy makers and higher education practitioners are grappling to understand how to improve retention and graduation rates (Mangan, 2014; Sturgis, 2013). Some recognize that there is a lack of data on academic pathways and drop out risks of various cohorts of students that would help understand when the problems start to manifest. Crosta states (2014):

It is important for institutions to track students and understand when they are at risk of abandoning their studies; but colleges have not yet developed the ability to distinguish normal variation in students' education pathways and signs of potential dropout. (p. 119)

Among the student characteristics that affect college program completion, research has identified gender, age, and whether or not the student is employed during studies. Data shows that in general, women and students who attend college directly after completing high school (younger than age 24) have higher completion rates (up to 20 percentage points higher) than students who attend college part-time or who delay their post-secondary education (Lipka, 2013; Mangan, 2014; Morris, 2012; Stern, 2013a). This is important to know because the sample for this research study was comprised of more women than men of various ages which could potentially impact their program completion. Although the job status of the participants in this study is not known, many students who attend community colleges work at least part time. As a result, they delay college program completion. Mangan (2014) reports that one in five part-time students will earn a certificate or degree in the span of six years.

Krumrei-Mancusco, Newton, Kim, and Wilcox (2013) declare that, "student success is at the heart of the educational enterprise", and "retaining students until

graduation is often a direct fulfillment of the mission of institutions of higher learning” (p. 247). In 2011, the National Commission on Higher Education Attainment met in Washington, DC and created a document focused on recommendations for increasing retention and graduation. This report emphasized the large college enrollment rates versus the low graduation rates (National Commission on Higher Education Attainment, 2013). Recommendations began with focusing on access and financial aid (Montalvo, 2013) as the majority of students attending college are part-time students or working adults who need flexible course schedules and depend on financial aid (National Commission on Higher Education Attainment, 2013; Valentine et al., 2011).

State funding for higher education dropped so dramatically in 2012 that a consequent unprecedented decline in student support services and tuition aid followed (National Commission on Higher Education Attainment, 2013). The National Commission on Higher Education Attainment report outlines general areas where change is required including “changing campus culture to boost student success, improving cost-effectiveness and quality, and making better use of data to boost success” (National Commission on Higher Education Attainment, 2013, pp. 10- 20). In addition, there is a need for career counselors, increased support of veteran students, and opportunities for faculty to learn updated effective teaching strategies (National Commission on Higher Education Attainment, 2013). Next, class schedules should be flexible and allow for individualized instruction; course work should be relevant to each student and transfer to other schools with ease (National Commission on Higher Education Attainment, 2013). Lastly, effective and efficient data collection and analysis allows for a better

understanding of what changes are positively impacting program completion and degree attainment (Morris, 2012; Nandeshwar, Menzies, & Nelson, 2011; National Commission on Higher Education Attainment, 2013). Complete College America adds the need to encourage students to participate in dual enrollment courses while in high school and to lobby policy makers to link funding to student completion of remedial courses and graduation (Mangan, 2014).

Community Colleges

While the National Commission on Higher Education Attainment addressed high education graduation rates in general, much attention is on community colleges completion rates (Kolenovic, Linderman, & Karp, 2013; Nitecki, 2011) as community colleges have “a crucial role in providing access to college” (Bailey & Alfonso, 2005, p.1). A study conducted by Bailey et al. (2006) examined data from the Integrated Post-secondary Education Data System (IPEDS) to model community college graduation rates. The data indicated that graduation rates were affected by institutional characteristics such as student composition (e.g., percentages of students by race/ethnicity, gender, part-time or full-time enrollment), college resources, size, and location (Bailey et al., 2006). Crosta (2014) notes that students attending community colleges are less likely to earn a certificate or degree because their status fluctuates from being full time to part time students and they take semesters off from attending classes.

Research by Bremer et al. (2013) examined college outcomes for a cohort of students at a community college, and found effects of age, race/ethnicity and program of study type on program completion. Results showed that older students, White/non-

Hispanic students, and students pursuing technical programs were more likely to graduate (Bremer et al., 2013). Also, the data took into account whether or not students in the cohort required remedial courses since so many students typically need remediation (Cooper, 2014); students required to enroll in remedial math classes were less likely to graduate when compared to students who did not need remedial math (Bremer et al., 2013). However, the studies by Bailey et al. (2006) and Bremer et al. (2013) reported graduation rates of students at the community college without differentiating students by their secondary education credential (traditional high school diploma or GED) which I argue constitutes a gap in the research literature.

In summary, the empirical research literature demonstrates:

- College and career readiness is a “national crisis” (Ivey, 2011, p. 96). Most college students require remediation with GED recipients and Hispanics students requiring more remediation than traditional high school graduations and/or students of other ethnicities (Garvey, 2011; Gilroy, 2014).
- Post-secondary program completion is a significant concern (Kim & Irwin, 2013), and is described as a “pervasive” and “persisting issue” (Williams, 2011-2012, p. 39). There is limited research on program completion of GED recipients at the community college as compared to traditional high school graduates.

My dissertation aims at filling the gap in literature by focusing particularly on the differences in community college participation and completion between GED recipients and traditional high school graduates. Current research discusses student success at

institutions of higher education, in general, but do not sufficiently address the issue of GED recipients at the community college.

Theoretical Framework

The guiding theoretical framework for this study is built around the concept of academic capital and the idea that individuals experience opportunities and obstacles over life course that affect their ability to capitalize on their investments in education. The study focuses on the time period in which individuals are enrolled in higher education after completion of high school requirements, whether through traditional high school coursework and graduation or the GED. Although research literature shows that the pathways to higher education matter (Wolniak & Engberg, 2010), this study inquires whether GED recipients are capable of building on the second chance that they had to obtain a secondary education diploma, and are capable of increasing their educational attainment through completion of higher education credential. A useful concept attached to the transition from secondary to post-secondary education is academic capital.

Academic capital describes the amount of education and academic experiences possessed by individuals that together with other forms of capital (e.g. social, cultural) determine their position in society. According to Bourdieu (1984):

Academic capital is in fact the guaranteed product of the combined effects of cultural transmission by the family and cultural transmission by the school (the efficiency of which depends on the amount of cultural capital directly inherited from the family). (p. 23)

The reference to academic capital is quite rare in Bourdieu's work; he mostly refers to the notion of cultural capital (1986) which also includes educational qualifications that people use to accumulate further forms of capital (e.g., economic) over life course.

Although not addressed in this study, I acknowledge that other forms of capital (e.g., social capital) could have been helpful in understanding the creation and accumulation of academic capital. For instance, Alfred (2010) refers to Bourdieu's social capital as "emphasizing the resources that people use to secure their own personal advantage" (p. 216) which clearly supports the idea that college readiness could be related to social capital. Social capital is not included in the theoretical framework of this study as the available data focuses specifically on academic capital. Fully understanding the social capital acquired by each individual, based on college students' accessible data, is beyond the scope of this study.

Economists use the notion of human capital (Schultz, 1961) and the idea that investment in education leads to economic returns over life course (Jackson & Kurlaender, 2013). In accordance with Rosenbaum (2001), human capital encompasses not only qualifications, but skills and abilities. Particularly for adults, skills and abilities are essential to succeed in the labor market as well as in continuing post-secondary education. Adults are faced with "opportunities and limitations" (Shanahan, 2000, p. 668) and make use of human capital to progress through life pathways.

For this study, I define academic capital not only as academic preparedness (i.e., knowledge, skills, abilities) that students need to start their college journey, but also in relation to program completion as an indicator of human capital acquisition that will likely increase labor market opportunities. Indeed, through their research, Cao et al. (1996) identified the preparation for the GED credentialing as adding to a person's human capital because they found that individuals with GED preparation had better

paying job options than individuals who did not complete high school graduation requirements. Bowen, Chingos and McPherson (2009) contend that “The key linkage is between the formation of human capital and productivity” (p.1). When comparing people who completed high school via a traditional route and the GED recipients, high school completers had the best salaries which was attributed to the human capital acquired by completing high school (Cao et al., 1996). Although academic and human capital notions are connected, for the purpose of this study, I will mainly employ the term of ‘academic capital’.

An additional theoretical perspective is based on the life course theory that employs the notion of pathways. Elder (1994) describes the life course as “a multilevel phenomenon, ranging from structured pathways through social institutions and organizations to the social trajectories of individuals and their developmental pathways” (p. 5). Benner (2011) believes that the life course theory “provides a developmental lens through which to study educational phenomena” (p. 300) and should be used when transitions and trajectories are the focus of research. Published educational studies from the 1980s to 2010s using the life course perspective have examined outcomes and variables including school dropout, GPA, achievement test results, attendance, and academic resilience (Benner, 2011). According to Crosta (2014), “student pathways are the time-ordered series of courses that students complete as they advance toward their education goals, typically program completion with a credential or transfer to a bachelor’s degree program” (p. 118). For this study, the structured pathways consist first in the specific way individuals completed secondary education and further engaged and

navigated through college to acquire academic capital. There is a need to employ the life course theory to “link individuals to the larger populations, improving understanding of not only micro-level student experiences but also macro-level educational inequalities that are targets by educational policy” (Benner, 2011, p. 300).

Therefore, the guiding theoretical framework for this study is shaped around Bourdieu’s notion of academic capital acquired through various formal education pathways over life course. The research design of the study and the interpretation of findings are supported by the notions of academic capital and life course to better explain the academic trajectories of GED recipients and traditional high school graduates.

Chapter 3

Method

This is a quantitative study employing community college administrative and academic data to examine how the type of secondary education credential affects students' college pathways. The purpose of this study is to explore the academic trajectories of GED recipients enrolled in courses at an urban community college in the Dallas/Fort Worth area, and to compare their paths toward college graduation to those of traditional high school graduates enrolled in the same community college at the same time (i.e., the 2005-2006 academic year). The study examines the relative contribution of demographic factors, pre-college academic preparedness, and specific college trajectories on building one's academic capital at the college level.

This chapter starts by reviewing the research questions and the conceptual model that will guide this study. In addition, this chapter includes information on the research site, data collection procedures, student population, and research sample. The main part of the chapter focuses on the research design of this study including the presentation of variables and the statistical analysis used to address the study research questions.

Research Questions

This study addresses the following three research questions:

1. Are there differences in pre-college academic preparedness (e.g., need to enroll in remedial courses in college) between all GED recipients and traditional high school graduates enrolled at the community college? Are these differences also controlled by demographic factors (e.g., gender, race/ethnicity, and age)?

2. What program of study types are GED recipients and high school graduates pursuing? Are there differences in student outcomes (i.e., college level GPA, total number of college credits earned, and program completion) between GED recipients and traditional high school graduates enrolled in degree programs? Are these differences also controlled by demographic factors (e.g. gender, race/ethnicity, and age)?
3. What is the combined effect of demographic factors (e.g. gender, race/ethnicity, and age), pre-college academic preparedness (e.g., secondary education credential, need to enroll in remedial courses in college), and college trajectories (e.g., program of study type) on student outcomes (i.e., college level GPA, total number of college credits earned, and program completion)?

Conceptual Model

According to Brathwaite (2002), “Conceptual frameworks or models are used to guide research studies, nursing practice, and educational programs” (abstract). The conceptual model of the study is built on the assumption that academic capital acquired at college level, and evident in student outcomes, is based on pre-college academic preparedness and influenced by one’s college trajectory, being qualified by students’ demographic characteristics. The design variable of the study (i.e., main independent variable to control student college outcomes) is a particular pre-college factor: type of secondary education credential.

Table 3.1 shows the conceptual model of the study - main concepts and variables. First, I argue that college trajectory is built not only on the secondary education degree

acquired, but also on pre-college academic preparedness because lack of skills in reading, writing, and math will require that students enroll in remedial courses prior to choosing a specific program of study at college level. A student needing remediation will be required to complete reading, writing, and/or math courses before enrolling in courses toward a certificate or degree, unless the student is pursuing a unique program of study that does not require the student to be college ready (exempt). In addition, there is the added complexity of pre-college academic preparedness and college trajectories since gender, race/ethnicity, and/or age may potentially alter the academic pathways of the students who are required to enroll in remediation.

Table 3.1 Conceptual Model

| Demographic factors | Pre-college academic preparedness | College trajectory | Student outcomes |
|---|--|---|---|
| <ul style="list-style-type: none"> • Gender • Race/ethnicity • Age | <ul style="list-style-type: none"> • Secondary education credential • Required remedial math • Required remedial reading • Required remedial writing | <ul style="list-style-type: none"> • Program of study type | <ul style="list-style-type: none"> • College level GPA • Total number of college credits earned • Program completion |

Next, college academic trajectories are important in reaching the final graduation goals. For the purpose of the study, I use the program of study type pursued to describe what students do at the college level. Program of study type describes whether the student is pursuing a transfer degree or is taking courses in a career/technical program which generally do not transfer. Examples of transfer programs of study are the

Associate in Arts degree and the Associate in Sciences degree. An example of a career/technical program of study is the Welding Associate in Applied Science degree.

Finally, student outcomes are discussed in terms of program completion, college level GPA, and total number of college credits earned which concludes a student's academic trajectory. Program completion (earning a certificate and/or degree) can be viewed as evidence of acquisition of academic capital and will likely affect the student's life course over time. Nonetheless, completing coursework is still vitally important in the acquisition of academic capital even if the student does not earn a certificate or degree; as a result, student outcome data such as college level GPA and total number of college credits earned are included in the conceptual model. Data on college level GPA and total number of college credits earned is used to compare groups of students (GED recipients and high school graduates) and to understand progress made during the time that the sample of students in this study attended the community college. A high college level GPA (with the maximum value being 4.0) and a larger total number of college credits earned can indicate a higher level of academic capital accumulated over time, that can be ultimately translated into a terminal degree or at least indicate the extent of individual's participation in higher learning.

While of critical importance is analyzing these factors and outcomes in relation to secondary education credential, additional analysis is performed to differentiate academic trajectories and student outcomes by demographic factors. For the purpose of this study, gender, race/ethnicity, and age are assumed to have an impact on students' pre-college

preparedness, choice of academic programs (program of study type), as well as college outcomes.

Data

Research Site

The college students selected for this study were enrolled in classes at one specific campus in a large urban community college system in the Dallas/Fort Worth area of Texas for the academic year 2005-2006. The community college system will be called CCS and is composed of seven campuses; the campus referenced in this study will be called Southwest Campus (SWC). According to the campus web page, SWC began serving students in 1970, as the second campus of CCS to open. SWC is accredited by the Southern Association of Colleges and Schools Commission on Colleges (SACS) and therefore, is able to offer students federal financial aid and transferable course work. In accordance with Creswell's (2009) recommendations for sample selection, this urban campus is "purposefully" (p. 178) chosen as the student records are plentiful and robust, and the student body is large enough to collect data for a sample of GED recipients and high school graduates for comparison.

The available academic and administrative data used in this study covers eight years between 2005-2006 and 2012-2013. Full completion data for SWC for specific program types has not yet been published for 2012-2013 which is the final academic year of data collection for the purpose of this study. However, it is important to note that between the academic years 2005-2006 and 2011-2012, SWC awarded 1,190 career/technical certificates (nontransferable), 383 career/technical associate degrees

(nontransferable), 66 nursing degrees, and 2,487 general studies associate degrees (transferable).

According to data posted on SWC's webpage, in 2005-2006, 75% of the certificates/degrees awarded were to female students. In 2012-2013, 59% were awarded to female students. Mirroring the ethnicity of the student body (primarily Hispanic as the campus is an HSI), the students who were awarded certificates/degrees were predominately Hispanic followed by Black students, both in 2005-2006 and 2012-2013.

Data Collection Procedures

The SWC student records database is first searched by the SWC Institutional Research (IR) staff to identify students in this community college who indicated on their applications for admissions that they earned GED credentials prior to enrollment and who were enrolled in courses at SWC for the 2005-2006 academic year. The same procedure is utilized to identify high school graduates attending SWC the same academic year. Secondary education credential information is available since students are asked to provide their high school diploma or evidence of a GED credential in order to apply for federal financial aid. Since student information is collected from 2005-2006 until 2012-2013, selecting the cohort enrolled in 2005-2006 enrollment allows ample time to pass (i.e., at least 8 years) in order for students to complete their program of study.

The analysis employs student level data. All of the variables except demographic factors (i.e., age, gender, and race/ethnicity) are attainable through the student's Advising Report. This is a document created by CCS student records database software available to the researcher and includes basic information on each individual student enrolled in

courses in CCS. Age, gender, and race/ethnicity data are obtainable from community college IR staff since they have access to Admissions data and this information was collected as the student applies for admission to the college. CCS assigned student identification numbers that will allow the merging of the two databases to create unique student records.

Student Population and Sample

The student population enrolled at SWC for the 2005-2006 academic year includes a total of 537 GED recipients and 7,237 traditional high school graduates. All of the GED recipients identified are considered for this study; an equal number of traditional high school graduates are randomly selected, via a random number chart, from the 7,237 identified by IR staff. Frequency tables of various demographic variables (e.g., age, gender, and race/ethnicity) ensure that the high school graduate sample matches approximately that of the GED recipients. All participants are assigned a numeric ID in the original database so that their confidential information can be eliminated from the final research file to avoid personal identification. The research sample employed in the study for Research Question 1 consists of N=1,073 students; 536 of the sample are GED recipients and 537 are traditional high school graduates. These students are enrolled in a variety of program of study types, some not leading to credentials. For Research Questions 2 and 3, students who did not pursue a degree granting program of study were removed from the sample, and the analysis is based on a sub-sample of N=980.

Research Design

Creswell (2009) states that the quantitative research method has been the dominate form of research for the social science for last 100 years. This is an empirical quantitative study based on various statistical analysis procedures (see e.g., Gall, Gall, & Borg, 2007). The study uses a comparative design that consists of contrasting and comparing student outcomes for groups that differ in terms of secondary education credential (i.e., GED recipients and traditional high school graduates). I also employ a correlational design to model student outcomes by various demographic, pre-college academic preparedness, and college trajectory factors.

Variables

Table 3.2 shows the constructs and variables used in the study, with the focus on the type of variable (i.e., categorical or continuous) and the categories of categorical variables. Each variable is further described in this section. Therefore, Table 3.2 expands the conceptual model presented in Table 3.1 by providing details on how each study variable is defined and what format will be used in the analysis.

Table 3.2 Constructs and Variables

| Construct | Variable | Label | Variable type/Categories |
|---------------------|----------------|-------|--|
| Demographic factors | Gender | GDR | 2-category variable: 1=Male; 2=Female |
| | Race/ethnicity | ETH | 5-category variable: 1=Anglo; 2=African American; 3=Hispanic; 4=Asian/Pacific Islander; 5=Other |
| | Age | AGE | Continuous variable <i>OR</i> 5-category variable: 1=24 years old-29 years old; 2=30 years old-34 years old; 3=35 years old-39 years old; 4=40 years old-49 years old; 5=50 years old and older |

Table 3.2 - continued

| | | | |
|-----------------------------------|--|--------|---|
| Pre-college academic preparedness | Secondary education credential | SEC | 2-category variable: 1=GED; 2=High School |
| | Required remedial reading | RRR | 3-category variable: 0=No; 1=Yes; 3=Exempt |
| | Required remedial writing | RRW | 3-category variable: 0=No; 1=Yes; 3=Exempt |
| | Required remedial math | RRM | 3-category variable: 0=No; 1=Yes; 3=Exempt |
| College trajectory | Program of study type ^a | PST | 2-category variable: 1=transferable; 2=other |
| Student outcomes | College level GPA | CLGP A | Continuous variable (0-4) |
| | Total number of college credits earned | TCE | Continuous variable |
| | Program completion | PC | 4-category variable: 0=none; 1=certificate only; 2=degree only; 3=more than one credential <i>OR</i> 2-category variable 1=None; 2=At least one degree/certificate |

^a Program of study is described broader in Research question 1 when the analysis is based on the full research sample that includes students who are not on a degree program path. Research questions 2 and 3 focus on a sub-sample of students enrolled in programs leading to credentials.

First, I introduce the demographic factors (e.g., gender, race/ethnicity, and age) used as control variables in the study. Second, I consider indicators of pre-college academic preparedness such as secondary education credential (GED or high school diploma) and college readiness (required remedial reading, writing, and math courses) based on entrance tests (Accuplacer, SAT, TAKS test) scores. Third, I consider program completion (i.e., whether or not the student earned certificates and/or degrees). Program completion is “the most common measure of success” (p. 98) in post-secondary education, according to Nitecki (2014), and therefore is a key element of this study.

Finally, I make the assumption that pathways toward college program completion are also relevant to efficiently building academic capital operationalized through 3 variables: program of study type, college level GPA, and total number of college credits earned are relevant and useful.

Demographic factors considered as potentially affecting and/or predicting pre-college academic preparedness, trajectories, and college outcomes are gender, race/ethnicity, and age. Gender is a categorical variable with 2 categories, male or female. Race/ethnicity is a categorical variable with 5 categories (names are used as recorded in the administrative data): Anglo, African American, Hispanic, Asian/Pacific Islander, and Other (American Indian, Non Resident/Alien, and Unknown). Age is recorded based on subtracting the birth year from 2013, and is also aggregated for some analysis into five groups: starting at age 24 and breaking into groups every 5 years until 50. The last group contains age 50 years old or older. Age is used as a continuous variable in the regression models and as a categorical variable for the comparative analysis.

In terms of pre-college academic preparedness, secondary education credential is a 2-category variable (GED credential and high school graduate). Required remediation is coded for three components: reading, writing, and math. Whether or not a student was required to take a remedial class, per category, will be coded as “no” = 0, “yes” = 1, and “exempt” = 3. The third category describes a few situations where a student is exempt and therefore will not have scores; possible scenarios include if the student is enrolled in

a certificate program that does not require these scores or if the student is returning to school after serving in the military.

Program of study type is determined by examining the majority of credits that the student earns, and based on information listed on the student's Advising Report. This determination was done by the researcher and reflects my knowledge and understanding of courses and programs at SWC. These credits can be general studies credits (transferable credits), or other types of credits (career/nursing credits/nontransferable credits). Program of study type is hugely important in understanding the students' academic trajectories. First, some programs are designed to earn credits that can be transferred to a university and include general study courses. Students engaged in this path indicate an initial interest in pursuing higher education after the two-year associate degree at SWC. Second, career/technical programs or nursing programs allow students to earn terminal certificates and degrees that do not transfer to university degree programs and are coded as "Other" for this study. This indicates that the student is potentially hoping to complete a quick program to improve job skills and/or does not aspire to continue his/her education after the associate degree. For Research Question 1, program of study type is used as a 4-category variable in order to provide a full portrayal of the choices made by the student population: in addition to transferable or other programs, students are listed as students who only enrolled in remedial courses or ESL/ESOL courses. Remedial courses and ESL/ESOL courses are not part of a program of study but are listed for Research Question 1 to provide a clear picture of the courses that the randomly selected sample (representative for the student population) enrolled in. For

Research Questions 2 and 3, I use program of study type as a 2-category variable: transferable or other, and I actually base the analysis on a smaller sample after removing students enrolled in remedial courses and ESL/ESOL courses who do not aspire toward completing a program of study.

Regarding student outcome variables, college level GPA is a continuous variable and is recorded exactly as indicated on the Advising Report as a numerical variable with two decimal places. Some examples are 4.00 and 2.03. Total number of college credits earned is totaled based on college credits listed on the student's Advising Report. This is significant information because not all students will complete a program of study but their academic trajectory and post-secondary education participation can still be evaluated using total number of credits earned and college level GPA. Program completion is the third outcome listed on the student's Advising Report. For this study, initially, program completion is recorded based on 4 categories (none, certificate only, degree only, or more than one credential) to provide more detail. However, since detailed analysis by demographic factors cannot be conducted with small sample sizes, I decided to aggregate some categories and define program completion as a 2-category variable: no program completion (none) or at least one degree/certificate.

Statistical Analysis

Various statistical techniques are employed in the study in order to make meaning of the data acquired (Gravetter & Wallnau, 1991). In this case, IBM's SPSS is the tool used to describe the data and identify statistically significant associations among variables (George & Mallery, 2014). Statistical analysis includes descriptive statistics,

analysis of variance (ANOVA) tests, crosstabulations and chi-square tests, and regression models. I will first provide some basic information on each statistical procedure.

Descriptive statistics are one way to “get acquainted” with the data (Johnson, 1992, p. 39). As described by Creswell (2009), descriptive statistics include ranges, standard deviations, and means. For this study, descriptive statistics include percent frequency for gender, race/ethnicity, age, required remedial reading, writing, and math, program of study type, and program completion, as well as measures of central tendency for continuous variables such as college level GPA and total number of college credits earned.

Chi-square distribution is a statistical test used to determine if two variables are independent of each other (Bluman, 2008). “The chi-square test is a nonparametric statistical test to determine whether research data in the form of frequency counts are distributed differently in different samples” (Gall, Gall, & Borg, 2007, p. 325). The chi-square test is an appropriate method of statistical analysis for this study as counts and percentages for program completion and program of study type are compared between GED recipients and high school graduates. I also use chi-square statistics to test the null hypothesis that required enrollment in remedial reading, writing, or math is independent on secondary education credential. Crosstabulations are employed, for instance, to show the distributions of remedial course enrollment by secondary education credential, for all students or separately by gender, race/ethnicity, and age groups. This is appropriate as “the purpose of crosstabulations is to show in tabular format the relationship between two or more categorical variables” (George & Mallery, 2014, p. 124).

In addition, comparing means is one way to “describe a relationship between one or more independent variables and a dependent variable” (Gravetter & Wallnau, 1995, p.69). Means and standard deviations are used to measure central tendency and variability (Gall, Gall, & Borg, 2007, p. 134). For this research, means are computed for college level GPA and total number of college credits earned, and will be compared by various factors using ANOVA tests. For instance, an ANOVA test allows for the examination of significant difference in the means of continuous variables across groups (George & Mallery, 2014), and the technique is appropriate for comparing the means of the total number of college credits earned and the means of college level GPA between the two secondary education credentialing groups. ANOVAs can be then conducted to compare means of the two continuous variables by secondary education credentials when the sample is disaggregated into groups based on age, gender, and race/ethnicity.

Lastly, several regression models are conducted in order to examine the relative contribution of demographic factors (gender, race/ethnicity, age), required remedial reading, writing, and math enrollment, secondary education credential, and program of study type on student outcomes. Linear regressions are used for dependent variables that are continuous such as college level GPA and total number of college credits earned as they allow “for the control of one variable (the independent variable) by means of controlling another variable” (dependent variable) (Johnson, 1992, p. 652). A binary logistic regression is used to predict program completion, which I will describe for this analysis as a 2-category dependent variable (none, at least one degree/certificate).

Table 3.3 summarizes the statistical procedures used for each analysis corresponding to the three research questions. The first research question is based on the full sample (N=1073) and consists of exploring the level of pre-college academic preparedness and need for remediation for the research sample. All variables involved are categorical which justifies the use of crosstabulations and chi-square tests. The second research question is based on a smaller sample of students pursuing a degree program (N=980), and focuses on student outcomes through a comparative perspective. It explores differences in means for college level GPA and total number of college credits earned when contrasting groups differentiated by secondary education credentials for all sample or separately for gender, race/ethnicity and age groups. The third question also focuses on student outcomes but takes a correlational approach, by focusing on developing three regression models: two linear regression models for predicting GPA and total number of credits earned, and one binary logistic regression model for program completion.

Table 3.3 Research Questions, Variables, and Statistical Procedures

| Research Question | Variables | Statistical Procedures |
|-------------------|---|---|
| 1 | <u>Pre-college academic preparedness:</u> Remedial reading, writing and math Secondary education credential Gender Race/ethnicity Age | Crosstabulations and Chi-square tests ($p < 0.05$) |
| 2 | <u>Student outcomes (comparisons):</u> College level GPA Total number college credits earned Program of study type (2-category variable) Program completion (2-category variable) Secondary education credential Gender Race/ethnicity | Descriptive statistics and ANOVA ($p < 0.05$) Crosstabulations and Chi-square tests ($p < 0.05$) |

Table 3.3 - continued

| | Age | |
|---|---|---|
| 3 | <u>Student outcomes (models):</u> College level GPA Total number college credits earned Program completion (2-category variable) Secondary education credential Gender Race/ethnicity Age (continuous) Remedial reading, writing, and math Program of study type (2-category variable) | Linear regression model Linear regression model Binary logistic model |

Chapter 4

Findings

Chapter 4 presents the findings of the study and is organized into the following sections:

- Descriptive statistics of the sample (rationale for subsample selection)
- Pre-college preparedness (Research Question 1)
- Comparative analysis of college trajectories (Research Question 2)
- Models of student outcomes (Research Question 3)

Descriptive Statistics of the Sample

Table 4.1 includes descriptive statistics of the randomly selected representative research sample including mean values for the continuous variables (e.g., age) and percentages for categorical variables (e.g., age groups, gender, race/ethnicity, secondary education credentials, required remediation for reading, writing, and math, and program of study type). Age is used as a categorical variable for conducting descriptive and comparative analysis (Research Questions 1 and 2) and as a continuous variable for the regression models (Research Question 3).

Table 4.1 Descriptive Statistics of the Research Sample (N=1073)

| Variable | Category | Percent (%) / means |
|---------------------|------------------------|---------------------|
| Demographic factors | | |
| Age (categorical) | 24-29 years old | 30.2 |
| | 30-34 years old | 24.4 |
| | 35-39 years old | 15.3 |
| | 40-49 years old | 18.2 |
| | 50 years old and older | 11.9 |
| Age (continuous) | Continuous | 36.3 |
| Gender | Male | 35.6 |
| | Female | 64.4 |

Table 4.1 - continued

| | | |
|---|--|------|
| Race/ethnicity | Anglo | 20.2 |
| | African American | 28.4 |
| | Hispanic | 45.3 |
| | Asian/Pacific Islander | 3.4 |
| | Other | 2.7 |
| Secondary education credential | | |
| Secondary education credential | High school diploma | 50.0 |
| | GED | 50.0 |
| Required remediation | | |
| Required remedial reading | No | 56.9 |
| | Yes | 38.9 |
| | Exempt | 4.2 |
| Required remedial writing | No | 65.1 |
| | Yes | 29.5 |
| | Exempt | 5.4 |
| Required remedial math | No | 14.4 |
| | Yes | 78.8 |
| | Exempt | 6.9 |
| College trajectory and selected outcomes | | |
| Program of study type (4-category variable) | General studies/transerable degree | 52.4 |
| | Career/technical non transferable certificate/degree | 35.0 |
| | Nursing | 3.9 |
| | Majority remedial courses | 6.8 |
| | Majority ESL/ESOL | 1.9 |
| Program completion (4-category variable) | None | 72.9 |
| | Certificate only | 3.4 |
| | Degree only | 16.8 |
| | More than one credential | 7.0 |

In terms of demographics, sample data (Table 4.1) indicates that the majority of the students in the sample (54.6%) were between 24-34 years old. The sample was comprised of 64.4% female and the largest portion of the sample was Hispanic (45.3%). The large difference in the number of females and males in the sample was surprising although ethnicity was expected to be primarily Hispanic as SWC is an HSI. The sample was selected as to have comparable numbers of high school graduates and GED

recipients. The subsamples of high school graduates and GED recipients are similar in terms of gender, ethnicity and age.

Considering required remediation, data on whether or not individuals in the sample were required to enroll in remedial courses showed that most students did not need to enroll in remedial reading (56.9%) or remedial writing (65.1%). Conversely, 78.8% of the sample was required to enroll in remedial math as compared to only 38.9% in remedial reading and 29.5% in remedial writing. Later in this chapter, required remediation will be discussed in terms of secondary education credential and demographics; a clearer picture of college readiness of the sample will develop as a study finding.

College trajectories are described in terms of program of study and program completion. Most students (52.4%) are enrolled in general studies, transferable programs while about 38.9% in career programs and nursing. Over 70% of students did not complete any credential yet. This sample (N=1,073) will be used to address Research Question 1 about pre-college preparedness.

After exploring data using detailed categories for program of study type and program completion for the full sample, I first decided to eliminate the 93 students (or 8.7% of the sample) who were not enrolled in degree program and could not be evaluated in terms of program completion. This leads to a sample of N=980 that will be used to answer Research Questions 2 and 3. In addition, after exploring program completion in relation to other variables, I decided to aggregate program completion categories and use a 2-category variable (none/at least one credential). The descriptive statistics of the new

sample (N=980) is only slightly altered in terms of demographics and pre-college preparedness so I will not present the details. Table 4.2 describes only the college trajectory and student outcome variables for the reduced sample (N=980) that will be used to address Research Questions 2 and 3.

Table 4.2 Descriptive Statistics of the Reduced Research Sample (N=980)

| Variable | Category | Percent (%) / means |
|--|------------------------------------|---------------------|
| College Trajectory | | |
| Program of study type (2-category variable) | General studies/transerable degree | 57.3 |
| | Other | 4 |
| | | 2 |
| | | .7 |
| Student Outcomes | | |
| College level GPA | Continuous (range 0-4) | 2.51 |
| Total number of college credits | Continuous | 47.16 |
| Program completion (4-category variable) | None | 70.3 |
| | Certificate only | 3.7 |
| | Degree only | 18.4 |
| | More than one credential | 7.7 |
| Program completion (2-category variable) | None | 70.3 |
| | Other | 29.7 |

Table 4.2 shows that 57.3% of the students are enrolled in transferable programs of study while 42.7% are enrolled in program of study types leading to more applied degrees (i.e., career/technical/nursing). The mean college level GPA for the sample was 2.51 and the total number of college credits earned was 47.16. A degree at SWC, whether transferable or not, requires at least 60 total specific college credits earned so this data indicates that many students in this study did not earn enough college credits to graduate with a degree. The least amount of college credits required for a certificate is 16

so some of these students may have earned certificates. Program of study type and program completion will be discussed in detail later in this chapter in relation to Research Questions 2 and 3. The college level GPA required to earn a certificate or degree at SWC range from 2.0 to 2.5 so the average college level GPA of the sample (2.51) is adequate.

Program completion (earning a certificate or degree) was remarkably low for this sample with 70.3% completing no program of study. Of the 29.7% who completed a program, 18.4% obtained a degree only, 7.7% more than one credential (a certificate and a degree, for example), and 3.7% earned a certificate only. These dismal completion rates will be discussed in more detail later in the chapter as secondary education credential and demographics are included in the conversation.

The remainder of the chapter consists of presenting findings of this study following the analysis used to address each. At the end of each section, there is a summary of the major findings.

Pre-college Preparedness

Research Question 1: Are there differences in pre-college academic preparedness (e.g., need to enroll in remedial courses in college) between all GED recipients and traditional high school graduates enrolled at the community college? Are these differences also controlled by demographic factors (e.g., gender, race/ethnicity, age)?

To answer this research question, I ran a series of crosstabulations for each of the three remedial course enrollment measures (reading, writing, math), first by secondary credential for all sample, and then separately for each demographic groups differentiated

by gender, race/ethnicity and age. Each analysis is accompanied by a chi-square test of association between enrollment in a specific remedial course and secondary credential. A p value less than 0.05 shows evidence of a statistically significant relationship between the two categorical variables (Gall, Gall, & Borg, 2007). For instance, if a chi-square test shows $\chi^2(2, n=1073) = 8.615, p = 0.013$, then I conclude that there is a statistically significant relationship between secondary education credential and remedial reading enrollment.

Remedial Reading and Secondary Education Credential

This first section focuses on the association between enrollment in remedial reading and secondary education credential for the whole sample and then separately for demographic groups. Table 4.3 displays the results of the analysis that are also briefly discussed in the text.

Table 4.3 Remedial Reading Enrollment by Secondary Education Credential (Column %)

| | Required remedial course | Secondary education credential | | Chi-square test (p value) |
|--------|--------------------------|--------------------------------------|--------------------------------------|------------------------------|
| | | GED recipients n (%) | High school graduates n (%) | |
| All | No Yes Exempt | 296 (55.2) 208 (38.8) 32 (6.0) | 315 (58.7) 209 (38.9) 13 (2.4) | 0.013* |
| Gender | | | | |
| Male | No Yes Exempt | 113 (61.1) 59 (31.9) 13 (7.0) | 117 (59.4) 74 (37.6) 6 (3.0) | 0.138 |
| Female | No Yes Exempt | 183 (52.1) 149 (42.5) 19 (5.4) | 198 (58.2) 135 (39.7) 7 (2.1) | 0.036* |

Table 4.3 - continued

| Ethnicity | | | | |
|------------------|--------|------------|------------|--------|
| Anglo | No | 97 (74.6) | 73 (83.9) | 0.251 |
| | Yes | 23 (17.1) | 9 (10.3) | |
| | Exempt | 10 (7.7) | 5 (5.7) | |
| African American | No | 63 (46.7) | 92 (54.1) | 0.124 |
| | Yes | 66 (48.9) | 76 (44.7) | |
| | Exempt | 6 (4.4) | 2 (1.2) | |
| Hispanics | No | 119 (49.8) | 130 (52.6) | 0.061 |
| | Yes | 105 (43.9) | 112 (45.3) | |
| | Exempt | 15 (6.3) | 5 (2.0) | |
| Asian | No | 10 (55.6) | 9 (50.0) | 0.942 |
| | Yes | 7 (38.9) | 8 (44.4) | |
| | Exempt | 1 (5.6) | 1 (5.16) | |
| Other | No | 7 (50.0) | 11 (73.3) | 0.196 |
| | Yes | 7 (50.0) | 4 (26.7) | |
| | Exempt | 0 (0.0) | 0 (0.0) | |
| Age | | | | |
| 24-29 | No | 41 (53.9) | 136 (54.8) | 0.049* |
| | Yes | 32 (42.1) | 111 (44.8) | |
| | Exempt | 3 (3.9) | 1 (0.40) | |
| 30-34 | No | 76 (55.9) | 75 (59.1) | 0.120 |
| | Yes | 53 (39.0) | 51 (40.2) | |
| | Exempt | 7 (5.1) | 1 (0.8) | |
| 35-39 | No | 65 (58.0) | 33 (63.5) | 0.517 |
| | Yes | 45 (40.2) | 17 (32.7) | |
| | Exempt | 2 (1.8) | 2 (3.8) | |
| 40-49 | No | 69 (53.5) | 46 (69.7) | 0.080 |
| | Yes | 54 (41.9) | 17 (25.8) | |
| | Exempt | 6 (4.7) | 3 (4.5) | |
| 50+ | No | 45 (54.2) | 25 (56.8) | 0.891 |
| | Yes | 24 (28.9) | 13 (29.5) | |
| | Exempt | 14 (16.9) | 6 (13.6) | |

* $p < 0.05$ ** $p < 0.001$; N=1073

Data show that just under 40 % of the students in this study were required to enroll in remedial reading (417 students) and over 55% were not required to take remedial reading. Based on secondary education credentials, the number of GED recipients required to enroll in remedial reading (208 students) was nearly identical to the

number of high school graduates (209) required to enroll in remedial reading. The chi-square test showed that there is a significant association between need to enroll in remedial reading and secondary education credential, $\chi^2(2, n=1073) = 8.615, p = 0.013$ which likely comes from the disproportion of 'no' and 'exempt' responses. Apparently more GED students were exempt of taking remedial reading courses. There is no way to know, based on the data collected, why GED were exempt from required reading remediation but the common reasons are because the student is returning from the military or pursuing a program of study type that does not require college readiness in reading (e.g., a technical certificate).

Gender groups

When considering the relationship between required reading remediation and secondary credential by gender groups, 60.2% of the men and 55.1% of females were not required to enroll in remedial reading. As detailed in Table 4.3, based on secondary education credential, 61.1% of the males who earned a GED and 59.4% of males who earned a high school diploma did not need to enroll in remedial reading. Although the GED recipients' percentage was higher than the high school graduates' percentage, among men, there is no statistically significant association between need to enroll in remedial reading and secondary education credential, $\chi^2(2, n=382) = 3.967, p = 0.138$. Among females, 52.1% of GED recipients and 58.2% of high school graduates did not need to enroll in remedial reading. For females, in this case, there is a statistically significant association between required reading remediation and secondary education credential, $\chi^2(2, n=691) = 6.646, p = 0.036$.

Ethnic groups

Without separating the sample by secondary education credential, within each ethnic category, it appears that most students are not needing remedial reading (170 Anglo students, 155 African American students, 249 Hispanic students, 19 Asian students, and 11 students in the Other category). Once secondary education credential is accounted for, among Anglos, 74.6% of GED recipients compared to 83.9% of high school graduates did not require remedial reading. Interestingly, 46.7% of the African American GED recipients compared to 54.1% African American high school graduates did not require remedial reading. African American is the only race/ethnic group that showed higher proportions of GED recipients requiring reading remediation than not needing it. Among African Americans, there is no statistically significant association between need for remedial reading and secondary school credential. Hispanic data showed that 49.8% of GED recipients and 52.6% of high school graduates did not need remedial reading. Of the Asian students, 55.6% of GED recipients and 50% of high school graduates did not require remedial reading. In the Other category, the number of GED students who required remedial reading was equal to the number of students who did not and the high school graduates showed more students as not needing the remediation. None of the ethnic categories showed a statistically significant association between required remedial reading and secondary education credential (Table 4.3).

Age groups

When students in different age groups are divided into GED recipients and high school graduates, data show that more students were not required to enroll in remedial reading than those who needed the courses (Table 4.3). Among the 24-29 age group, data did show a statistically significant association between needing remedial reading and secondary education credential, $\chi^2(2, n=324), = 6.020, p = 0.049$, in that more students did not need reading remediation. Conversely, the other age group categories did not show any statically significant associations between need of remedial reading and secondary education credential.

Remedial Writing and Secondary Education Credential

This section focuses on the association between enrollment in remedial writing and secondary education credential for the whole sample and then separately for demographic groups. Table 4.4 displays the results of analysis that are further discussed.

Table 4.4 Remedial Writing Enrollment by Secondary Education Credential (Column %)

| | Required remedial course | Secondary education credential | | Chi-square test (p value) |
|--------|--------------------------|--------------------------------------|--------------------------------------|---------------------------|
| | | GED recipients n (%) | High school graduates n (%) | |
| All | No Yes Exempt | 317 (69.1) 183 (34.1) 36 (6.7) | 381 (70.9) 134 (25.0) 22 (4.1) | 0.000** |
| Gender | | | | |
| Male | No Yes Exempt | 110 (59.5) 61 (33.0) 14 (7.6) | 141 (71.6) 45 (22.8) 11 (5.6) | 0.044* |
| Female | No Yes Exempt | 207 (59.0) 122 (34.8) 22 (6.3) | 240 (70.6) 89 (26.2) 11 (3.2) | 0.004* |

Table 4.4 - continued

| Ethnicity | | | | |
|------------------|--------|------------|------------|---------|
| Anglo | No | 95 (73.1) | 74 (85.1) | 0.019* |
| | Yes | 25 (19.2) | 5 (5.7) | |
| | Exempt | 10 (7.7) | 8 (9.2) | |
| African American | No | 71 (52.6) | 107 (62.9) | 0.190 |
| | Yes | 57 (42.2) | 56 (32.9) | |
| | Exempt | 7 (5.2) | 7 (4.1) | |
| Hispanics | No | 128 (53.6) | 172 (69.6) | 0.000** |
| | Yes | 94 (39.3) | 69 (27.6) | |
| | Exempt | 17 (7.1) | 6 (2.4) | |
| Asian | No | 11 (61.1) | 15 (83.3) | 0.327 |
| | Yes | 5 (27.8) | 2 (11.1) | |
| | Exempt | 2 (11.1) | 1 (5.6) | |
| Other | No | 12 (85.7) | 13 (86.7) | 0.941 |
| | Yes | 2 (14.3) | 2 (13.3) | |
| | Exempt | 0 (0.00) | 0 (0.00) | |
| Age | | | | |
| 24-29 | No | 53 (69.7) | 201 (81.1) | 0.014* |
| | Yes | 19 (25.0) | 45 (18.1) | |
| | Exempt | 4 (5.3) | 2 (0.8) | |
| 30-34 | No | 90 (66.2) | 86 (67.7) | 0.116 |
| | Yes | 39 (28.7) | 40 (31.5) | |
| | Exempt | 7 (5.1) | 1 (0.8) | |
| 35-39 | No | 65 (58.0) | 34 (65.4) | 0.182 |
| | Yes | 45 (40.2) | 15 (28.8) | |
| | Exempt | 2 (1.8) | 3 (5.8) | |
| 40-49 | No | 72 (55.8) | 41 (62.1) | 0.632 |
| | Yes | 48 (37.2) | 20 (30.3) | |
| | Exempt | 9 (7.0) | 5 (7.6) | |
| 50+ | No | 37 (44.6) | 19 (43.2) | 0.512 |
| | Yes | 32 (38.6) | 14 (31.8) | |
| | Exempt | 14 (16.9) | 11 (25.0) | |

* $p < 0.05$ ** $p < 0.001$, N=1073

Data show that more GED recipients (183 students) were required to enroll in remedial writing as compared to high school graduates (134 students). Similar to remedial reading, the data showed that for all students in this study, there is a significant

association between need to enroll in remedial writing, $\chi^2(2, n=1073) = 16.821, p = 0.000$ and secondary education credential.

Gender groups

Of the sample, 65.7% of the males and 64.7% of the females did not require remedial writing. After taking secondary education credential into account, more male GED recipients (110 students, 59.5%) and male high school graduates (141 students, 71.6%) did not require remediation as compared to those who required remediation. The same was true for female students with 59% of the GED recipients and 70.6% of the high school graduates not needing remedial writing (Table 4.4). For males, there was a statistically significant association between need to enroll in remedial writing and secondary education credential, $\chi^2(2, n=382) = 6.233, p = 0.044$. In addition, there was a statistically significant association between required writing remediation and secondary education credential for females, $\chi^2(2, n=691) = 11.092, p = 0.004$.

Ethnic groups

According to Table 4.4, the general trend for ethnic groups and required remedial writing is that for each of the ethnic groups, more students in each group did not need remedial writing compared to the number of students in the group who needed remedial writing. This was also true for each ethnic group when considering secondary education credential and required remedial writing; the largest numbers were seen in the 'No' category for each ethnic group for both GED recipients and high school graduates (see Table 4.4). For both the Anglo and the Hispanic ethnic categories, there was a statistically significant association between need to enroll in remedial writing and

secondary education credential with Anglo $\chi^2(2, n=217) = 7.957, p = 0.019$ and Hispanic $\chi^2(2, n=486) = 15.421, p = 0.000$. For African American, Asian, and Others, there was no statistically significant association.

Age groups

In each age category and based on whether the students were GED recipients or high school graduates, less students required remedial writing than students who did not (Table 4.4). For most age groups, there is no association between required remediation in writing and secondary education credential, except in the 24-29 age group where data show a significant association, $\chi^2(2, n=324), = 8.573, p = 0.014$.

Remedial Math and Secondary Education Credential

This section focuses on the association between enrollment in remedial math and secondary education credential for the whole sample and then separately for demographic groups. Table 4.5 displays the results of the analysis that are further discussed.

Table 4.5 Remedial Math Enrollment by Secondary Education Credential (Column %)

| | Required remedial course | Secondary education credential | | Chi-square test (p value) |
|--------|--------------------------|-------------------------------------|--------------------------------------|---------------------------|
| | | GED recipients n (%) | High school graduates n (%) | |
| All | No Yes Exempt | 37(6.9) 453 (84.5) 46 (8.6) | 117 (21.8) 392 (73.0) 28 (5.2) | 0.000** |
| Gender | | | | |
| Male | No Yes Exempt | 18 (9.7) 147 (79.5) 20 (10.8) | 44 (22.3) 143 (72.6) 10 (5.1) | 0.001* |
| Female | No Yes Exempt | 19 (5.4) 306 (87.2) 26 (7.4) | 73 (21.5) 249 (73.2) 18 (5.3) | 0.000** |

Table 4.5 - continued

| Ethnicity | | | | |
|------------------|--------|------------|------------|---------|
| Anglo | No | 13 (10.0) | 33 (37.9) | 0.000** |
| | Yes | 105 (80.8) | 49 (56.3) | |
| | Exempt | 12 (9.2) | 5 (5.7) | |
| African American | No | 8 (5.9) | 32 (18.8) | 0.004* |
| | Yes | 118 (87.4) | 127 (74.7) | |
| | Exempt | 9 (6.7) | 11 (6.5) | |
| Hispanics | No | 10 (4.2) | 38 (15.4) | 0.000** |
| | Yes | 206 (86.2) | 200 (81.0) | |
| | Exempt | 23 (9.6) | 9 (3.6) | |
| Asian | No | 5 (27.8) | 9 (50.0) | 0.379 |
| | Yes | 12 (66.7) | 8 (44.4) | |
| | Exempt | 1 (5.6) | 1 (5.6) | |
| Other | No | 1 (7.1) | 5 (33.3) | 0.152 |
| | Yes | 12 (85.7) | 8 (53.3) | |
| | Exempt | 1 (7.1) | 2 (13.3) | |
| Age | | | | |
| 24-29 | No | 5 (6.6) | 47 (19.0) | 0.011* |
| | Yes | 66 (86.8) | 195 (78.6) | |
| | Exempt | 5 (6.6) | 6 (2.4) | |
| 30-34 | No | 10 (7.4) | 36 (28.3) | 0.000** |
| | Yes | 118 (86.8) | 90 (70.9) | |
| | Exempt | 8 (5.9) | 1 (0.8) | |
| 35-39 | No | 6 (5.4) | 11 (21.2) | 0.002* |
| | Yes | 103 (92) | 37 (71.2) | |
| | Exempt | 3 (2.7) | 4 (7.7) | |
| 40-49 | No | 9 (7.0) | 15 (22.7) | 0.005* |
| | Yes | 109 (84.5) | 44 (66.7) | |
| | Exempt | 11 (8.5) | 7 (10.6) | |
| 50+ | No | 7 (8.4) | 8 (18.2) | 0.257 |
| | Yes | 57 (68.7) | 26 (59.1) | |
| | Exempt | 19 (22.9) | 10 (22.7) | |

* $p < 0.05$ ** $p < 0.001$, N=1073

A large number of students were required to enroll in remedial math (845) although more of the GED recipients (453 students) compared to high school graduates (392 students) needed remediation. The data showed that there is a significant

association between need to enroll in remedial math, $\chi^2(2, n=1073) = 50.339, p = 0.000$, and secondary education credential.

Gender groups

Overall, 75.9% males and 80.3% females were required to enroll in remedial math. Table 4.5 shows 79.5% male GED recipients and 87.2% female GED recipients needed remedial math. Similarly, 143 male high school graduates and 249 female high school graduates were required to enroll in remedial math. Data show that there is a statistically significant association between need to enroll in remedial math courses and secondary education credential for both males, $\chi^2(2, n=382) = 13.929, p = 0.001$, and females, $\chi^2(2, n=691) = 38.839, p = 0.000$.

Ethnic groups

Each ethnic group had more students who required remedial math than students who did not (Table 4.5). In each ethnic category with the exception of the Asian students, the number of GED recipients and the number of high school graduates requiring remedial math was higher than those not needing remediation. Almost 67% of Asian GED recipients needed remedial math as compared to 44.4% of Asian high school graduates (Table 4.5). Three out of five of the ethnic categories show statistically significant associations between need to enroll in remedial math and secondary education credential. Among Anglo students, data resulted in $\chi^2(2, n=217) = 24.378, p = 0.000$. Similarly, for African Americans, $\chi^2(2, n=305) = 11.060, p = 0.004$. Among Hispanic students, data indicated $\chi^2(2, n=486), 22.421, p = 0.000$.

Age groups

The majority of GED students and high school students in each age categories needed remedial math with the highest percent being the GED students in the age 35-39 category (92.0 %). The only age group that did not show an association between required math remediation and secondary education credential was the age 50+ group. For ages 24-29, $\chi^2(2, n=324) = 9.00, p = 0.011$. For ages 30-34, $\chi^2(2, n=263) = 23.629, p = 0.000$. For ages 35-39, $\chi^2(2, n=164) = 12.442, p = 0.002$. Lastly, for ages 40-49, $\chi^2(2, n=195) = 10.774, p = 0.005$.

In summary:

- Data show statistically significant associations between required remedial reading and secondary education credential, between remedial writing and secondary education credential, and between remedial math and secondary education credential for all students.
- When examining the data by gender groups, for females, there was a significant association between need for remedial reading and secondary education credential (Table 4.3). For both genders, there was a significant association between need for remedial writing (Table 4.4) and need for remedial math (Table 4.5), and secondary education credential.
- When examining data by ethnic groups, I did not find any association between developmental reading and secondary education credential among any group (Table 4.3). However, a relationship was found for remedial writing and

secondary education credential, among Anglo and Hispanic groups (Table 4.4). For Anglos, African Americans, and Hispanics data showed statistically significant associations between need for remedial math and secondary education credential (Table 4.5).

- When examining data by age groups, I did not find many associations between need for remedial reading (Table 4.3) or remedial writing (Table 4.4) and secondary education credential, except for the age group 24-29. However, for all age groups except the ages 50+ group, there was a statistically significant association between need for developmental math (Table 4.5) and secondary education credential.

Comparative Analysis of College Trajectories

Research Question 2: What program of study types are GED recipients and high school graduates pursuing? Are there differences in student outcomes (i.e., college level GPA, total number of college credits earned, and program completion) between GED recipients and traditional high school graduates enrolled in degree programs? Are these differences also controlled by demographic factors (e.g., gender, race/ethnicity, age)?

In this section, I will compare various indicators of college trajectories for the GED recipients and high school graduates, for the whole sample or separately by gender, ethnicity, and age groups. In terms of statistical procedures employed in this section, crosstabulations for program completion were run by secondary education credential and then, as for Research Question 1, separately by gender, ethnicity, and age. Then,

ANOVA tests were used to compare and find statistically significant differences among means of continuous variables across groups. For instance, the mean college level GPA and mean total number of college credits earned for the GED recipients were compared to the corresponding means for the high school graduates, for all students and then separately within each gender, race/ethnic, and age groups . For Research Question 2, program of study type became a 2-category variable ('transferable' or 'other' programs). However, program completion is described in detail, as a 4-category variable. As a reminder, students who only took remedial courses or ESL/ESOL courses are removed from the sample. Therefore, sample size used in these analysis is N=980 (Table 4.2 shows some descriptive statistics for the reduced sample).

As noticeable in Table 4.2, just over half of the sample was pursuing the general studies/transferable program of study (57.3%). Results are not surprising as community college are recognized as being an inexpensive option for obtaining general studies credits before a student transfers to a university to pursue a major. Also, it is reasonable for 42.8% of the sample to be taking classes toward career/technical, nontransferable programs or nursing as the community college is also known for providing skills training. Program completion numbers were very low; almost 2/3 of the participants (354 students, 70.3%) did not complete a program of study. The next largest group was students who completed a degree only (18.4%).

Program Completion and Secondary Education Credential

This section compares and contrasts study results on program completion for the whole sample and within demographic groups (Table 4.6). It is more likely for the GED

recipients to show no program completion outcomes (74.2%) than for high school graduates (66.6%). Also, completing a degree only is higher among high school graduates (21.3%) as compared to GED recipients (15.3%). While earning certificates is comparable for both groups, receiving more than one credential is more popular among high school graduates (8.3%) than among GED recipients (6.9%). Regardless of these differences, there is no statistically significant association between program completion and secondary education credential, $\chi^2(3, n=980) = 7.453, p = 0.059$ for the sample. However, some effects of secondary education credential on program completion are noticeable among some demographic groups further analyzed.

Table 4.6 Program Completion by Secondary Education Credential (Column %)

| | Program completion | Secondary education credential | | Chi-square test (<i>p</i> value) |
|--------|---|---|--|--------------------------------------|
| | | GED recipients n (%) | High school graduates n (%) | |
| All | None Certificate only Degree only More than one credential | 354 (74.2) 17 (3.6) 73 (15.3) 33 (6.9) | 335 (66.6) 19 (3.8) 107 (21.3) 42 (8.3) | 0.059 |
| Gender | | | | |
| Male | None Certificate only Degree only More than one credential | 125 (76.7) 9 (5.5) 19 (11.7) 10 (6.1) | 140 (74.9) 8 (4.3) 26 (13.9) 13 (7.0) | 0.862 |
| Female | None Certificate only Degree only More than one credential | 229 (72.9) 8 (2.5) 54 (17.2) 23 (7.3) | 195 (61.7) 11 (3.5) 81 (25.6) 29 (9.2) | 0.026* |

Table 4.6 - continued

| Ethnicity | | | | |
|------------------|--------------------------|------------|------------|--------|
| Anglo | None | 86 (71.7) | 57 (66.5) | 0.039* |
| | Certificate only | 8 (6.7) | 2 (2.3) | |
| | Degree only | 15 (12.5) | 23 (26.4) | |
| | More than one credential | 11 (9.2) | 5 (5.7) | |
| African American | None | 98 (79.0) | 109 (68.6) | 0.200 |
| | Certificate only | 3 (2.4) | 9 (5.7) | |
| | Degree only | 15 (12.1) | 24 (15.1) | |
| | More than one credential | 8 (6.5) | 17 (10.7) | |
| Hispanics | None | 149 (73.0) | 152 (67.3) | 0.618 |
| | Certificate only | 6 (2.9) | 8 (3.5) | |
| | Degree only | 36 (17.6) | 50 (22.1) | |
| | More than one credential | 13 (6.4) | 16 (7.1) | |
| Asian | None | 12 (70.6) | 9 (56.3) | .310 |
| | Certificate only | 0 (0.0) | 0 (0.0) | |
| | Degree only | 4 (23.5) | 3 (18.8) | |
| | More than one credential | 1 (5.9) | 4 (25.0) | |
| Other | None | 9 (75.0) | 8 (53.3) | 0.247 |
| | Certificate only | 0 (0.0) | 0 (0.0) | |
| | Degree only | 3 (25.0) | 7 (46.7) | |
| | More than one credential | 0 (0.0) | 0 (0.0) | |
| Age | | | | |
| 24-29 | None | 48 (78.7) | 172 (75.4) | 0.802 |
| | Certificate only | 2 (3.3) | 7 (3.1) | |
| | Degree only | 8 (13.1) | 41 (18.0) | |
| | More than one credential | 3 (4.9) | 8 (3.5) | |
| 30-34 | None | 91 (75.2) | 81 (66.4) | 0.511 |
| | Certificate only | 4 (3.3) | 6 (4.9) | |
| | Degree only | 20 (16.5) | 27 (22.1) | |
| | More than one credential | 6 (5.0) | 8 (6.6) | |
| 35-39 | None | 78 (73.6) | 29 (56.9) | 0.160 |
| | Certificate only | 2 (1.9) | 1 (2.0) | |
| | Degree only | 16 (15.1) | 15 (29.4) | |
| | More than one credential | 10 (9.4) | 6 (11.8) | |
| 40-49 | None | 85 (73.9) | 33 (54.1) | 0.016* |
| | Certificate only | 5 (4.3) | 5 (8.2) | |
| | Degree only | 19 (16.5) | 12 (19.7) | |
| | More than one credential | 6 (5.2) | 11 (18.0) | |

Table 4.6 - continued

| | | | | |
|-----|--------------------------|-----------|-----------|--------|
| 50+ | None | 52 (70.3) | 20 (48.8) | 0.020* |
| | Certificate only | 4 (5.4) | 0 (0.0) | |
| | Degree only | 10 (13.5) | 12 (29.3) | |
| | More than one credential | 8 (10.8) | 9 (22.0) | |

* $p < 0.05$ ** $p < 0.001$, N=980

Gender groups

Among male GED recipients, 76.7% did not complete a program of study; of the males who completed the high school diploma, 74.9% did not complete a program of study. Similarly, 72.9% of female GED recipients and 61.7% of female high school graduates did not complete a program of study. There was no statistically significant association between completion of program of study and secondary education credential for males, $\chi^2(3, n=350) = 0.746, p = 0.862$, although there was an association for females, $\chi^2(3, n=630) = 9.286, p = 0.026$.

Ethnic groups

There were no statistically significant associations between program completion and secondary education credential among any of the ethnic groups except the Anglo students, $\chi^2(3, n=217) = 8.367, p = 0.039$. However, it is interesting to notice the patterns of program completion for each secondary education credential within ethnic groups. For GED recipients, 71.7% of the Anglo students, 79.0% of the African American students, 73.01% of the Hispanic students, 70.6% of the Asian students, 75.0% of the Other students did not complete a program of study. Similarly, of the high school graduates, 66.5% of the Anglos, 68.6% of the African Americans, 67.3% of the Hispanics, 56.3% of the Asians, and 53.3% of the Other students did not complete a program of study.

Age groups

Among two out of the five age categories (the two oldest categories) results show a significant association between program completion and secondary education credential. Among the age group 40-49, the chi-square test indicates $\chi^2(3, n=195) = 10.375, p = 0.016$; and among the age group 50+, the chi-square test shows $\chi^2(3, n=127) = 9.800, p = 0.020$ which are both statistically significant.

College Level GPA and Secondary Education Credential

An ANOVA test was used to compare the mean college level GPA of GED recipients to the mean college level GPA of high school graduates for all students and within each demographic group (see Table 4.7). A statistically significant difference in mean college level GPA exemplifies a difference in academic capital with the assumption that the higher the college level GPA, the greater the academic capital acquired by the student.

The mean college level GPA of the sample varied depending on secondary education credential. The mean college level GPA was higher for the high school graduates (2.585) compared to the GED recipients (2.424). There was a significant difference in mean college level GPA between GED recipients and high school graduates, $F(1,978) = 5.846, p = 0.016$.

Table 4.7 Mean College Level GPA by Secondary Education Credential

| | Secondary education credential | | ANOVA (<i>p</i> value) |
|------------------|--------------------------------|----------------------|----------------------------|
| | GED recipient | High school graduate | |
| | Mean (standard deviation) | | |
| All | 2.424 (1.106) | 2.585 (0.964) | 0.016* |
| Gender | | | |
| Male | 2.264 (1.135) | 2.527 (0.983) | 0.021* |
| Female | 2.507 (1.083) | 2.617 (0.952) | 0.175 |
| Ethnicity | | | |
| Anglo | 2.663 (1.128) | 3.066 (0.930) | 0.007* |
| African American | 2.172 (1.087) | 2.319 (0.950) | 0.225 |
| Hispanics | 2.447 (1.058) | 2.549 (0.906) | 0.286 |
| Asian | 2.565 (1.237) | 2.737 (1.238) | 0.693 |
| Other | 2.028 (1.231) | 2.947 (0.737) | 0.024* |
| Age | | | |
| 24-29 | 1.649 (1.291) | 2.471 (0.980) | 0.000** |
| 30-34 | 2.394 (1.040) | 2.539 (0.926) | 0.251 |
| 35-39 | 2.548 (1.002) | 2.542 (1.121) | 0.971 |
| 40-49 | 2.666 (0.944) | 2.953 (0.680) | 0.037* |
| 50+ | 2.555 (1.164) | 2.846 (0.669) | 0.179 |

* $p < 0.05$ ** $p < 0.001$; N=980

Gender groups

For males, there was a significant difference between mean college level GPA, $F(1,348) = 5.412$, $p = 0.021$, with the high school graduates earning a higher mean GPA (2.527) compared to the GED recipients (2.264). For females, the high school graduates did earn a higher mean college level GPA (2.617) than the GED recipients (2.507) although the difference between the means was not statistically significant.

Ethnic groups

In each of the ethnic groups, the mean college level GPA was higher for the high school graduates than for the GED recipients. Two ethnic groups showed significant difference between the means: Anglo (3.066 for high school graduates versus 2.663 for

GED recipients) and Other (2.947 for high school graduates versus 2.028 for GED recipients). The ANOVA tests indicate statistically significant differences among means for Anglo, $F(1,205) = 7.469, p = 0.007$, and Other, $F(1,25) = 5.792, p = 0.024$. Overall, the highest GPA of 3.066 is obtained by Anglo high school graduates and the lowest of 2.028 by GED recipients in the Other ethnic group.

Age groups

Two out of the five age categories showed a statistically significant difference between the mean college level GPA between GED recipients and high school graduates. ANOVA tests indicate: for the 24-29 age group, $F(1,287) = 29.303, p = 0.000$, and for the 40-49 age group, $F(1,174) = 4.413, p = 0.037$. College level GPA is extremely low (1.65) for GED recipients in the age group 24-29. Older students who completed a traditional high school program have the highest college level GPA (e.g., 2.95 for age group 40-49 and 2.85 for age group 50 or above).

Total Number of College Credits Earned and Secondary Education Credential

This section compares and contrasts study results on total number of college credits earned for the whole sample and within demographic groups (Table 4.8). Overall, the GED recipients' mean number of college credits (43.46) was lower than that the mean number of college credits obtained by the high school graduates (50.67). The ANOVA test shows that there was a significant difference in the average number of college credits accumulated by GED recipients and those who earned a high school diploma, $F(1,978) = 11.266, p = 0.001$. Similarly to college level GPA, total number of college credits earned

is an important indicator of academic capital. The greater the number of college credits earned, the greater the academic capital acquired.

Table 4.8 Mean Total Number of College Credits Earned by Secondary Education

Credential

| | Secondary education credential | | ANOVA (<i>p</i> value) |
|------------------|--------------------------------|----------------------|----------------------------|
| | GED recipient | High school graduate | |
| | Mean (standard deviation) | | |
| All | 43.46 (32.701) | 50.67 (34.493) | 0.001* |
| Gender | | | |
| Male | 39.30 (33.209) | 46.24 (33.758) | 0.054 |
| Female | 45.62 (32.277) | 53.30 (34.706) | 0.004* |
| Ethnicity | | | |
| Anglo | 44.20 (33.391) | 48.14 (35.132) | 0.414 |
| African American | 41.86 (31.666) | 47.33 (34.378) | 0.170 |
| Hispanics | 44.80 (32.378) | 53.32 (33.010) | 0.007* |
| Asian | 41.53 (42.484) | 58.63 (52.805) | 0.312 |
| Other | 32.50 (28.691) | 52.47 (29.765) | 0.091 |
| Age | | | |
| 24-29 | 30.48 (35.087) | 43.84 (31.217) | 0.004* |
| 30-34 | 42.75 (32.348) | 51.15 (32.600) | 0.045* |
| 35-39 | 43.70 (29.978) | 59.04 (39.013) | 0.007* |
| 40-49 | 49.16 (31.911) | 61.80 (34.998) | 0.017* |
| 50+ | 46.12 (34.029) | 60.29 (42.508) | 0.053 |

* $p < 0.05$ ** $p < 0.001$; N=980

Gender groups

There was no statistically significant difference between the mean number of college credits earned by male GED recipients (39.30) and male high school graduates (46.24). For females, the high school graduates earned the greater mean number of college credits (53.30) compared to their GED recipient counterparts (45.62). The ANOVA test shows that this difference was statistically significant, $F(1,628) = 8.275$, $p = 0.004$.

Ethnic groups

Only for one ethnic group a statistically significant difference between the mean total number of college credits earned was obtained: Hispanics, $F(1,205) = 7.273$, $p = 0.007$. Among Hispanics, and in each of the other ethnic groups, the mean total number of college credits earned by high school graduates was higher than the total number of college credits earned by GED recipients. Data show that Asian high school graduates obtained the highest mean total number of college credits earned (58.63) while the lowest value is shown by the GED recipients in the Other ethnic group (28.69).

Age groups

There was a statistically significant difference in the mean total number of college credits earned by GED recipients and by high school graduates for all age categories except the 50+ category. In all age categories, the mean total number of college credits earned by high school graduates was higher than the total number of college credits earned by GED recipients. Not surprisingly, there is some increase in the values of this indicator with age because older students had perhaps cumulated more credits over life course. For instance, those in age group 40-49 who graduated high school with the traditional diploma accumulated on average 61.80 credits while GED recipients age 24-29 have on average only 30.48 total number of college credits.

In summary:

- There is a noticeable trend in the program of study types pursued with the majority of the students enrolled in general/transerable programs (Table 4.1).

However, regardless of secondary education credential, most students did not earn any credential at all. There is no statistically significant association between program completion and secondary education credential (Table 4.6).

- Data show statistically significant associations between completing a program of study and secondary education credential for females, Anglo students, and age groups 40-49 and 50+ (Table 4.6).
- Data show that the means of college level GPA were higher for the high school graduates compared to GED recipients. ANOVA tests showed statistically significant differences in the means of college level GPA when comparing GED recipients and high school graduates for all students, and for males, Anglo students, the Other ethnic category, ages 24-49, and ages 40-49 (Table 4.7).
- Data show that the means of total number of college credits earned were systemically higher for the high school graduates compared to GED recipients. ANOVA tests showed statistically significant differences in the means of total number of college credits earned by secondary credential for all students, and for females, Hispanics, and all age categories except ages 50+ (Table 4.8).

Correlational Analysis of Student Outcomes

Research Question 3: What is the combined effect of demographic factors (e.g., gender, race/ethnicity, age), pre-college academic preparedness (e.g., secondary education credential, need to enroll in remedial courses in college), and college trajectories (e.g., program of study type) on student outcomes (i.e., college level GPA, total number of college credits earned, and program completion)?

Linear regressions are adequate statistical procedures when examining how the college level GPA and the total number of college credits earned are predicted by each independent variable included in the model when all other independent variables were held constant. All models are including the independent variables shown in the conceptual model presented in Table 4.1. For all categorical predictors, dummy variables were derived for all categories except the reference category that does not appear in the tables (i.e., male, Anglo, high school graduate credential, required remediation in reading, writing or math, transferable program of study type). Age was treated as a continuous variable. Results of linear regression models are presented in terms of unstandardized coefficients (B) and their standard errors, and include the t-tests that show whether the particular predictors have significant contribution in explaining the model.

Modeling College Level GPA

This section presents a discussion of results of the linear regression model predicting the college level GPA (Table 4.9). The predictors employed in the linear regression model explain 15.1% of the total variation in the dependent variable (GPA). Based on the ANOVA test for the model, a p-value of 0.000 indicates that the college level GPA regression model is a good fit for the data. The constant in the model indicates an average value of 1.88 that would be characteristic for a reference group. The positive and negative values of the unstandardized coefficients show how much the GPA increased or decreased with respect to the constant in the model.

Table 4.9 College Level GPA Linear Regression Model

| Variables | Unstandardized coefficients | | Significance t-tests (<i>p</i> value) |
|----------------------------------|-----------------------------|----------------|---|
| | B | Standard error | |
| (Constant) | 1.883 | 0.175 | 0.000** |
| Age | 0.024 | 0.004 | 0.000** |
| Female | 0.141 | 0.065 | 0.030* |
| African American | -0.566 | 0.091 | 0.000** |
| Hispanics | -0.223 | 0.086 | 0.010* |
| Asian | -0.115 | 0.183 | 0.529 |
| Other | -0.345 | 0.199 | 0.083 |
| GED recipient | -0.231 | 0.066 | 0.001* |
| Required remedial reading no | 0.180 | 0.076 | 0.018* |
| Required remedial reading exempt | -0.718 | 0.324 | 0.027* |
| Require remedial writing no | -0.047 | 0.081 | 0.562 |
| Required remedial writing exempt | -0.340 | 0.280 | 0.225 |
| Required remedial math no | 0.390 | 0.093 | 0.000** |
| Required remedial math exempt | 0.031 | 0.200 | 0.876 |
| Career/nursing/nontransferable | -0.126 | 0.065 | 0.054 |
| $R^2_{adj}=.151$ ** | | | |

* $p < 0.05$ ** $p < 0.001$; N=980

T-tests for some predictors are statistically significant. Age is positively correlated with college level GPA, and each additional year brings an increase of .024 GPA. Women have higher GPA than men. As compared to Anglo students, all other ethnic groups have lower GPA although only African Americans and Hispanics have statistically significant lower GPA. Secondary education credential is a significant predictor showing that when all predictors are included, the GED recipients have an average GPA that is .231 lower than the high school graduates. GPA is not very different for those who do not have to take remedial courses. As compared to those who have to take remedial courses in reading, GPA is significantly higher for those who do not have

to take remediation, but lower for those who are exempt. While taking (or not) remedial writing does not contribute much to the model, a large effect is noticeable for remedial math: those who do not have to take math remediation have a .390 points increase in GPA compared to those who have to take it. Finally, students who are in nontransferable programs have a lower GPA than those in transferable programs, although differences are not significant.

Modeling Total Number of College Credits Earned

Table 4.10 includes the results of the linear regression predicting the total number of college credits earned. The linear regression model for total number of college credits earned reported an adjusted R^2 of 0.099 indicated 9.9% of the total variation in total number of credits earned was explained by the independent variables. The p value for the ANOVA was 0.00 so this is significant such that the model predicts the dependent variables well.

Fewer variables showed significant contribution in predicting the total number of college credits when all other independent variables were included. The variables that showed a positive correlation with total number of college credits earned included gender and age. This means that the model predicts that women in the study earn more college credits than men do, and each year increase in age results in an increase of 0.826 credits. The model shows that Hispanics and Asian students earned more college credits as compared to Anglos, while African Americans and students in the Other ethnic category earned less college credits. The model also predicts that GED recipients earn 11.479 less college credits than high school graduates; and that the total number of college credits

earned is lower for most students who were not enrolled in remedial courses or who were exempt. Students pursuing career/technical programs of study are expected to earn 0.508 less credits than students pursuing programs of study types that are transferable.

Table 4.10 Total Number of College Credits Earned Linear Regression Model

| Variables | Unstandardized coefficients | | Significance t-tests (<i>p</i> value) |
|----------------------------------|-----------------------------|----------------|---|
| | B | Standard error | |
| (Constant) | 20.115 | 5.859 | 0.001** |
| Age | 0.826 | 0.122 | 0.000** |
| Female | 4.713 | 2.190 | 0.032** |
| African American | -2.354 | 3.071 | 0.444 |
| Hispanics | 4.883 | 2.876 | 0.090 |
| Asian | 8.422 | 6.126 | 0.170 |
| Other | -1.145 | 6.684 | 0.864 |
| GED recipient | -11.479 | 2.230 | 0.000** |
| Required remedial reading no | 2.252 | 2.548 | 0.377 |
| Required remedial reading exempt | -14.272 | 10.884 | 0.190 |
| Required remedial writing no | -0.493 | 2.728 | 0.857 |
| Required remedial writing exempt | 1.233 | 9.401 | 0.896 |
| Required remedial math no | -4.317 | 3.110 | 0.165 |
| Required remedial math exempt | -26.400 | 6.717 | 0.000** |
| Career/nursing/nontransferable | -0.508 | 2.186 | 0.816 |
| $R^2_{adj}=.099$ ** | | | |

p*< 0.05 *p*<0.001; N=980

Modeling Program Completion

A binary logistic regression was further employed to predict the likelihood of program completion (none=reference category) by the set of variables proposed in the conceptual model. The Nagelkerke R^2 is 0.095 so 9.5% of the total variation in the outcome (program completion) is explained by the set of independent variables that predict well the model. Table 4.11 contains the odds ratios for the model that show how

much more likely it is for an event to occur (i.e., complete program) when the student is in the corresponding category as compared to being in the reference category.

Table 4.11 Logistic Regression Model for Program Completion (None=ref)

| Variables | Reference categories and levels | Odds ratios (ExpB) |
|---------------------------|---------------------------------|--------------------|
| Age | Ordinal variable | 1.038** |
| Gender | Male=ref | - |
| | Female | 1.505* |
| Ethnicity | Anglo=ref | - |
| | African American | .714 |
| | Hispanic | 1.052 |
| | Asians | 1.620 |
| | Others | 1.491 |
| Secondary credential | High school=ref | - |
| | GED | .528** |
| Remedial reading | Yes=ref | - |
| | No | 1.106 |
| | Exempt | .123 |
| Remedial writing | Yes=ref | - |
| | No | .876 |
| | Exempt | .832 |
| Remedial math | Yes=ref | - |
| | No | .981 |
| | Exempt | .259* |
| Program type | Transferable=ref | - |
| | Other | 1.263 |
| Constant | | .118** |
| Nagelkerke R ² | | .095 |

* $p < 0.05$ ** $p < 0.001$; N=980

Some results in Table 4.11 are notable. Age is a significant predictor, each year of age increasing the likelihood of program completion by about 4%. Women are about 50% more likely than men to complete the pursued program. While ethnic group is not a significant predictor in the model, we note that African Americans are less likely to complete while Asians and Others are more likely to complete the program compared to

Anglos. One of the strongest predictor is secondary education credential with GED recipients being about half less likely to complete compared to high school graduates. There is not much effect of remediation on program completion, except that those who have been exempted to take math remedial courses are about 4 times less likely to complete the pursued program. Although not significant, being in a nontransferable program leaves the student more likely to complete than being in a general transferable program.

In summary, some notable results are:

- Secondary education credential was a significant predictor of all student outcomes as predicted by all models performed in this study. GED recipients' mean college level GPA was lower than the high school graduates' mean college level GPA. The mean total number of college credits earned was lower for GED recipients than high school graduates. GED recipients were less likely than high school graduates to complete a program degree.
- Age and gender were positively correlated with both GPA and total number of college credits earned, showing that older students and female are more likely to acquire academic capital. Consequently, these groups are more likely to complete a degree program.
- Compared to students pursuing transferable programs, those pursuing other program of study types (career/technical) had lower GPAs and earned less college credits, but were slightly more likely to be program completers.

Chapter 5

Discussion

This chapter focuses on three main findings of this exploratory study that will be discussed in relation to literature and through the lens of academic capital and life course theory. The implications of the results are provided in terms of K-12, higher education, and adult basic education policy and practice. The findings, in particular, revolve around required math remediation, the academic pathways chosen by the sample, and the program completion rates. Next, this chapter describes the limitations, strengths, and overarching significance of this study. Recommendations for further research are provided as the chapter concludes.

College Readiness: Math Required Remediation

The results of this study indicate that the need for math remediation is substantial at this community college. In fact, required remedial math was statistically associated with secondary education credential and visibly differentiated by gender, most ethnicities, and most age groups. The percent of GED recipients required to enroll in remedial math was primarily 10-20 percentage points higher than that of the high school graduates. These results are supported by prior research indicating that students are entering community colleges with low level skills in math (Barnes & Slate, 2014; Bound, Lovenheim, & Turner, 2010), with this study providing additional data that GED recipients are less prepared academically than high school graduates.

Required math remediation is costly to the students in time and tuition, but is the current standard remedy for unprepared students. “A large percentage of student are

required to take one or more remedial courses, and a large percentage do not persist past the first year” (Porter & Polikoff, 2012, p. 396). In the case of SWC, the remedial math pathway, before the 2014-2015 academic year, was comprised of Developmental Math (DMAT) courses numbered 0066, 0090, 0097, 0098, and 0099. DMAT 0066 teaches Adult Basic Education math which is approximately third grade level math. Each subsequent DMAT course moves the student closer and closer to College Algebra with DMAT 0097, 0098, and 0099 teaching high school level math (Pre-Algebra). A student testing at the lowest level (DMAT 0066) would take up to five semesters of remedial math to obtain college level readiness for math. Federal financial aid did pay for these courses but students lost years of college that could have been dedicated to credit courses.

Per recent Texas House Bill 5, effective the 2014-2015 academic year, students in Texas post-secondary institutions must be offered a variety of remedial math options based on the students’ scores on the new TSI assessment, and the college is limited to a developmental math sequence of only two courses. The new courses at SWC are DMAT 0305 and DMAT 310 and are equivalent to high school math. If a student scores lower than DMAT 0305, he or she is directed to courses offered through the continuing education department and these noncredit courses are not paid for via federal financial aid like DMAT 0305 and 0310 courses are. In addition, the college must offer Non-Course Based Options that are either eight-week seminars or tutoring sessions that allow students to focus on specific math skills that they are lacking and to progress quickly. These seminar/tutor courses are not paid for via federal financial aid so students must pay out of pocket. The idea behind this initiative being that students will spend less time in

developmental classes and be able earlier to enroll in college level classes, which will ultimately have a positive effect on their life course, and without a significant increase in financial cost to the students.

As noted by Porter and Polikoff (2012), “Being assigned to remedial coursework is an indication that the institution views the student as ‘unready’ to enroll in regular credit-bearing courses that count toward a degree” (p. 398). In turn, college completion is affected. It is impossible for these students to earn any degree at a community college, per Texas law, without being college level in math; many degrees require the student to complete at least College Algebra. There is a greater risk that a substantial number of students, including GED recipients, may give up on their education because they become frustrated with required remedial coursework and their lost dream of completing a degree. The impact of required remedial education on a student’s academic trajectory is multi-faceted: it is true that students need to learn the missing academic knowledge and skills in order to be academically successful and progress, but the risk of losing students because of discouragement is also very real.

Implications for Policy and Practice

There is a clear “disjunction between high school and college” (Porter & Polikoff, 2012, p. 395). Students are often surprised when they are admitted to a college and are then told that they are not prepared and need remedial coursework (Tierney & Garcia, 2011). Students believe that their schooling and life course experiences have prepared them for college and provided them with the initial academic capital needed for college success. Texas high school curriculum and assessment leaders and Adult Basic

Education GED program administrators and teachers must initiate conversations with community college academic decision makers to align K-12 and college readiness curriculum standards. There is a clear lack of communication between K-12 and higher education; Stern (2013) reports that “states have improved standards, but not enough higher education instructors are familiar with them” (p. 20).

In regard to the GED, Cain (2003) adds that the goal of Adult Basic Education needs to be adjusted and progress beyond preparing students to pass the GED exams to improving their college readiness. The good news is that the Office of Vocational and Adult Education, a derivative of the U. S. Department of Education, created College and Career Readiness Standards (CCRS) for Adult Education and the new 2014 GED and the exams are said to be aligned to these standards (2014 GED Test, 2013). Martin Kehe leads the development and implementation of the new 2014 GED and he took several years to collaborate with experts all over the U. S. to ensure that the new test would “provide detailed information about the test-taker’s readiness for college and career training programs” (2014 GED test, 2013, p. 1). The new standards and subsequent assessments now include computer skills and other skills that employers are looking for (2014 GED test, 2013).

Another area of improvement is in terms of measuring college readiness and the need for assessment standards to be examined and developed further nationally for consistency and validity (Porter & Polikoff, 2012). Camara (2013) reports that:

two multi-state consortia have been formed to develop assessment systems aligned to the Common Core State Standards (CCSS), which will be used to determine whether students are college and career ready (CCR), and several states are independently designing similar assessments (p. 16).

The Common Core State Standards (K-12) curriculum has been adopted by New York, for example, but not by Texas (Bauerlein, 2013). There has also been the “suggestion of using the National Commission of National Assessment of Educational Progress (NAEP) 12th-Grade Assessment as a measure of college readiness” (Porter & Polikoff, 2012, p. 395) but not many state educators are familiar with these standards. Some states outside of Texas are still using the SAT, ACT, and/or Accuplacer scores to determine college readiness; clearly, this is an indication that little consistency exists across states. Texas is moving in a positive direction by implementing the new TSI Assessment with diagnostic results but there is no data as to the benefits to students as the process is so new, and this assessment is only used in Texas.

In reference to GED recipients and remedial math, serious consideration of increased funding of higher education support services and programs needs to occur. GED recipients enter post-secondary education with unique academic needs. Traditional college support programs such as tutoring or math workshops are often geared toward students who recently graduated from high school, and they do not address the needs of adult learners. Adult learners are more autonomous than younger students and require a different approach to math remediation as they are more anxious and feel less secure in their mathematic abilities (Jameson & Fusco, 2014). Zachry (2010) highlights the wide age span of GED recipients and notes the need for educational services to address the older GED recipients (adult learners) as well as the younger population.

In addition, GED recipients are often unaware of free or reduced cost remediation resources or are unfamiliar with how to connect to these available support services;

targeting GED recipients specifically and notifying them of math support services could help the students locate support and thus gain vital math knowledge and skills (Kist, 2003). There are currently no remedial math support services in place at SWC geared specifically toward GED recipients or adult learners. There are also no academic support outreach efforts taking place at SWC targeting the GED recipient population.

Academic Trajectories: Secondary Education Credential and Program of Study Type

When I started my research, I expected the results of the study to indicate that more of the students at SWC to pursue other programs such as career/technical and nursing, but learning that a little over half of the sample was pursuing transfer degrees makes sense ultimately. The fact that more students are pursuing transfer degrees is in agreement with historical federal legislation and the current push in K-12 education for all students to attend college, preferably universities. Farmer-Hinton (2010) states:

Through various legislative acts (e.g. the GI Bill, the Economic Opportunity Act), social activism and policies (e.g. Civil Rights, Women's rights, Affirmative Action), and increased postsecondary options (e.g. open admissions in community colleges, test optional admissions in universities), the higher education community is slowly countering long-held beliefs about who can gain access to higher education. (p. 571)

In Texas, the Texas Higher Education Coordinating Board College for All Texans web site (www.collegeforalltexans.com) has links to financial aid, choosing a college, applying to college, and college admissions procedures. This website offers materials for school counselors, parents, and students and is one of the many products of the Texas P-16 councils. The Texas P-16 councils are hoping to increase the number and diversity of students attending post-secondary education in Texas and have developed a Generation Texas website (<http://gentex.org>) and marketing campaign. One quote on the webpage

states “The question really wasn’t whether I was going to go to college, but what college I was going to.” College for all is a message heard loudly and frequently at Texas public schools beginning in elementary school and is adding to the number of students enrolling in community college across the state. Therefore, the study findings regarding program of study types appears to be consistent with the state-wide message toward pursuing higher education and aiming to the highest attainment levels.

Additionally, student who are not ready to move away from home or who are financially limited choose transfer programs at the community college as a stepping stone toward their next degree. At SWC, the CORE curriculum is comprised of 60 college level credits (including a college level math course) which is guaranteed to cover the first two years of academics for students who transfer to public universities in Texas. The only contingency is that the community college transfer student must have a GPA of at least a 2.0 and must complete the entire CORE. The SWC CORE is made up of three tiers and students are encouraged, although not required, to complete the first tier before they move onto the next tier. The first tier includes courses in English, history, speech or a foreign language, college level math, and physical education. The second tier is made up of courses in English, sociology or psychology, federal government, U. S. History, fine arts, philosophy, and science. The last tier requires courses in Texas government and electives.

The indication from the data that 42.8% of the sample were pursuing other programs of study such as career/technical education and nursing was also reasonable. President Barack Obama has repeatedly emphasized the role of the community college in

boosting the economy by training people and consequently putting them back to work (Linsdey-Taliefero & Tucker, 2013; Mullin, 2012). The understood mission of the community college is to provide students with job skills and economic stability (Cohen & Brawer, 2008). Rosenbaum (2011) emphasizes that not all students benefit from general studies/transfer programs of study and would do better to “look for more realistic options that could have good payoffs with higher probabilities” (p. 117) such as “short-term certificates and associate’s degrees” (p. 116).

At SWC, the career and technical programs with the highest enrollment are the Certified Public Accountant (CPA) certificate and the Welding certificates programs of study. Courses needed for both of these programs are at enrollment capacity months before the classes begin each semester. SWC offers graduate level accounting courses approved by the Texas State Board of Public Accountancy (TSBPA) at the very low tuition rate found at a community college. Students pursuing the CPA certificate at SWC can apply the courses toward the TSBPA requirements. This program is unique since it provides graduate level courses at an urban community college; usually students have to be accepted into graduate school and pay high tuition rates to enroll in the same accounting classes that SWC offers. The SWC CPA program allows students from diverse socioeconomic and ethnic backgrounds to train for high paying and respectable jobs in the field of accounting.

Another example is the Welding program of study at SWC that offers three different certificates that can be earned after the student completes nine welding classes. Similar to the above mentioned CPA students, these welding students go on to earn high

wages and ensure job security, both locally and across the nation. The credits needed to complete the welding program are generally not transferable but students understand the significance of earning the welding certificate in terms of employability and possibly increased pay. Both the CPA program and the welding certificate are examples of the benefits that career/technical programs of study at SWC offer.

Implications for Policy and Practice

College and career readiness, and College for all (with a focus on transferable programs of study and the eventual earning of a four-year degree) are goals that have been heavily pushed in Texas K-12 education, and now the state is seeing mixed results. Individuals, regardless of secondary education credential, are more aware of the possibilities of pursuing post-secondary education although there is some disappointment when students attending college discover that they are unprepared for and unsuccessful in general studies/transfer courses. Jerrim (2013) believes that the concept of college for all is “excessive and misaligned” (p. 197). People are led to believe that “college is the only respectable goal and that it is easy and attainable by all” (Rosenbaum, 1998, p. 56). Although the efforts are centered on good intentions and closing the gaps in college enrollment, heavy emphasis on the transfer program of study type does not address the academic and career goals *for all* students.

The key to serving all students is providing resources, like the Generation Texas website (<http://gentex.org>) mentioned previously in this chapter. It is important to show students that career/technical program of study is a good option. Moreover, it is essential to provide details on both program of study type options that would allow GED recipients

and high school graduates to identify which pathway fits their unique talents, skills, and career goals, and thus positively affect their academic trajectories and outcomes. The program of study type data collected for this study is encouraging in that it shows that students at SWC are pursuing both transfer and other program of study types. At SWC, students learn about program of study types offered when they attend new-student orientations. In addition, SWC requires all students who are considering transfer programs of study to enroll in Learning Frameworks (EDUC 1300), a course where students are taught about learning styles, how to take notes and study in college, and about degree plans, including program of study types. The combination of the orientation sessions and the EDUC 1300 course is a move in the right direction in terms of encouraging students at SWC to choose the program of study type that is the best possible fit for them.

Student Outcomes: Low GPA, Low Total Number of Credits, Low Completion

The results of this study showed that there were statistically significant differences in the mean college level GPA and the mean total number of college credits earned between the GED recipients and the high school graduates. For both outcome indicators, the means were lower for the GED recipients. In addition, the GED recipients were nearly half less likely to complete a program of study as their high school graduate counterparts. With graduation rates at the community college already being so low (Bragg & Durham, 2012), an indication that GED students experience even more problems in academic performance and program completion is a substantial finding.

SWC recently began a Success Coach program where full time college staff is volunteering to assist in retention and academic success efforts. The program is organized such that each Success Coach is assigned a particular subject, math for example, and faculty in that discipline contact the Success Coach when a student is repeatedly absent, missing assignments, or failing tests. The Success Coach contacts the student and offers suggestions on areas of improvement as well as provides details on tutoring and support services. Although the program has not been in place very long, initial reviews of campus retention and academic success data indicate that the program is positively influencing students to continue enrollment in classes and to find ways to improve academically. The Success Coach program was not in place in 2005-2006 (the initial academic year of enrollment for student data collected for this study) but is currently gaining momentum and is a positive want to improve college level GPA, total number of college credits earned, and program completion for all students. Students can see that there are people on campus who are concerned about them and this may motivate students to attend class and try harder.

SWC also offers students a wide variety of student organizations to become involved in, ranging from Student Veterans of America to Career Connections. Participating in student government and other clubs allows students to feel like part of the campus community and conceptualizes learning. These organizations expose students to networking and to service learning, which can both positively affect the student's life course. It is possible that without the diverse experiences and opportunities to join campus organizations, the academic success rates of students at SWC could be lower.

Implications for Policy and Practice

Searching recent literature and research for reports on policies and practices designed to increase the academic outcomes of GED recipients reveals there is no evidence that current national or state efforts are being evaluated. It is alarming and disheartening to realize that this specific population has severely unmet academic needs. Sturgis (2014) states that “the university and college systems aren’t really equipped to help college students succeed, given that the majority of today’s enrollees are ‘nontraditional’ students” (p. 26). There must be an increased focus on understanding the various cohorts of students, such as GED recipients, if we are to see improvements. Data collection and analysis of “when, where, and why we lose students” is essential (Morris, 2012, p. 167).

Providing diverse campus organizations and supporting initiatives similar to Success Coaches are one way more community colleges could reach out to GED recipients to build a sense of belonging and to offer academic support. GED recipients need help navigating the sophisticated dynamics of the higher education system. One-on-one and/or small group interactions with other students and staff could reduce some of the intimidation and anxiety GED recipients struggle with during their journeys.

Limitations of the Study

A major limitation of this study involves the use of data that may not be entirely accurate in defining program completion. Program completion data results have to be interpreted with the understanding that not all students who attend a community college are pursuing a certificate and/or degree. In some cases, students are upgrading skills,

pursuing general interests, or taking classes to fill in gaps in their university curriculum.

Most data supports the idea that community college students have ambitions to complete a program but there are always exceptions (Bailey et al., 2006). Nitecki (2014) adds:

Because community college students often accumulate credits without completing a specific degree, transfer before completing a program, lose credits on transfer, attend on a part-time basis due to family and work obligations, or leave school and return years later to finish, low graduation rates within traditional time frames are not necessarily accurate measures of student success. (p. 99)

Lack of completion of a program does not necessarily indicate that a student is under-prepared or that the community college is not supporting the academic success of these students (Bailey et al., 2006).

Another limitation of this study is that the data available does not allow for examining the effect of social capital on students' trajectories and outcomes. Starting with academic capital, as the data allows, is of great value but a more holistic view of community college students' social interactions over life course would be useful to understand their experiences. Social capital gained through interactions with family and friends who have attended college and/or via college readiness activities in high school could further differentiate high school graduates' academic trajectories from those of GED recipients. We can assume that the level of social capital that students possess varies tremendously from student to student, based on upbringing and opportunities, but we do not know if social capital widens the college completion gap developing because of secondary education credential.

Also of note is the possibility of increased Type I errors (i.e., identifying an effect that does not exist) due to multiple statistical tests (e.g., chi-square tests and ANOVAs)

performed simultaneously in this study without any multiple testing adjustment.

However, since this is an exploratory study, the focus was mainly on identifying patterns rather than drawing inferential conclusions.

Strengths and Significance of the Dissertation

This study goes beyond previous research on access and success in higher education since it focuses specifically on GED recipients at the community college through the lens of academic capital. Prior research on community colleges focuses on retention and program completion in terms of demographics but lacks the consideration of secondary education credential. According to Lerman (2013), “Both with regard to measurement and policy, the primary focus in the U. S. has been on academic skills, as measured by tests of reading, writing, and math abilities and by educational attainment, including degree completion” (p. 1). One goal of this study is to specifically include secondary education credential in the discussion.

The research presented in this study included pre-college academic skills measurements (required reading, writing, and math remediation) as well as degree completion (program completion) but adds additional factors such as college level GPA, program of study type, and total number of college credits earned information in defining students’ academic trajectories. These supplementary considerations allow for a more detailed understanding of the academic trajectories of the GED recipients particularly when their trajectories and outcomes are compared to those of the high school graduates. Rather than merely including the starting point (pre-academic preparedness) and the end-point (program completion) of students’ academic trajectories, this study is framed

around the idea that it is important to measure success along academic and life course pathways. For instance, considering what program of study type a student chooses and how successful the student is based total number of college credits earned and college level GPA.

The findings of this study are significant because little to no research has been published on the academic trajectories of GED recipients at the community college and yet these individuals are interested in post-secondary education and are, based on this data, limited in their success. In addition to improving one's job options, the value of the GED credential is contingent on its ability to prepare recipients for higher education; this study specifically addresses program completion at the community college and indicates the discrepancies between the results for GED recipients and high school graduates.

Recommendations for Further Study

This study begins the conversation about developmental math and college readiness at the community college, especially for GED recipients. Due to changes in Texas law and the resulting changes in the college readiness assessment and courses, much research needs to be conducted. There is currently no data pertaining to how the new college readiness assessment is impacting student enrollment in developmental math options in Texas and specifically at SWC; there is no data on the new TSI assessment in terms of its accuracy in measuring college readiness in math and in correctly placing students in developmental or Non-Course Based Options. Data also needs to be collected to ascertain if the new sequencing is a faster route toward college readiness in math. Also, since financial aid does not pay for many of the remedial math options, data needs

to be collected to see if students on federal financial aid are leaving the college altogether since they can not afford the new classes.

Qualitative research and data also needed to better understand the academic choices (program of study type) GED recipients make. Quantitative data provides insight into the academic capital and pathways for this population but there is a missing piece: the personal experiences of individual students. Qualitative studies in which GED recipients who are attending community college courses are interviewed would be insightful; questions could focus on what the GED recipients view as obstacles in their journeys and what support services are needed to overcome these obstacles. This would allow for a more holistic view of their academic experiences and any extra support services needed.

Conclusion

The program completion of all students is important, but realizing that GED recipients are hugely unsuccessful at the community college requires focused attention. The research conducted and reported in this dissertation is a starting point for further research and academic support of GED recipients in higher education. As Cain suggests:

Policy makers should fund research that identifies ways to prevent dropout, improve the skill building component of GED programs, and increase the number of GED holders who successfully pursue postsecondary education and training. Such research should evaluate model education programs and identify policies or interventions that remove barriers that make it harder for GED holders to enroll and succeed in postsecondary education. (Cain, 2003, p. 4)

The most effective way to influence policies and practices in this area is to collect accurate data and use the data to inform decision making. In addition, more research in this area is fundamental to change. Community colleges, and universities alike, are under

increased scrutiny to prove institutional effectiveness (Allen, 2002) and are using institutional data to shift funding to projects that increase program completion.

Suggestions made by Cain in 2003 are still valid today: alter the function of the GED from high school equivalency to a precursor to college readiness, increase funding for GED recipients transitioning to post-secondary education, and increase college teachers' and administrators' understanding of adult education standards. Only then will GED recipients have a true opportunity to advance their education and consequently advance in life.

Appendix A

Key Terms

The following key terms are defined by the researcher as they are used in this study.

Academic capital: based on Bourdieu's theory of human capital. Academic capital is comprised of a person's academic preparedness (i.e., knowledge, skills, abilities) to start the college journey, and his/her program completion as an indicator of human capital acquisition that will likely increase labor market opportunities. The amount of education and academic experiences possessed by individuals that together with other forms of capital (e.g. social, cultural) determine their position in society.

First generation college student: a college student coming from a family where his/her parents have not earned a four-year college degree. This student is the first in his/her family to go to college.

Life course theory: the structured pathways consisting of the specific way individuals completed secondary education (GED recipient or high school diploma) and further engage/navigated through college to acquire academic capital. Specifically, the pathway (academic trajectory) beginning with whether or not a student needs required remediation progressing through the GPA and college credits that a student earns to whether or not a student completes a program of study or not.

P-16: The time span from Pre-kindergarten through earning a four-year degree at a college or university.

Part-time student: a student who is enrolled in less than 12 college credits hours per semester; usually 6 credits or less.

Post-secondary education: any education pursued after an individual has earned a secondary education credential.

Program completion: meeting all the requirements (coursework and GPA) to earn a certificate or a degree at a college or university.

Program of study type: the type of degree plan a student at SWC is pursuing. Students at SWC are taught by marketing materials and academic advisors to refer to the list of classes that are required for them to earn a certificate or a degree as their program of study. Program of study type allows the programs of study to be categorized as either transferable or other (career/technical/nursing).

Remedial courses: courses designed by the college or university to address students' gaps in skills in reading, writing, and math.

Retention: remaining in a course or program of study until completion.

Secondary education: the education a person received from kindergarten through 12th grade or through an equivalency program such as the General Education Development (GED). Also referred to as a K-12 education.

Secondary education credential: the credential earned verifying that the individual has completed a K-12 education. In Texas, this can be accomplished as a GED recipient or by earning a traditional high school diploma.

Appendix B

Institutional Review Board Approval

As noted by Gall, Gall, and Borg (2007), “any research project involving the participation of human beings must be reviewed by and institutional review board (IRB) (p. 55). Initially, IRB approval was obtained from the community college where the student data was obtained. In order to meet IRB standards for the community college, I provided the SWC IRB with the projected duration of the research, description of participants, location of the project, resources needed from the community college, procedures for data collection, and dissemination and use of the information collected.

Next, IRB approval was given by the University of Texas at Arlington IRB for the protection of human subjects. The UTA IRB was provided a copy of the community college IRB approval and IRB Form #1A was submitted as it allowed for exemption of full review by the IRB. This form was appropriate because the resource data obtained through this research did not require any direct contact with human subjects and utilized data readily available at the community college. The information required for the IRB exempt form was very similar to what was required by the community college IRB with the addition of the naming of the individuals serving on the dissertation committee.

EXEMPT PROTOCOL SUMMARY FORM

D#

ACADEMIC TRAJECTORIES OF GED RECIPIENTS AT THE COMMUNITY COLLEGE
Title of Research Project

Karen Blue 214-860-8541 kblue@dcccd.edu
Principal Investigator (PI) / Project Director Phone / E-Mail Address

2013 BH

9 months
Projected Duration of Research (x# of months) Projected Starting Date September 2012
~~November 15, 2012~~

ending Dec. 201

Dr. Trache, Supervising Faculty, UTA
Other organizations and/or agencies, if any, involved in the study

Done

Exempt under code: 4
Circle One. Turn for definitions.

Revised 8/19/13

Please attach the following:

- Brief description of the participants
- Location(s) of the project and identification of any MVC resources needed to conduct the survey (e.g. web applications, data entry, coding, etc.)
- Procedures to be used for data collection (including population and sampling methodology)
- Dissemination and use of information collected
- Whether data will be confidential or anonymous and who will have access to data
- Informed Consent Form
- Questionnaires to be used

BH

Responsibilities of the Principal Investigator:

- ✓ Any additions or changes in procedures in the protocol will be submitted to the IRB for written approval prior to these changes being implemented.
- ✓ Any problems connected with the use of human subjects once the project has begun must be communicated to the IRB Chair
- ✓ The Principal Investigator is responsible for retaining informed consent documents for a period of three years after the project.

Karen Blue 9-14-12
Principal Investigator Signature / Date

| | | | |
|---|-----------------------------------|---|---|
| Signature of MVC IRB Chair: <u>[Signature]</u> | | Date: <u>10-12-12</u> | |
| IRB Chair: Check One Box | Approved <input type="checkbox"/> | Approved W/ Conditions <input type="checkbox"/> | Refer to Full Committee for Review <input type="checkbox"/> |

Signature of IRB Chair for Revision: [Signature]
DATE: 8-19-13

Academic Trajectories of GED Recipients at the Community College

Karen Blue

Exempt Protocol Attachment

Participants:

Institutional data will be used to identify 537 students who attended SWC in 2005-2006 with GED credentialing and 537 students who entered SWC with high school diplomas from 2005-2006. Elizabeth created this list (per the original IRB request, before she left for San Francisco).

Location/ Resources:

The only information needed from SWC Institution Research (IR) will be the identification of the 1074 total students. This will require a query of SWC students from 2005-2006 in which a list of GED recipients and a list of high school graduates is created. This list does not need to be exhaustive since the sample size is a total of 1074 students.

Procedures for Data Collection:

All data will be existing data and will be obtained via Datatel. This will not require any surveys or any interaction with students. Once SWC identifies the 1074 students (completed already by Elizabeth per the original IRB approved request), the researcher will use Datatel to examine each student's demographic information, entrance exam scores (Accuplacer, SAT, etc.) and GPA. In addition, the research will look at each student's semester to semester campus selection for courses, semester to semester persistence, program(s) of study, and completion of certifications and degrees.

Dissemination and Use of Information Collected

The results of the study will be submitted to Dr. Trache and the dissertation committee at the University of Texas at Arlington as a requirement for completion of the degree. The results may also be presented at a relevant education conference or be submitted for publication. SWC and the specific students will not be identifiable.

Data

The data will be confidential and only accessed by the researcher. The researcher will assign each student an alpha numeric code so that data cannot be traced back to a particular student in the study. The college will be referred to as a community college in the southern United States and will never be identified in publication or in presentations.

Informed Consent Form/Questionnaires

No form is necessary as students will not be contacted, interviewed, or identifiable in the data. No questionnaires will be used.

THE UNIVERSITY OF TEXAS AT ARLINGTON
INSTITUTIONAL REVIEW BOARD FOR THE PROTECTION OF HUMAN
SUBJECTS

IRB FORM #1A:
PROPOSAL FOR RESEARCH INVOLVING HUMAN SUBJECTS
APPLICATION FOR EXEMPT RESEARCH

Faculty, staff, students, or employees who propose to engage in any research, demonstration, development, or other activity involving the use of human subjects must have review of that activity by the Institutional Review Board for the Protection of Human Subjects (IRB), prior to initiation of that project. Applications for exemption must be reviewed and documented as exempt by the IRB. The IRB is responsible for safeguarding the rights and welfare of subjects who participate in the activity. If you require further assistance in completing this form or need additional information, please contact Research Administration at 817-272-3723 or regulatoryservices@uta.edu.

*This version of Form #1A is intended to be used in conjunction with a submission to the IRB via the electronic protocol submission system:
<https://www.uta.edu/ra/real/loginscreen.php?view=50>.*

SECTION A: GENERAL INFORMATION

1. Please list any NON-UTA Protocol Personnel that could not be entered via the electronic submission face page.

| Name: | Affiliation: | Participant Status (Co-Investigator, Collaborator, etc.): |
|-------|--------------|---|
| | | |
| | | |
| | | |
| | | |

2. Expected Start Date: March 1, 2014 *(You are not authorized to begin any research involving human subjects until the IRB has reviewed and approved the research protocol.)*
3. Expected Completion Date: December 31, 2014

SECTION B: FUNDING (If this research is not supported by funding, please skip to section C.)

4. Source: FEDERAL (Specify Agency: _____)
 INDUSTRY SPONSORED (Specify Agency: _____)
 Departmental State (Specify Agency: _____) Other:

Funded Grant/Contract Number:

- Check here if grant is pending (Date of Grant Submission: _____)

SECTION C: EXEMPTION STATUS OF THE RESEARCH PROTOCOL

Human subject research qualifying as exempt must correspond with one or more of the exempt categories mandated by the human subject research federal regulations, Title 45 CFR Part 46.101. This section is intended to determine if your research project can appropriately be designated as exempt.

Special Note Regarding Prisoners as Subjects

Human subject research involving prisoners as subjects is not eligible for exemption. Instead, please complete IRB Form #1 (Application for Non-Exempt Research) and IRB Form #2C (Application for Prisoner). A Prisoner is defined as any individual involuntarily confined or detained in a penal institution. The term is intended to encompass individuals sentenced to such an institution under a criminal or civil statute, individuals detained in other facilities by virtue of statutes or commitment procedures which provide alternatives to criminal prosecution or incarceration in a penal institution, and individuals detained pending arraignment, trial, or sentencing.

Instructions

Please check the box of one or more of the categories below that apply to your research, then in Section D, provide specific details describing your research project in relation to the exemption category. If none of the exemption categories listed below apply to your research, please submit IRB Form #1 instead for non-exempt human subject research.

- A.** Research conducted in established or commonly accepted educational settings, involving normal educational practices, such as (i) research on regular and special education instructional strategies, or (ii) research on the effectiveness of or the comparison among instructional techniques, curricula, or classroom management methods.
- B.** Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey

procedures, interview procedures or observation of public behavior, unless:
(i) information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and (ii) any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation. (*Research must meet both conditions i and ii to be disqualified from this exemption.*)

Special Note Regarding Children as Subjects

If your research project includes children, ages 0-17, then exemption B only applies if, in addition to the conditions above, your research involves ONLY educational tests or public behavior when the investigator(s) do not participate in the activities being observed. The exemption for surveys or interviews does not apply to children as subjects.

- C.** Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior that is not exempt under paragraph B of this section, if: (i) the human subjects are elected or appointed public officials or candidates for public office; or (ii) federal statute(s) require(s) without exception that the confidentiality of the personally identifiable information will be maintained throughout the research and thereafter.
- ✓ **D.** Research involving the collection or study of existing data, documents, records, pathological specimens, or diagnostic specimens, *if these sources are publicly available or if the information is recorded by the investigator in such a manner that subjects cannot be identified, directly or through identifiers linked to the subjects.*
- E.** Research and demonstration projects which are conducted by or subject to the approval of department or agency heads, and which are designed to study, evaluate, or otherwise examine:
 - (i) *Public* benefit or service programs; (ii) procedures for obtaining benefits or services under those programs; (iii) possible changes in or alternatives to those programs or procedures; or (iv) possible changes in methods or levels of payment for benefits or services under those programs.
- F.** Taste and food quality evaluation and consumer acceptance studies, (i) if wholesome foods without additives are consumed or (ii) if a food is consumed that contains a food ingredient at or below the level and for a use found to be safe, or agricultural chemical or environmental contaminant at or below the level found to be safe, by the Food and Drug Administration or approved by the Environmental Protection Agency or the Food Safety and Inspection Service of the U.S. Department of Agriculture.

SECTION D: RESEARCH PROCEDURES AND SUBJECT SELECTION

5. Does your research involve mentally incapacitated subjects?

No

If yes, please also complete and submit IRB Form #2A.

6. Does your research involve pregnant women, human fetuses, neonates of uncertain viability, or nonviable neonates?

No

If yes, please also complete and submit IRB Form #2B.

7. Does your research involve children, ages 0-17?

No

If yes, please also complete and submit IRB Form #2D.

8. Please describe your research procedures in layman's terms. Specifically, describe how your research meets one or more of the exemption categories chosen above. Data will be obtained through an already established database regarding specific students at one community college in Dallas, Texas. IRB approval from the community college has been obtained. Data will included student GPA, program completion, age, gender, and other demographic and academic data listed on each student's summary document. A group of students who earned their GED and a group of students who earned high school diplomas will be compared.

9. How many subjects will be enrolled in this research project? 1074 student records

10. Please describe how and where subjects will be recruited. Student data will be obtained based on whether or not the student completed high school with a diploma or earned a GED. Data also obtained based on students being enrolled at the college of the study 2005-5006.

11. Please describe your process/procedures for obtaining informed consent, if applicable.
N/A

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Biographical Information

Karen Blue first became interested in education as an undergraduate student at Texas A&M Galveston (TAMUG) studying Marine Biology. As she completed her courses at TAMUG, she volunteered with an AmeriCorps program on the TAMUG campus that was helping students who had not completed high school. Tutoring these students allowed her to discover her interest in teaching and so she went on to earn a Master of Education in Teaching degree from the University of Texas at Arlington and a Texas Teacher Certificate in Secondary Biology. In December, 2014, Karen will earn her doctoral degree in Educational Leadership and Policy Studies from UTA.

Karen has taught a variety of subjects to diverse populations of students. At area middle schools, she taught 7th grade science for six years. At a local community college, she taught English as a Second Language (ESL), developmental reading, developmental math, and alternative teacher training. Students in Karen's classes have been a wide range of ages and ethnic backgrounds. Teaching and learning are what Karen enjoys the most.

In the future, Karen will continue to work to improve academic attainment for all students but with a maintained focus on those who do not complete high school. She hopes to teach GED students and to assist in increasing their program completion rates at community colleges and universities. Her research interests are high school dropout prevention, GED instruction, and program completion at the community college.