

AN ABSTRACT OF THE DISSERTATION OF

Karen M. Sanders for the degree of Doctor of Philosophy in Education presented on December 10, 2007.

Title: The Relationship of Selected Academic Factors to the Persistence of General Educational Development (GED) Recipients Enrolled in Community Colleges: An Oregon Study

Abstract approved:

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Dr. Samuel Stern

The purpose of this study was to better understand the relationship between selected academic factors and the persistence of GED recipients in community colleges in the state of Oregon. With this purpose in mind, the study addressed the following research question: Is there a relationship between selected academic variables and GED recipient persistence in community colleges? In order to address this question, enrollment and academic performance information was extracted from two existing datasets on 4,785 students who had received their GED credential in Oregon and had subsequently enrolled in one of Oregon's 17 community colleges between 2003 and 2005. Using an explanatory correlational design, frequency distributions and logistic regression analyses, the following conclusions were drawn:

- Students who received a GED credential in Oregon between July 2003 and June 2005 and subsequently enrolled in one of Oregon's 17 community colleges persisted in the postsecondary institution at a rate of 50% as defined by enrollment in two consecutive terms following receipt of the GED credential.

- Students who participated in remedial coursework during their first term persisted at higher rates than those who took no remediation.
- Mean standard GED score did not have a relationship to persistence.
- Enrollment status, as measured by the total number of credits attempted during the first term, had a positive relationship to persistence.
- Academic performance in a student's first term had a strong, positive relationship to persistence.

Taking both these findings and the results of other related research into account, the study concluded with suggestions for practitioners to help facilitate the success of GED recipients who enrolled in community college following the receipt of their credential. These suggestions included: (a) Addressing barriers to full-time enrollment through the provision of financial incentives and the use of innovative and flexible instructional delivery methods, (b) providing purposeful and comprehensive students support services, (c) implementing a mandatory placement policy, and (d) developing bridge programs between adult education and college-level programming.

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The Relationship of Selected Academic Factors to the Persistence of General Educational  
Development (GED) Recipients Enrolled in Community Colleges: An Oregon Study

by

Karen M. Sanders

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APPROVED:

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Dr. Samuel Stern, representing Education

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Dean of the College of Education

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Dean of the Graduate School

I understand that my dissertation will become part of the permanent collection of Oregon State University libraries. My signature below authorizes release of my dissertation to any reader upon request.

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Karen M. Sanders, Author

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KMS

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The Relationships of Selected Academic Factors to the Persistence of General Educational Development (GED) Recipients Enrolled in Community Colleges: An Oregon Study

The Relationship of Selected Academic Factors to the Persistence of General Educational Development (GED) Recipients Enrolled in Community Colleges:  
An Oregon Study

Chapter 1  
Introduction

*How can the U.S. compete when 93 million adults have low literacy skills?*

- *National Council of State Directors of Adult Education, 2006*

More than ever, our future depends on education. The 21<sup>st</sup> century world is one of rapidly changing technology, globalization of product and financial markets, and significant demographic shifts. The workplace of tomorrow - information intense and technologically advanced - will offer an abundance of better jobs that could bring prosperity to thousands of Americans (Jenkins, 2003). However, the vast majority of these jobs are increasingly demanding higher levels of education, particularly in occupations that pay a living wage (Jones & Kelly, 2007). Unfortunately, there are millions of individuals in the United States (U.S.) today who lack a postsecondary level education. In Census 2000, the government reported that more than 34 million adults in the United States over the age of 18 lacked a high school diploma. In addition, according to McCabe (2000), only 42% of students who do complete high school have the necessary skills to begin college-level work, and two-thirds of those who enter college are academically under-prepared (see Figure 1).

Demographic trends only make the situation appear more dismal. Over the next 20 years the U.S. population will become increasingly diverse. The White population is getting older and most of the growth expected in the younger population

|  |   |  |
|--|---|--|
| 84% of students who enter 9 <sup>th</sup> grade graduate from high school with a diploma or GED. | 59% enter postsecondary education.        | 42% of those entering postsecondary education are prepared for college-level work. |
| 16% drop out   | 41% do not enter postsecondary education. | 58% are under-prepared for college-level work.                                     |

*Figure 1. Academic readiness of high school students moving to higher education*

will be minorities, mostly Hispanic (Kelly, 2005). This demographic shift is significant because, as Kelly (2005) pointed out, there are currently very large disparities in educational attainment between Whites and most minority groups. For example, between 1990 and 2000, 40% of the White U.S. population, aged 25-64, had an Associate's Degree or higher, as compared to only 15% for the Hispanic population. When looking at a Bachelor's Degree or higher, these percentages change to 30% and 10% respectively (Kelly, 2005). In sum, most of the population growth in the U.S. over the next several years will occur among those populations that are the least educated, and have traditionally not accessed postsecondary educational opportunities.

As those who have traditionally been under-educated increasingly understand the connection between postsecondary education and social and economic prosperity,

it seems likely that a growing number will search out ways to attain additional education and training. While many will take the traditional path through the public school system, others will search out alternatives. For more than 65 years, the General Educational Development (GED) Test has been a viable alternative to the traditional high school diploma. The GED certifies a high school level of academic knowledge and skills, no matter where or in what manner the individual learned them. This certification also provides individuals with a valid means of accessing postsecondary educational opportunities. Over the course of its history, the GED testing program has served as a bridge to further education and employment for more than 16 million people (GED Testing Service, 2006).

Unfortunately, while an average of just over 500,000 Americans do earn a GED each year (GED Testing Service, 2005), less than one third of these individuals enroll in postsecondary education (Reder, 2007). During the past five years, this issue of low transition rates of GED recipients to postsecondary education has become a national focus. Initiatives such as: (a) the Lumina Foundation-sponsored *Pathways to Advancement*, a project designed to help expand postsecondary access and attainment for low-income working adults (Oregon Department of Community Colleges and Workforce Development [ODCCWD], 2005), (b) the *Adult Basic Education - Community College Transitions Project*, sponsored by the National Department of Education Office of Vocational and Adult Education, and (c) the Nellie Mae Foundation: *ABE to College Transitions Project*, have all focused on supporting adults' transition to postsecondary education.



While these and other initiatives have successfully been developing strategies to increase the transition rate of GED holders into postsecondary education, a related issue, that of persistence in postsecondary education, remains a significant challenge. Although more GED recipients are beginning to successfully transition, the percentage who remain in college and persist towards a postsecondary degree or certificate remains extraordinarily low, somewhere between 5% and 10% (Tyler, 2001). Although GED recipients are a small proportion of the undergraduates in postsecondary education, they are not as successful as traditional high school graduates in the labor market, thus making success in postsecondary education all the more important (Rose, 1997).

There is a perception among many educators and policy makers that the failure of GED recipients to persist in postsecondary education is due to the fact that the GED is somehow less rigorous than a traditional high school diploma, and that as a result GED holders are under-prepared for college level work (Soltz, 1996). If this perception were correct, it would mean that the majority of GED recipients would transition not into college level courses, but rather into remedial programs. Herein lies a contradiction, because there is a body of research which indicates that students who participate in, and successfully complete remediation, persist at equal or even higher rates than students who enter community colleges with no remediation needs (Boylan, Bonham, & White, 1999; Crane, McCay & Poziemski, 2002; Kolajo, 2004). Unfortunately, there is a paucity of research looking specifically at the GED recipient population so the question remains if indeed GED holders enroll at high rates into

remedial courses, why is their overall persistence rate so much lower than other student populations?

#### *Research Purpose and Question*

The purpose of this study was to better understand the persistence behavior of GED recipients in community colleges. With this purpose in mind, the current study addressed the following overarching research question:

- Is there a relationship between selected *academic* factors and persistence of GED recipients in community college?

#### *Significance of the Study*

The current study is significant for the following three reasons: (a) In the U.S. today, many remain undereducated, despite a rapidly growing need for postsecondary education, (b) the GED is an accepted and highly used alternative for those who do not successfully complete high school and desire to access postsecondary education, and (c) a very low percentage of GED recipients transition to, and persist in, postsecondary education.

*The rapidly growing need for education.* According to the National Center for Education Statistics (2005), 93 million American adults, or 45% of the adult population, have limited reading, writing, and mathematics skills. This widespread lack of educational attainment among the adult population coupled with future demographic trends and changing demands of the 21<sup>st</sup> century workforce, should be of serious concern to future leaders.

The world is changing and America's workforce training system must respond. As we enter the 21st century, we find ourselves living and working in a new economy, a global economy built on a foundation of information and communications technology. In 1950, over 80% of the jobs in America required unskilled labor (Day & McCabe, 1997), however, today, the balance between skilled and unskilled work has shifted significantly, with more and more jobs requiring skilled workers. Furthermore, of the remaining unskilled jobs, Roueche & Roueche (1993) contend that they are dead-end jobs that don't provide a route to the middle class as they may have done in the past. In 1997, Day and McCabe estimated that by the year 2000, more than 85% of new jobs would require skilled workers and professionals, leaving very few jobs for those who were unskilled. By 2005, advances in technology and ongoing globalization had indeed resulted in the elimination of many unskilled jobs, with knowledge-based employment growing at a faster rate and in larger numbers than any other segment of employment (Kelly, 2005). In fact, as seen in Figure 2, the largest projected growth between now and 2014 will be in those jobs that require some level of postsecondary education (U.S. Bureau of Labor Statistics, 2005).

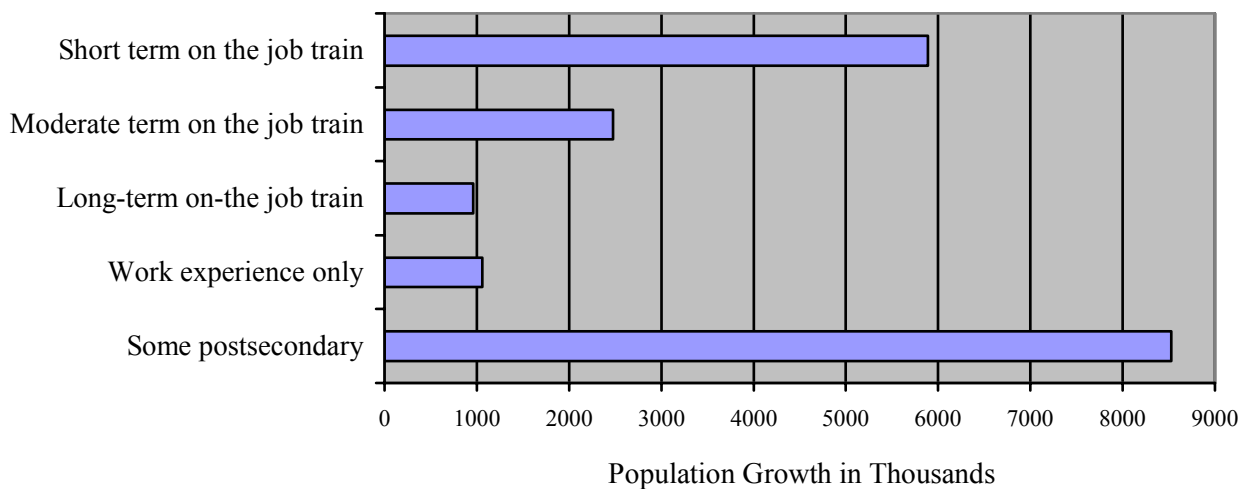


Figure 2: Changing workforce educational needs: 2004-2014

In today's economy, educational level is also clearly linked to earning potential. As seen in Table 1, more education equals less unemployment, and in fact, average weekly earnings increase as levels of education increase.

Table 1: *Education Pays*

| Educational level          | Average weekly earnings | Percent unemployed |
|----------------------------|-------------------------|--------------------|
| No high school diploma     | \$384                   | 11.8%              |
| High school diploma        | \$533                   | 6.1%               |
| Some college               | \$598                   | 5.3%               |
| Two-year college degree    | \$671                   | 3.9%               |
| Four-year or higher degree | \$960                   | 2.9%               |

Unfortunately, while the types of knowledge and skills needed to successfully compete and to earn a living wage have changed, current educational and training levels have not. According to Jones and Kelly (2007), there are over 25 million adults, aged 18-64, with less than a high school diploma or equivalent. Furthermore, according to McCabe (2005), while 84% of students who enter 9<sup>th</sup> grade will graduate with a diploma or GED, only 59% of those will enter postsecondary education, and of those, 58% are under-prepared for college work. Such widespread poor educational attainment could be a significant barrier to America's future social and economic prosperity.

The demographic make-up of the U.S. population is changing. By the year 2020, the projection is for a 77% increase in the number of Hispanics, a 69% increase in Asians, a 32% increase in African-Americans, and less than a one percentage point increase in the White population (Kelly, 2005). In addition, the White population is aging, and the majority of growth in the younger population will be among segments of the population with the lowest levels of education (Jones, 2007). This demographic shift is significant because as Kelly (2005) clearly summarized: "Poor education participation and completion rates among the populations with the lowest higher education attainment levels are the fastest growing segments of our population, suggesting a growing national challenge" (Kelly, 2005, p. 19). As the number of under-educated adults increases, so too does the pool of individuals who would benefit from completing a GED.

*GED as a step towards postsecondary education.* According to the National Commission on Adult Literacy (2007), more than 25 million adults aged 18-64, or 14% of the entire U.S. population within this age range do not have a high school diploma. This large number of adults without high school credentials represents a social and economic challenge that intensifies each year as society demands a more highly skilled workforce. For the past 65 years, the GED has represented an alternative way to certify the attainment of high-school level academic skills for those adults who, for many reasons, were unable to complete traditional high school programs. In fact, over the course of its history, the GED examination has served as a bridge to further education and employment for more than 16 million people (GED Testing Service, 2006), and today an average of 800,000 adults take the test annually, with one in every seven high school credentials awarded in the United States based on the GED tests (National Center for the Study of Adult Learning and Literacy [NCSALL], 2003).

Throughout the country, the GED credential is well established and widely accepted as a valid alternative to a traditional high school diploma. In fact, 97% of colleges and universities accept the GED as equivalent to a high school diploma, and more than 90% of U.S. employers consider those who earned their GED the same as traditional high school graduates in terms of hiring, salary, and opportunities for advancement (GED Testing Service, 2006). The GED will therefore likely remain a common stepping-stone well into the future for those in need of postsecondary education.

*Lack of transition and persistence of GED recipients.* The transition and persistence of GED recipients in postsecondary education is a key component in the effort to assist the 93 million adults who have limited literacy skills (National Council of State Directors of Adult Education, [NCSDAE], 2006). Each year an average of 500,000 individuals nationwide receive a GED credential and qualify for further education, training, and employment opportunities (GED Testing Service, 2006). In 2003, 63% of GED recipients indicated that they obtained this credential in order to pursue further education. Unfortunately, only 30 to 35% actually enrolled in postsecondary education (NCSALL, 2003). Individuals moving from adult education programs into postsecondary education often face considerable challenges. Many have insufficient academic, study, and time management skills, and may not understand enrollment and financial aid systems and other aspects of college life (Alamprese, 2005). In addition, there is often a need to clarify for GED recipients how their classroom learning can be directly tied to future education and employment possibilities (Smith & Locke, 1999).

Whatever the reasons for low transition rates may be, most professionals in the field of education agree that far too few individuals enroll in postsecondary education following receipt of the GED (Alamprese, 2005). In an effort to solve this problem, several initiatives have been launched over the last several years to encourage adult education programs, community colleges, and professional organizations to assist adults in their transition to postsecondary education. In addition, several research

groups have been documenting emerging best practices, and transition to postsecondary has been established by federal policy to be one of the required measures of accountability for adult education programs nationwide (National Reporting System for Adult Education (NRS), 2006).

This focus at the national level has encouraged local programs to develop strategies to improve the transition rate of GED recipients to postsecondary education. There has, however, not been a similar focus on persistence following transition. Increasing the numbers of students who transition, but not addressing the low persistence rate of GED holders in postsecondary education, is only solving half of the problem.

According to Tyler (2001), only 5% to 10% of GED recipients who have transitioned to postsecondary levels complete at least one year. In a 1996 report from the National Council of Education Statistics (NCES) on non-traditional undergraduates, it was discovered that non-traditional students were more than *twice* as likely to leave college in their first year than were traditional students – 38% versus 16%. Furthermore, among students seeking an Associate’s Degree, non-traditional students were half as likely as traditional students to have obtained their objective (27% versus 53%), and were twice as likely to have left college without getting a degree (47% versus 22%) (Horn, 1996). While GED recipients were not singled out in this report, one defining characteristic of non-traditional students was that they did not graduate from a traditional high school, but rather earned a GED or other alternative



credential. This means that although the population was not exclusively made up of GED recipients, this group was a subset of the larger population.

### *The Oregon Problem*

In Oregon, as in many other states, there are many individuals who are choosing to get a GED in lieu of a high school diploma. In fact, among young adult Oregonians, 9% receive a GED rather than a high school diploma, one of the highest percentages in the nation (National Center for Public Policy and Higher Education, 2006). Unfortunately, also reflective of the nation as a whole, poor educational attainment, low transition and persistence rates in postsecondary education, and changing demographics are also evident in Oregon. According to Worksource Oregon (2007), nearly 17% of Oregonians (393,000) who are over 16 years of age and not in school do not have a high school diploma. For those who do have a diploma or GED, according to *Measuring Up 2006*, a national report card for higher education that looked at the effectiveness of states' educational systems, "Oregon's performance is mediocre in preparing its young people for education and training beyond high school. The likelihood of high school students going on to college immediately after graduation has declined sharply over the past decade" (National Center for Public Policy and Higher Education, 2006, p. 3). In fact, the percentage of 25-49 year olds in Oregon enrolled in any type of postsecondary education was only 3.5% in 2006 as compared to 5.1% in other states.

Persistence rates in Oregon's community colleges are equally dismal with only 44% of first year community college students returning for a second year, meaning

that more than half do not continue their education (National Center for Public Policy and Higher Education, 2006). In 2006, this was in contrast to 62% in the more successful states around the country.

Demographically, the state has also seen significant changes. Over the past decade there has been major growth in immigrant populations. The state's foreign-born population grew by 108% during the 1990s, which made it the sixteenth fastest growing immigrant state in the country (Lotspeich, Perez-Lopez, & Ost, 2003). Additionally, this population is linguistically diverse and isolated, and over half have been categorized as limited English proficient (LEP), a group that tends to hold less desirable jobs and earn lower incomes (Lotspeich et al.).

Because of rapidly changing demographics, high numbers of GED completers, low transition rates to postsecondary education, and poor persistence rates currently evident in the community colleges around the state, it is imperative that educational leaders do more to increase the success rates of those GED recipients who do successfully make the transition to a community college. In order to best address this issue, more information on the factors related to GED recipient persistence is needed.

### *Summary*

In summary, the low transition rate of GED recipients to postsecondary education is a problem that has caught the attention of both those in adult education programs and those in postsecondary institutions. While the many initiatives in this area are successfully encouraging the development of strategies to increase the transition rate of GED holders into postsecondary education, the question remains: if

the persistence rate of GED recipients continues to be extraordinarily low, what is the point of drastically increasing the number who transition? Reaching a better understanding of which factors are related to the persistence of GED recipients in community colleges can help institutions develop programs and support services to assist students to be more academically successful. In order to facilitate this understanding, the current study addressed the following research question:

- Is there a relationship between selected academic factors and persistence of GED recipients in community college?

## CHAPTER 2

### Literature Review

*The U.S. needs all of its citizens prepared for the information-rich environment of the 21<sup>st</sup> century. Access to postsecondary education must, therefore, be a pillar of educational policy.*

*- Robert McCabe, 2000*

The purpose of this chapter is to provide a context for the examination of persistence behavior of GED recipients in community college. Additionally, the information in this chapter provides a rationale for those academic variables that were included in the current study. Following a brief description of the literature search process and definitions of key concepts, literature in the following five areas was reviewed:

- (1) *The GED*: Information on the development and history of the GED was reviewed. This section includes information on the history of the GED examination, an explanation of test content, and the use of the GED in today's society. The purpose of this section was to provide contextual and background information for the study.
- (2) *Transition*: Several current federal transition initiatives focusing on moving GED recipients into postsecondary education were reviewed. These studies were looked at in order to examine the frequency with which transition currently occurs in community colleges, both for traditional and non-traditional students.

- (3) *Persistence*: Research on persistence, both for traditional and non-traditional students, was reviewed. In order to provide a framework for the discussion of GED recipient persistence behavior in community colleges, different theoretical models of student attrition and persistence were also examined. Finally, specific studies on the persistence of GED holders in postsecondary institutions, as well as comparative studies looking at GED recipients and high school diploma holders were included. This information provided information on what was already known about the persistence of GED recipients after they successfully transitioned to postsecondary education.
- (4) *Remediation*: Studies on the general need for remediation in postsecondary education, studies looking at the relationship between remediation and academic performance, as well as literature on GED recipients and their need for remediation were reviewed. This section provided insight into the current need for remediation for all students moving into community colleges. It also provided a better understanding of the positive effect remediation has on academic success, and the contradiction between anecdotal evidence of a high placement rate into developmental education for GED recipients and documented low persistence rates in postsecondary education. Finally, this section revealed the paucity of research on how these two factors are specifically related for the GED recipient population.
- (5) *Factors affecting student persistence*: The academic performance of GED completers is influenced by several demographic, academic, and

environmental variables. Literature was reviewed to determine which of these factors have been shown to affect student success and persistence in postsecondary education. Following a review of which variables appeared in the literature is a list of which factors were chosen to be included in the study, which were purposefully excluded, and the rationale for why these choices were made.

### *Literature Search*

Articles were obtained through searches of educational databases, including ERIC, Dissertation Abstracts, and Academic Premier. Articles were included if their focus was in one or more of the following areas: (a) student persistence in postsecondary education, (b) academic performance of under-prepared students in community colleges, (c) the developmental education student population, and/or (d) the GED recipient population. Some of the key words that were used to search these databases were: (a) student persistence, (b) GED, (c) developmental education, (d) remediation, (e) student success, (f) academic achievement, (g) community college, (h) postsecondary education, (i) transition to postsecondary, and (j) adult education. Reference lists from articles closely related to the topic of the proposed study were also used to locate additional information. There were no date parameters put on the searches, and articles ranged from the 1950s to the present. Finally, all articles were from either the United States or Canada, and all were in English.

### *Key Concepts*

This section defines the key concepts for this study. The following terms are outlined: (a) adult education, (b) GED examination, (c) developmental education, (d) remedial education, and (e) persistence.

*Adult education.* Adult education is defined as inclusive of pre-college English as a second language (ESL), adult basic education (ABE), and adult secondary education (GED or high school completion) programs. According to Boylan (2004), “The goals of adult education programs are usually related to life and work skills. Most commonly, these programs are designed to improve literacy and language skills and improve their participants’ opportunities in the current and future work force” (p. 7). Boylan also suggested that most community college adult education programs are non-credit bearing, are not eligible for federal financial aid, and students do not have to pay college tuition.

*GED examination.* The General Educational Development Test, or GED Test, is an examination that certifies the taker has attained American or Canadian high-school level academic skills. The test consists of five individual tests: language arts - writing, language arts - reading, social studies, science, and mathematics. To pass the GED, a student must pass all five sub-tests and perform in at least the 40<sup>th</sup> percentile of high school seniors nationwide. States do have the ability to set their own individual passing requirements, however, each must be at or above the national minimum set by the GED Testing Service (GED Testing Service, 2005). While the GED examination

is offered in several languages, the current study focused on the English language version.

*Developmental education.* In the context of this paper, the term developmental education refers to a continuum of courses and services ranging from tutoring and advising, to remedial coursework in individual skill areas. The primary goals of developmental education programs are to prepare students for success in the college curriculum and to increase student retention (Boylan, 2004).

*Remedial education.* There is disagreement among practitioners regarding the definitions of the terms “remedial” and “developmental.” Some argue that remedial education refers exclusively to pre-college courses, whereas developmental programs are usually considered to be college level with a focus on academic development such as study strategies, or critical thinking, rather than on a particular content area (Boylan, Bonham, & White, 1999). Others (Roueche & Roueche, 1999) use the terms interchangeably. In the current study, the second definition (i.e., that there is no difference in meaning between the terms remedial and developmental education) was used.

*Persistence.* In the literature, the term persistence has primarily been defined in two ways: (a) certificate or degree completion (Boesel, Alsalam & Smith, 1998; Horn, 1996; Osei, 2001; Rose, 1999), or (b) enrollment beyond the term of initial entry into the institution (Brooks-Leonard, 1991; Campbell & Blakey, 1996; Halpin, 1990). Two-year public colleges experience the lowest retention rates of all colleges and universities. In addition, the lowest rate of consecutive term persistence within the



community college occurs from a student's first to second term (Brooks-Leonard, 1991). Unfortunately, the first to second term persistence rates are also the most critical because "they tend to be the lowest, and to set the stage for subsequent term-to-term rates" (Brooks-Leonard, 1991, p. 58). Rogers (1977) argued that the first term is indeed the most important for many students because students' ideas and expectations concerning college and their abilities can be modified or shaped by these initial experiences. Additionally, as Horn (1996) noted, because the gap in attrition rates of non-traditional students closes considerably from the first to the second year, improving first term persistence could very well improve the chances of non-traditional student success. Therefore, because of the importance of persisting from the first to the second term, and because only five to ten percent of GED recipients make it through one year of postsecondary education (Kallenbach & Zafft, 2006), the current study defined persistence as a student completing one term and registering in a second consecutive terms in a community college following receipt of the GED credential.

## The GED: What is it?

*Passing the GED tests provides adults with an opportunity to move forward to pursue further education and better jobs, and to serve as role models for their families and generations to come.*

*- David Ward, President  
American Council on Education GED Testing Service, 2005*

Following is a brief description of the GED examination. The history, content, and use of the test will all be described in order to provide contextual and background information for the study.

### *History*

The GED began in 1942 with the development of a battery of tests for U.S. military personnel who had not completed high school. The tests were developed in order to accommodate the large numbers of returning veterans who had been sent overseas to fight in World War II before they completed high school, as well as for the large numbers of men and women leaving school early to join the industrial workforce (American Council on Education [ACE], n.d.). After World War II, it became apparent that the GED tests could also benefit civilians who had not completed high school, and by 1959 the number of non-veterans exceeded the number of military personnel taking the test (Falk, 1995). Today, the GED Test is used in all 50 states, in U.S. territories, and in many Canadian provinces. Over the course of its history, the GED testing program has served as a bridge to further education and employment for more than 16 million people. In the state of Oregon, just over 237,000 GED

credentials were issued between 1943 and 2003 (GED Testing Service, 2006), with an average of an additional 7,000 issued per year since 2003.

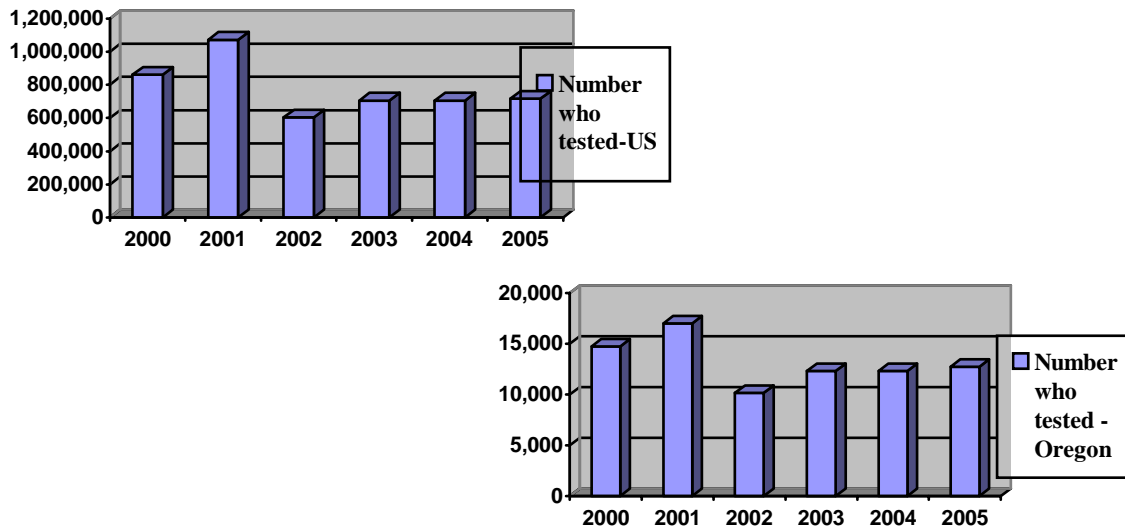
### *Test Content*

Although the term GED Test is often used, students must actually pass five individual examinations in order to receive the GED credential. The five tests are language arts-writing, social studies, science, language arts-reading, and mathematics. The tests were designed to measure the ability to understand, evaluate, and manipulate concepts and information, and to use knowledge and reason to reach general conclusions in the five subject areas (Boesel, Alsalam & Smith, 1998). Throughout the 65-year history of the GED, the tests have been periodically updated in order to reflect the knowledge and abilities that traditional high school graduates possess. To date, there have been four test series, the original was released in 1942 and then revisions were released in 1978, again in 1988, and finally the most current version was introduced in 2002. While the academic content areas of the GED have not changed since 1942, the priorities and assumptions by which proficiency in these areas is determined have evolved. The 2002 series reflects the increased emphasis on academic standards that are currently prevalent in the K-12 community, as well as shifts in assessment methods, high school curricula, and the needs of the 21<sup>st</sup> century economy. This series tests skills in contexts designed to be relevant to adults, to be as practical and realistic as possible, and to reinforce key themes of global awareness and the impact of technology (Hsu & Ezzelle, 2007).

The GED test of today measures the major and lasting outcomes of a four-year high school program of study. The content of the tests corresponds to what graduating high school seniors are expected to know in writing skills, social studies, science, literature, and mathematics. One value of the GED credential is therefore that it validly certifies the attainment of high school level knowledge and skills and thus qualifies individuals for further education, training, and employment opportunities (GED Testing Service, 2005).

#### *Use of the GED*

Today the GED is well established and accepted as a valid alternative to a traditional high school diploma. In fact, 97% of colleges and universities accept the GED credential as equivalent to a high school diploma, and more than 90% of U.S. employers consider those who earned their GED the same as traditional high school graduates in terms of hiring, salary, and opportunities for advancement (GED Testing Service, 2005). Many take advantage of this acceptance and currently an average of 800,000 adults take the test annually, with one in every seven high school diplomas awarded in the U.S. being based on the GED tests (NCSALL, 2003). See Figure 3 for the numbers of GED candidates who took the GED between 2000 and 2005, both nationally and in Oregon (GED Testing Service, 2006).



*Figure 3: Number of GED candidates who tested nationally and in Oregon 2000-2005*

It is interesting to note that in 2001 a record number of individuals, 1,069,899 nationwide to be exact, took the GED examination. According to the GED Testing Service (2005), the primary cause of this large jump in participation (from 860,684 testers in 2000 to 1,069,899 in 2001) was the introduction of the new test series in 2002. Throughout 2001, a massive outreach campaign was undertaken in order to alert adults nationwide that they needed to successfully complete all of the 1988 series tests before December 31, 2001, or start the complete test battery over in 2002. The result was a 24% increase in test-takers in 2001. With this substantial increase in 2001, “the residual effect for 2002 was predictable: The number of GED candidates taking the tests dropped by more than 43% to the smallest number in 10 years” (GED Testing Service, 2005, p. 2). Through 2003, the second year of the new series, the number of candidates once again increased, and there is reason to believe that the upward trend will continue as successful completers tell others about their success (GED Testing

Service, 2005). In sum, despite the drop of examinees in 2002, trends indicate that the GED will continue to be a popular choice for many hoping to transition into postsecondary education.

*The GED: Summary*

As the 21<sup>st</sup> century workforce increasingly demands educated and skilled workers, the GED credential will play a key role in providing Americans with a second chance to access and succeed in postsecondary education. In February of 2006, the National Council of State Directors of Adult Education (NCSDAE) emphasized the importance of reaching today's adult learners by issuing the following statement:

In 2005, the Department of Labor reported 150 million people in our workforce. In 2005, the National Center for Educational Statistics reported three million students graduated from high school. Thus, at best, only 2% of our workforce comes from public schools each year. So the source of workers must be the adult population today. We cannot afford to wait 50 years for education reform to reconstitute the workforce. We must move at least 12 million of the 93 million American adults who have limited reading, writing and math skills (National Assessment of Adult Literacy, 2005) through the GED and on to community college within the next five years. (NCSDAE, 2006, p. 2)

Since the 1940s, there have been millions of adult Americans who have required a method to validate that their skills and knowledge were equivalent to a high school diploma. The GED examination was developed for this express purpose and continues today to be a vehicle for individuals to access further education, training, and employment opportunities (Baldwin, 1990). Access to higher education, however, is not enough. In order to be successful in the 21<sup>st</sup> century workforce, those individuals that do complete their GED must continue to build their skills through further

education. Unfortunately, the success rate of this student population in postsecondary education is dismal – only five to ten percent of GED recipients make it through one year of postsecondary education, and only about 1% obtain an associate’s degree (Kallenbach & Zafft, 2006). It is important therefore that additional research be done to determine why these students don’t succeed.

### Transition

*The notion that adult education students are the students of the future at community colleges is not hypothetical. It is a fact.*

*- Council for Advancement of Adult Literacy, 2005*

Community colleges play a key role in the transition of adult education students to postsecondary education. According to the Council for Advancement of Adult Literacy (CAAL) (2005):

Their (community colleges) choice is not whether to play this role, but whether to play it well – whether they wish to make a purposeful effort to expand the educational and economic opportunities of the three million people enrolled in adult education programs each year, and, indeed, whether and how to expand their service to reach into the presently unserved population. (p. 36)

While the focus of this study was on the persistence of GED recipients *following* successful transition into community college, understanding current transition initiatives helps provide a more complete picture of the journey faced by GED recipients hoping to succeed in postsecondary education. The following section therefore includes a brief discussion of the need for the development of transition

programs, as well as a description of five current initiatives that have been implemented nationally since 2000.

#### *The Need for Transition Programs*

As mentioned earlier, several thousand students take the GED each year. In 2003, 63% of those who passed the examination indicated that they were obtaining the credential in order to pursue further education (GED Testing Service, 2005). However, on average about 27% of GED holders actually obtain any postsecondary education annually (Reder, 2007). In fact, the limited data on GED recipients' transition to postsecondary education show that only a small percentage enroll in postsecondary programs in the year following their participation in adult education programs (Alamprese, 2005; Long, 2004).

#### *National Transition Initiatives*

Whatever the reasons for low transition rates may be, educators and policy makers alike agree that far too few GED graduates enroll in postsecondary education (Alamprese, 2005; McCabe, 2000). In an effort to solve this problem, a growing number of states have implemented programs to increase transition rates. At the national level, several initiatives have been launched to address this issue. Table 2 lists some of the most successful including: (a) The Breaking Through Initiative, (b) The Nellie Mae ABE to College Transitions Project, (c) The U.S. Department of Education - Community College Transitions Project, and (d) the CALL Project on Adult Education and Community Colleges.



Table 2: *Transition to Postsecondary Education: National Initiatives*

| Initiative  | Sponsoring agencies   | Purpose   |
|---|---|---|
| Breaking Through: Helping Low-Skilled Adults Enter and Succeed in College and Careers | Jobs for the Future<br>National Council on Workforce Education<br>Charles Mott Foundation | This initiative is looking to encourage community college leaders to develop, sustain, and expand strategies that provide pathways for low-skilled adults to postsecondary credentials. (Jobs for the Future, 2004).                          |
| Nellie Mae: ABE to College Transitions Project  | New England Literacy Resource Center<br>Nellie Mae Educational Foundation                 | This project consists of 25 transition programs in six New England states. The program consists of instruction in academic, computer, college survival and study skills, and educational and career counseling (Alamprese, 2005).             |
| Adult Basic Education – Community College Transitions Project                         | National Department of Education: Office of Vocational and Adult Education (OVAE)         | The focus of this project is to identify programs, practices, and strategies that successfully facilitate transitions from ABE to postsecondary education programs at community colleges. (Berkeley Policy Associates, 2004).                 |
| Adult Education and Community Colleges  | Council for the Advancement of Adult Literacy   | CAAL is studying connections between adult education and community colleges. The goal is to programs that support the successful transition from the adult education system to postsecondary education and career opportunities (CAAL, 2005). |

*Transition: Summary*

The initiatives outlined in Table 2 are some examples of how, in recent years, adult education programs, community colleges, and professional organizations have all begun to more actively assist adults in their transition to postsecondary education. In addition, a number of recent reports (Chisman, 2004; Jenkins, 2003; Walker & Strawn, 2004) have described exemplary efforts designed to help adults make the transition from basic skills to college-level courses (Prince & Jenkins, 2005). However, despite this interest in transition activities, “relatively little is known about what happens to adults with limited education who do enter community colleges” (Prince & Jenkins, 2005, p. 4). In fact, according to Tyler (2001) only 5% - 10% of those GED recipients who successfully transition into postsecondary education complete at least one year of study. So, while the transition rate of GED recipients to postsecondary education should improve as a result of the many national initiatives currently being implemented, the issue of persistence in postsecondary education remains a challenge. Increasing the numbers who transition, but not addressing the low persistence rate of these students once they are enrolled in the institution, is only solving half of the problem.

## Persistence

*Only five to ten percent of GED recipients make it through one year of postsecondary education, and only about 1% obtain an associate's degree.*

*Silja Kallenbach, New England Literacy Resource Center, 2006*

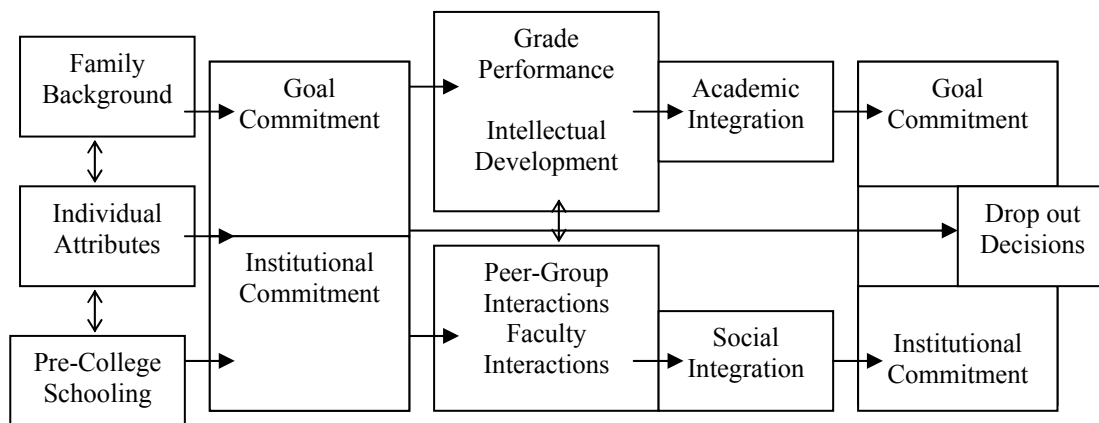
Student persistence in postsecondary education has, over the last 30 years, been a topic of interest to both community college leaders and researchers. Questions such as why students stop-out or drop out, or why students transfer prior to completing their educational goals, have been repeatedly asked (Osei, 2001). Much of this research has been guided either by a theoretical model developed in 1975 by Tinto, or by models developed in response to criticisms of Tinto's work. In order to provide a context for what factors may be related to GED recipient persistence in postsecondary education, the following section briefly explores Tinto's model of student attrition, as well as other models that were developed specifically to explain the persistence and/or attrition of non-traditional students.

### *Theoretical Models*

In the 1970s, the research on student attrition and persistence in higher education moved from a descriptive to a more theoretical approach. Working under the assumption that "a theory's value lies in its ability to explain, and its ability to guide the selection of certain variables to be evaluated while eliminating others" (Allison, 1999, p. 11), researchers constructed different frameworks with the hope of better understanding the issue of high student drop out rates in postsecondary education.

Spady (1970) was the first to develop a model of the college attrition process. In his framework, he emphasized the impact of both social and academic factors on the decision of students to persist or to drop out. Five years later, Tinto (1975) expanded Spady's model to explain how and why students drop out of higher education. Briefly, Tinto's Student Integration Model (SIM) attempted to explain all aspects and processes that influenced an individual's decision to leave college, and ultimately how these processes interacted to produce attrition (McCubbin, 2003). Tinto argued that individuals enter social organizations, in this case higher education institutions, with varying background characteristics and experiences, as well as a wide variety of personal and educational goals and varying degrees of commitment to the institution. In Tinto's model, academic and social systems are the keys to student integration at college institutions and drop out will occur if there is a lack of integration by the student in either of these systems. In sum, Tinto argued that the greater the degree of integration into the social and academic aspects of the college, and the greater the degree to which the student was committed to their goals and the institution, the greater the likelihood that the individual would persist (Halpin, 1990). See Figure 4 for a representation of the SIM.

While Tinto's Student Integration Model remains a very influential model of attrition (McCubbin, 2003), some have criticized it, arguing that the model cannot, and should not generalize beyond students in traditional, residential, four-year college settings (Halpin, 1990). In an effort to address this issue, Bean and Metzner (1985) proposed a model for the study of non-traditional college students. Their model



*Figure 4: Tinto's student integration model (adapted from Tinto, 1975)*

differed significantly from earlier models in the way social integration was viewed. Bean and Metzner presented social integration as having only a minimal effect on the persistence of non-traditional students who tended to be older and did not reside on a college campus (Kothenbeutel, 1993). They argued in fact that because Tinto's model relied heavily on social integration to explain student attrition, and because one defining characteristic of non-traditional students was a lack of social integration into the institution, a different theory was needed to explain attrition for this student population (see Appendix A for a representation of Bean and Metzner's model.) As a result, they developed a framework, which included factors more characteristic of non-traditional college students, namely variables that emphasized greater interaction with the non-collegiate, external environment (Osei, 2001). In this context, a non-traditional student was defined as:

Older than 24, or does not live in a campus residence (e.g., is a commuter), or is a part-time student, or some combination of these three factors, is not greatly influenced by the social environment of the institution, and is chiefly concerned with the institution's academic offerings. (Bean & Metzner, 1985, p. 489)

A variety of other studies (Allison, 1999; Bers & Smith, 1991; Halpin, 1990; Pascarella & Terenzini, 1980) have applied the Tinto model, the Bean and Metzner model, or variations thereof, to non-traditional student populations at different types of postsecondary institutions. Furthermore, Tinto himself has modified his 1975 model twice, once in 1987, and again in 1993, in order to include more recent research on non-traditional students, two-year institutions, and commuting students.

While much work has been done to develop a theoretical framework explaining the attrition of non-traditional student populations in postsecondary education, very few studies have applied these frameworks to the GED recipient population. In fact, while most if not all GED recipients could be classified as non-traditional students (according to Bean and Metzner's (1985) definition), an extensive search of the literature located only one study that applied such a framework specifically to GED recipients. In 1985, Beltzer applied Tinto's conceptual model to GED recipients in a study comparing the success of GED holders with traditional high school graduates. The sample consisted of 198 GED students and 201 traditional high school graduates. Students responded to a questionnaire to determine their levels of academic integration, social integration, institutional commitment, and goal commitment. The results of the study supported the predictive validity of the Tinto model in identifying potential dropouts among GED recipients. Additionally, Beltzer

found that the most important factor in predicting persistence for GED recipients in community college was academic performance.

### *GED Recipient Persistence*

While little research has been done to test the above theoretical models of student attrition on GED recipients, there has been a large amount of research on the persistence of GED recipients focused primarily on the academic performance of this population in comparison to high school graduates. The following section examines several studies that have compared the academic performance of these two groups in the community college.

In 1993, Kroll published a review of the research done between 1970 and 1990 that had evaluated the performance of GED recipients at public two-year colleges. She looked at a total of 16 studies and divided them into three groups. The first group of studies compared GED and high school diploma (HSD) students who were academically successful and had graduated from community colleges. The second group compared GED and HSD students among new enrollees, and the final group of studies compared GED students with all other enrollees. Kroll (1993) used two criteria for selecting the studies for review: (a) the data had to represent students in two-year public colleges in the United States, and (b) the data could not be limited to only technical and vocational training programs. Studies were purposely excluded if the data from the two-year colleges were aggregated with data from four-year colleges, or if the studies had restricted the population to students enrolled in technical or

vocational training. These criteria resulted in the exclusion of seven studies found during Kroll's literature search.

While all of the studies reviewed by Kroll (1993) did compare the academic performance of GED recipients with that of HSD holders, the findings as a whole were non-definitive. Nine of the studies found that there was no significant difference in the academic performance of GED completers and HSD holders, three studies found that GED completers were more successful, and three studies concluded that HSD holders were more successful. Finally, one study found that for full-time students there was no significant difference between the two groups. However, for students enrolled part-time, being a HSD holder meant a higher rate of academic success (Kroll, 1993). See Table 3 for a summary of these findings.

Kroll (1993) pointed out several reasons for this lack of agreement across studies. She argued that these studies were flawed because they used different measures of success, inappropriate comparison groups, and were limited in scope. In the following section, each of these limitations is explored, followed by steps that were taken in the current study to address these issues.

*Measures of success.* When comparing the success of GED recipients and HSD holders in community colleges, an important question to ask is: What is an appropriate measure of success? There was no consistent measurement of success across the reviewed studies, and in fact, each researcher defined success a little differently. Some used grade point average (GPA), some patterns of enrollment, some college placement scores, and others degree completion. Furthermore, in many studies, persistence was



Table 3: *Academic Success: GED Recipients vs. High-School Diploma Holders*

| Study                                | No Difference      | GED More Successful | HSD More Successful |
|--------------------------------------|--------------------|---------------------|---------------------|
| Beltzer, 1985                        | X                  |                     |                     |
| Bigby, 1989                          |                    |                     | X                   |
| Byrd, Hayes, Hendrix & Simpson, 1973 | X                  |                     |                     |
| Clark, 1987                          | X                  |                     |                     |
| Grady, 1983                          | X                  |                     |                     |
| Grise & Klein, 1986                  | X                  |                     |                     |
| Hamilton, 1998                       |                    |                     | X                   |
| Hannah, 1972                         |                    | X                   |                     |
| McElroy, 1990                        |                    | X                   |                     |
| Means, 1987                          | X                  |                     |                     |
| Scales, 1990                         | X                  |                     |                     |
| Schillo, 1990                        |                    |                     | X                   |
| Spillar, 1982                        | X                  |                     |                     |
| Turner, 1990                         |                    | X                   |                     |
| Willett, 1982                        | X                  |                     |                     |
| Wilson, 1982                         | X<br>(PT students) |                     | X<br>(FT students)  |

equated with success, however, there was either no clear definition of persistence given, or the definition of persistence was not consistent across studies. This lack of consistency makes it difficult to replicate, and thus to generalize findings to other populations. In order to address this limitation, the current study differentiated between success and persistence. In this study, individual course grades and cumulative GPA were used as the measure of success, whereas persistence was defined as a student enrolling for two consecutive terms following receipt of the GED credential.

*Inappropriate comparison groups.* None of the studies reviewed by Kroll (1993) compared the GED student who was successful in a community college to the GED student who was unsuccessful. Rather, comparison groups were made up of HSD holders. According to Kroll (1993), these comparison groups were inappropriate because they often included both academically talented students using the community college as a stepping-stone to an advanced degree, and “reverse transfer” students who had studied at a university, or perhaps had even completed a four-year degree, and were now at the community college in order to pursue professional certifications. Kroll (1993) argued that it wasn’t reasonable to expect GED recipients to perform at the same level as these other students. Furthermore, she pointed out that the studies did not take into account the critical life-status differences between HSD and GED students, and to conceptualize HSD and GED students as being equal in all respects except certification status was inappropriate. The current

study addressed this issue by comparing GED recipients, not with HSD students, but with other GED completers.

*Limited scope.* Kroll (1993) also pointed out that the large majority of the studies reviewed here were small scale, and depended upon data readily available in student records. In fact, all but two of the studies were confined to single institutions. It's unrealistic to expect that the results of a study done at one institution can be generalized to the whole spectrum of GED student experiences at community colleges across the country or even across an individual state. The current study addressed this issue by looking at data from more than one institution with the hope of generalizing the findings to all of Oregon. There are seventeen community colleges in Oregon and they differ in many ways. Some are urban and some rural, some are multi-campus and some are single institutions, and some are very large while others are very small. Taking a sample from this diverse population made it more appropriate to generalize the findings across multiple institutions.

*Additional research.* Since 1993, additional studies have been done that looked at the issue of academic performance by GED recipients in community colleges. Soltz (1996) did a quantitative, longitudinal study over a period of 23 years comparing academic achievements in higher education between GED graduates and high school graduates. O'Neill (1995) monitored the progress for three semesters of GED recipients after they completed a required remedial reading course in an urban community college, and Rose (1998) took a qualitative approach to the question by

conducting in-depth interviews of 12 GED students in order to provide themes of GED recipient persistence in postsecondary education.

In his longitudinal study, Soltz (1996) found the academic performance of GED holders to be comparable to that of high school graduates. He reported that the graduation rate of GED recipients appeared to be the same as that of the college's student population as a whole. O'Neill (1995) found that there was no significant difference between GED recipients and a similar group of traditional high school graduates in GPA, total credits, number of degree credits, retention rate, and average grade in a college level English course. Rose (1998) found that GED recipients can be successful in postsecondary education, and that there are many financial, social, and academic factors, such as individual characteristics, goal commitments, or institutional factors, that influence this success (Rose, 1998).

While each of these studies found that GED recipients could be successful in a community college setting, there are some limitations that should be noted. As with those studies reviewed by Kroll (1993), there is a limited ability to generalize from the Soltz (1996) and O'Neill (1995) studies. The O'Neill study was done at a single institution, and the sample size was small. Soltz (1996) did examine the records of over 5,600 GED holders who had enrolled in a large, midwestern community college over a 23-year period. Although this is a large sample size, the fact that the study was limited to a single institution also limits its generalizability. As mentioned earlier, the current study addressed the issue of limited generalizability by looking at the

performance of a large sample of GED recipients at several two-year institutions across the state of Oregon.

*Persistence: Summary*

There has been much research on the academic performance of GED recipients in community colleges. Some of the studies compared academic performance between GED holders and HSD holders (Kroll, 1993, Soltz, 1996) while others explored the experience of GED recipients in community colleges (Beltzer, 1985; O'Neill, 1995; Rose, 1998). The findings of these studies were not consistent, and did not agree on whether GED recipients were as successful, more successful, or less successful than traditional high school graduates in postsecondary education. Given these conflicting findings, the question becomes what is the difference between those GED recipients that do persist and those that do not?

In order to provide insight into this question, the current study examined the issue of GED recipient performance in postsecondary education in a way that addressed the limitations of the research reviewed above. Specifically, in order to eliminate the possible life-status differences between HSD and GED holders, GED holders were not compared with traditional high school graduates, but rather with other GED holders. Furthermore, a consistent measurement of persistence, namely completion of one full term and enrollment in a second consecutive terms following receipt of the GED credential, was used across several institutions and in a variety of geographical locations.

## Remediation

*In 2004, 49% of first time freshmen in two-year institutions were enrolled in at least one remedial course. The figure for GED graduates was 62%.*

*- National Postsecondary Student Aid Study, 2004*

In his longitudinal study comparing academic achievements in higher education between GED recipients and high school graduates, Soltz (1996) commented, “large numbers of GED recipients enrolled in developmental education classes” (p. 274). This observation was also noted in several of the studies included in Kroll’s (1993) review. The research reviewed to this point did not address the issue of student academic performance specifically in developmental education programs; however, if GED students do initially place into developmental education, what does this mean for their academic success? Because this issue has significant implications for GED recipients, the following section examines what existing literature says about the general effectiveness of developmental/remedial education programs in community colleges. Current research was reviewed in the following areas: (a) the general need for remediation, (b) the relationship between remediation and academic success, and (c) GED recipients in remedial education.

### *The Need for Remediation*

At the core of the community college mission is the notion of providing opportunity and access to all. Without developmental education programs, colleges would have neither. In addition to being inseparable from the philosophy of access, developmental education is also vital to the creation of a competitive economy as the

changing demands of the workforce and increased diversity challenge America's ability to compete globally (McCabe, 2000). Each year, as more individuals realize the need to expand their knowledge and improve their skills, enrollments in postsecondary institutions, and therefore the numbers of under-prepared students, continues to grow (Day & McCabe, 1997). In order to meet this need, postsecondary educational institutions will need to offer remedial options for their students, and, indeed, according to a 1996 study conducted by the National Center for Education Statistics (NCES), 100% of community colleges and 81% of four-year schools currently do so (Horn, 1996).

According to McCabe (2000), there are roughly one million students each year who begin college and are placed in remedial courses. At community colleges, where the largest numbers of under-prepared students start their postsecondary careers, 41% of freshmen are enrolled in at least one remedial course (Shults, 2000). In Oregon, this number is slightly lower at about 38%; however, Oregon community colleges only recommend students take remedial courses based on placement tests, enrollment in the courses is not required. As colleges throughout the state move toward mandatory placement in remediation, the percentage of freshmen enrolled in at least one remedial course will likely increase (Oregon Department of Community Colleges and Workforce Development, 2005).

Why do so many students need postsecondary remedial education? One reason stems from changes in the workplace. The increasingly knowledge-based economy and a viable global marketplace is compelling the U.S. to increase the number of

people who have skills for job requirements that weren't needed twenty years ago (McCabe, 2000). A second reason is lack of preparation. A significant gap continues to exist between current high school graduation standards and the competencies needed to begin college (Young, 2002). Finally, demographic changes are contributing to the increased need for postsecondary remedial education. Over the next several years, the population will be far more diverse, with the fastest growing populations being those that historically have the lowest levels of education (Kelly, 2005).

#### *Remediation and Academic Success*

Given the increasing need for postsecondary education, and the large numbers of under-prepared students entering community colleges, the question naturally arises as to whether remediation is effective in preparing students for success in college-level programs. A number of studies have looked at this issue, and following is a review of the research that examined the effect of developmental education on students' academic success in community colleges.

There is compelling evidence in the literature of the general efficacy of developmental education (Boylan, Bonham & White, 1999). McCabe (2000) found, in fact, that students who complete remedial coursework pass 88% of college English classes and 82% of college mathematics classes. This pattern holds true for graduation rates as well. Boylan (1999) found that those who were judged to be under-prepared and who participated in developmental education at community colleges were slightly more likely to earn a degree than the typical community college student. "Nationally, 22% of those who enter any particular community college complete an associate's



degree at that institution...but, 24% of those who participate in developmental education at any particular community college complete an associate's degree at that institution" (Boylan, 1999, p. 3). Finally, Platt (1993) found, in a study of students in 16 Texas community colleges, that students who completed reading remediation showed a passing rate of 80% in college-level English courses. This compared quite favorably to the passing rate of 85% for those students who did not need remediation.

Two separate meta-analyses also found that developmental education programs successfully prepare students for college-level work. Kulik, Kulik, and Shwalb (1983) prepared a meta-analytic synthesis of findings from 60 evaluation studies done prior to 1983. Their findings showed that "special college programs for high-risk students have had basically positive effects on students" (Kulik et al., 1983, p. 397). In 1994, Burley (1994) also used a meta-analysis to answer the question: Do college developmental studies programs increase the chances of under-prepared college students' success in college? Looking at 27 studies done between 1972 and 1990, Burley (1994) found that while the effect size was small, it was also positive, thus leading to her conclusion that "college developmental studies perform as well as controls" (Burley, 1994, p. 3).

While both of these meta-analyses support the notion that developmental education programs are effective in preparing community college students for academic success, the limitations of this research design should be considered.

Although meta-analyses can be used to establish relationships between study outcomes and broad characteristics of studies, they cannot establish relationships between outcomes and unique characteristics. This results in broad generalizations, and may exclude some important characteristics. To augment the findings of these two meta-analyses it is therefore important to examine individual studies done on the effectiveness of developmental education programs.

There have been several studies done that have examined the effect of remediation on student success. For example, Crane, McCay, and Poziemski (2002) looked at how the performance of students who successfully completed developmental coursework compared with the performance of students that entered college needing no remediation. They examined the performance of 3,873 students new to one community college in the fall of 1997, and found that students successful in developmental coursework did as well or better in college-level courses than students who needed no remediation. In fact, with respect to retention, they found, “students successfully completing developmental courses had the highest fall to spring and fall to fall retention rates regardless of developmental subject area studied and the rates were higher than the rates for students not needing developmental coursework” (Crane et al., 2002, p. 30). In addition, they concluded that taking developmental courses did not reduce the likelihood of earning a degree or certificate. The authors commented that, “this study is a contribution to the dialogue on the positive impact and effect of developmental education at the college level” (Crane et al., 2002, p. 9).

Kolajo (2004) looked at the academic performance of developmental and non-developmental students, and examined the effects that developmental courses had on academic progress leading up to graduation. An analysis of three years of data found that developmental students performed equally well as non-developmental students in college level courses, depending on the number of pre-college level courses taken. These findings, as well as those of Crane et al. (2002), agree with a multitude of other studies (Boylan, Bliss & Bonham, 1997; Boylan, Bonham & White, 1999; McGregor & Attinasi, 1996; Patty, 1989), which also concluded that remedial courses do prepare students for academic success in postsecondary education.

In addition to the studies that found developmental education to be effective, other research looked at specific strategies that seemed to further enhance student success. Two areas that were explored were early remediation and concurrent enrollment.

*Early remediation.* In a longitudinal study of 1,254 under-prepared students at a mid-western, suburban community college, Campbell and Blakey (1996) found that remediation was a strong predictor of student persistence, thus agreeing with those studies mentioned above. In addition, their findings added to the literature by examining the effect of *early* remediation on student performance. They defined early remediation as taking the remediation coursework within the student's first year of enrollment. They suggested that especially for those students that are the least prepared, taking remedial courses the first year seems to have a positive effect on academic performance. Two years later, Amey and Long (1998) also found that early

remediation contributed to student success. Specifically, they found that, “students in the successful group were more likely to enroll in their first developmental class during the first semester of course taking, whereas those in the unsuccessful group tended to wait until the second semester to enroll” (p. 3).

*Concurrent enrollment.* Illich, Hagan, and McCallister (2004) found that remedial courses help prepare students for college-level work. While many studies on developmental education focus only on course completion, or on performance in college-level courses following successful completion of remediation, this study added to the literature by focusing on concurrent enrollment. The researchers examined the assumption that students’ under-preparation is limited to a specific skill area. They did this by assessing the college-level performance of students who were concurrently enrolled in remedial and college-level courses. They found that college-level pass rates were much higher among concurrently enrolled students who *did* successfully complete their remedial courses. In contrast, pass rates were much lower for students who did not successfully complete development courses. These less successful students under-performed irrespective of the type of college-level course taken.

*Study limitations.* As with the research looking at GED recipient academic performance in postsecondary education, the reviewed studies on the efficacy of developmental education also have some limitations. While the findings of the many studies reviewed here agree that developmental education is effective in preparing students to be successful in postsecondary education, there are some design limitations. The primary weakness is that each of the studies, with the exception of

Boylan, Bliss, and Bonham (1997), was limited to one institution. It is therefore difficult to say with confidence that the findings can be generalized to all developmental education programs nationwide. In addition, as Boylan, Bonham, and White (1999) pointed out, “developmental education is something of an umbrella under which a variety of interventions designed to develop the diverse talents of students may fit” (p. 88). As a result, although the different studies all looked at student success in developmental education programs, it was not clear if each of the programs at the individual institutions contained identical components. This once again makes it difficult to generalize the findings of these studies to larger populations, and suggests that further research needs to be done to explore the make-up of each of these successful developmental education programs.

#### *GED Recipients in Remedial Education*

While there is a large body of research on the effectiveness of developmental education, none of the studies reviewed thus far looked specifically to see if being a GED holder (versus being a high school graduate) played a role in the efficacy of developmental education programs. Rather, the studies focused on comparing students in developmental programs with students not needing any remediation, with no mention of whether they came to college with a high school diploma or a GED. This researcher was only able to locate four studies, two conducted in 1995, one in 1996, and one in 2000, which examined the relationship between GED recipients and participation in developmental education.

Three of these studies, O'Neill (1995), Ricketts (1996), and Fisher and Sandiford (2000), compared the academic achievement and persistence of GED recipients and high school graduates in urban community college settings. O'Neill investigated the academic progress of high-risk GED graduates as compared to high-risk students who had graduated from traditional high school programs. High-risk was defined as those who were required to take a remedial reading course upon entrance to the college. Ricketts compared the academic persistence of a select group of 17- and 18- year-olds who were enrolled as first time / full-time students at a community college in Tennessee. Finally, Fisher and Sandiford's sample consisted of degree-seeking students who had received a high school diploma or GED and who were classified as under-prepared and enrolled in college preparatory courses (i.e., reading, English composition, or mathematics) during their first semester. All three studies found that there was no significant difference between the two groups' GPA, total credit hours earned or retention rates. Furthermore, each study concluded, in line with many of the studies reviewed earlier, that GED recipients do as well as high school graduates in college-level coursework.

The O'Neill study, while resulting in specific information on the performance of GED recipients in postsecondary remedial education, is limited in two ways. First, as with several of the studies that looked at academic performance of GED recipients, this study was also limited to a single institution. As a result of focusing on a single community college, it is difficult to generalize to other GED recipients who may be enrolled at institutions very different from this urban, New York community college.

This is also the case with both Ricketts (1996) and Fisher and Sandiford (2000) as they conducted their studies at single community colleges in Tennessee and south Florida, respectively. A second limitation of these three studies is that in each, GED recipients were compared with a group of high school graduates. Going back to the earlier argument made by Kroll (1993), there are significant life-status differences between students in these two groups, thus making a true comparison difficult. In order to address this limitation, it would be necessary to compare GED recipients needing remediation with those GED recipients not needing remediation, rather than with high school graduates.

In a fourth study, Coberly (1995) examined the impact of required developmental education classes on high school graduates and GED holders at a university in Arkansas. She found that GED graduates were more likely to be required to attend developmental English classes than high school graduates by a margin of greater than two-to-one. Her data also indicated that GED graduates were more likely to be required to attend developmental mathematics and reading courses, and that this group was more likely than high school graduates to require remediation in multiple skill areas.

This study is also limited by the fact that it was done at a single institution. Furthermore, it was not a community college, but rather a four-year university. These two facts make it once again difficult to generalize these findings to a larger population of GED recipients studying at community colleges. Coberly's (1995) study is additionally limited by the chosen sample. The total sample size was fairly large,

728 students; however, of these 728, 707 – or 97.1% - were high school graduates, leaving only 21 students (2.9% of the total sample population) for the GED comparison group. It is difficult to generalize to all GED recipients based on a sample size of 21, and as a result, her findings that GED graduates are much more likely to require remediation is suspect, and requires additional exploration.

*Remediation: Summary*

While there were many studies on the positive effect of developmental education on student performance (Boylan, 1999, Crane et al., 2002, Kolajo, 2004; Kulik, Kulik, & Shwalb, 1983), there was a paucity of research that focused specifically on the GED recipient population in remedial courses. Ricketts (1996) himself stated, “of all studies conducted on academic performance of GED graduates, only one [he is referring to the 1995 O’Neill study] investigated the remedial / developmental aspect that is so prevalent in today’s community colleges” (p. 70). Henry (1999) gave one explanation for this lack of research specific to the GED population when he pointed out that in 1992, the U.S. Department of Commerce Bureau of the Census began counting GED completers as high school graduates. As a result, GED graduates were difficult to separate from the rest of the community college population when examining who was placed in remediation. Reder (2007) reiterated this point when he wrote that while some national surveys conducted by the U.S. Department of Labor or the Census may have provided a broad perspective on GED recipients, for the most part prior to 2003, they typically categorized the high school diploma with the GED, not making it possible to identify GED holders



separately. The current study has therefore added to the existing literature by focusing solely on GED recipients, and separating them from other students who require remediation upon entrance to a community college.

The review of the remediation literature also had implications for the design of this study. First, in terms of the chosen samples, the vast majority of the studies were limited to one institution (Campbell & Blakey, 1996; Illich, Hagan, & McCallister, 2004; Kolajo, 2004; Patty, 1989). Secondly, the few studies that did focus on GED recipients in remedial education were limited by the fact that they compared GED recipients with high school diploma holders (Coberly, 1995; Fisher & Sandiford, 2000, O'Neill, 1995; Ricketts, 1996). In order to address these limitations, the current study chose a sample from GED recipients enrolled in 17 community colleges, and this group was not compared with high school graduates.

As mentioned earlier, the current study focused on the relationship of selected academic factors to GED recipient persistence in community college. As shown above, remediation has been identified in the current literature as an important factor when looking at non-traditional student persistence, yet although GED recipients are considered non-traditional, there is a paucity of research focused specifically on this population and their performance in remediation. Because of this lack of research, and because of a contradiction between anecdotal evidence of high placement rates into developmental education for GED recipients and documented low persistence rates in postsecondary education, the relationship between remediation and GED recipients needs further exploration and was thus included in the current study.

### Factors Affecting Student Persistence

*The most important factor in predicting persistence for GED graduates in community colleges was academic performance. Therefore the institution must address certain areas that will facilitate academic integration of this student population.*

- Stephen Beltzer, 1985

As described earlier, theoretical frameworks to explain student attrition in postsecondary education were initially developed by Spady (1970) and Tinto (1975). In these models, the focus was on student integration into the academic and social systems of the institution. Tinto, for example, argued that drop out would occur if there were a lack of engagement in either of these systems. These models were developed for traditional students attending four-year residential universities. In the years since 1975, many studies have tested, supported, and expanded the predictive validity of this model for traditional student attrition (Astin, 1975; Bean, 1980; McCubbin, 2003; Pascarella & Terenzini, 1980), and all have examined variables related to demographics, social, and academic integration. See Table 4 for a summary of those variables that most often occurred in the literature as having some relationship to *traditional* student persistence.

While many scholars have supported the validity of Tinto's model, this framework was also criticized as not being applicable to non-traditional student populations. In response to this perceived limitation, Bean and Metzner (1985) developed a theoretical framework that focused specifically on non-traditional

students. Like Tinto, Bean and Metzner also found that academic integration was important for this population, however, this new model took a different view of social

Table 4: *Variables Associated with Traditional Student Persistence*

| Background variables   | Academic integration variables   | Social integration variables  |
|--|--|---|
| <ul style="list-style-type: none"> <li>• Age</li> <li>• Ethnicity</li> <li>• Gender</li> <li>• Family background</li> <li>• Previous schooling</li> <li>• Parents' education</li> <li>• Highest expected degree</li> </ul> | <ul style="list-style-type: none"> <li>• Goal commitment</li> <li>• Faculty interactions</li> <li>• Academic and intellectual development</li> </ul> | <ul style="list-style-type: none"> <li>• Peer group relations</li> <li>• Institutional commitment</li> <li>• Involvement in college organizations</li> <li>• Informal relationships with faculty</li> </ul> |

integration. Bean and Metzner argued that social integration only had a minimal effect on the persistence of non-traditional students (because they tended to be older and not reside on the college campus) and that it was the external environment, rather than the campus environment, that had a greater impact on this population. The Bean and Metzner (1985) model thus examined demographic, academic, and environmental variables in an attempt to explain non-traditional student persistence. Several other studies (Beltzer, 1985; Bers & Smith, 1991; Brooks-Leonard, 1991; Kroll, 1993; O'Neill, 1995; Osei, 2001; Rose, 1998) also examined factors that fell into one or more of these three general categories (i.e., student demographics, academic factors, and environmental factors) when exploring the issue of non-traditional student persistence, attrition, and/or success. See Table 5 for a summary of those variables that

most often occurred in the literature as having some relationship to *non-traditional* student persistence.

Table 5: *Variables Associated with Non-Traditional Student Persistence*

| Demographic variables  | Academic variables  | Environmental variables   |
|--|---|---|
| <ul style="list-style-type: none"> <li>• Age</li> <li>• Ethnicity</li> <li>• Gender</li> <li>• Marital status</li> <li>• Previous schooling</li> </ul> | <ul style="list-style-type: none"> <li>• Enrollment status</li> <li>• GED scores</li> <li>• Remedial course enrollment</li> <li>• Remedial course completion</li> <li>• Grade point average</li> <li>• Degree completion</li> </ul> | <ul style="list-style-type: none"> <li>• Employment status</li> <li>• Perceived or real lack of financial resources</li> <li>• Family responsibilities</li> <li>• Outside encouragement</li> <li>• Validating experiences</li> <li>• Delayed entry</li> </ul> |

#### *Non-traditional students*

Of these two frameworks, which one is the most relevant for GED recipients? This question can be answered by determining if GED recipients should be viewed as traditional or non-traditional students. Exactly what constitutes a non-traditional student in postsecondary education has been widely discussed (Horn, 1996). Many scholars, however, agree that non-traditional students can be defined as older (usually over age 24), attending part-time, and/or not living on campus (Bean & Metzner, 1985; Vellella & Hu, 1991; Pascarella & Terenzini, 1991). Vellella and Hu added, “increasing age, marital and parental status, and work experience are among distinct factors contributing to their [non-traditional students] differing needs” (p. 335).

In the report, *Non-traditional Undergraduates: Trends in Enrollment*, Horn, of the National Center for Education Statistics (1996), applied the term non-traditional to students who did not follow an educational path historically perceived as traditional (i.e., enrolling full-time in college immediately after graduating from high school). In developing a definition of non-traditional, the report focused on choices and behaviors that had the potential to increase the risk of attrition. As a result, non-traditional students were defined as having one or more of the following seven characteristics: (a) delayed enrollment, (b) part-time enrollment, (c) financial independence, (d) full-time employment while enrolled, (e) dependents other than spouse, (f) single parent, and (g) did not obtain a standard high school diploma. The report also argued that each of these characteristics was a risk factor and that students possessing multiple non-traditional factors were more at risk for dropping out and were therefore more likely to have low rates of persistence (Horn, 1996).

According to Horn's (1996) definition, GED recipients, because they did not obtain a standard high school diploma, should be characterized as non-traditional. In addition, in this researcher's personal experience, GED recipients are also likely to be older, to delay their enrollment, enroll as part-time students, and have family responsibilities, all characteristics of non-traditional students cited in the above definitions. Thus, for the purposes of the current study, GED recipients were defined as non-traditional students. As a result, the study looked to past research and already existing theoretical frameworks developed to explain the attrition and persistence

behavior of the non-traditional student population, in order to determine which independent variables should be considered for inclusion.

As mentioned earlier, existing models developed for non-traditional students have included three types of factors: demographic (or background), environmental, and/or academic. While factors in all three of these areas play a role in persistence behavior, the current study focused on determining relationships between *academic* variables and persistence of GED recipients in community college. This focus was chosen for two reasons: the primary importance of academic integration for the non-traditional student population and the practical ability of colleges to (at least somewhat) influence academic factors.

*Importance of academic integration for non-traditional students.* The importance of academic factors for non-traditional student attrition was evident throughout the literature (Bean & Metzner, 1985; Falk, 1995; Halpin, 1990; Pascarella & Chapman, 1983). According to Bean and Metzner, academic variables represent the primary way in which non-traditional students interact with the institution and as a result, such variables do have a direct effect on academic performance and persistence. Agreeing with Bean and Metzner's concept, Halpin, in a study applying the Tinto model to a group of first time freshmen in a rural New York community college, noted, "the apparent greater influence of academic integration compared to social integration is particularly noteworthy" (p. 26). Finally, Beltzer (1985), who looked specifically at the GED recipient population, found that the most important factor in predicting persistence for this student population was academic performance. Beltzer

(1985) also commented that the characteristics a student brings to college may be substantially less important in predicting persistence decisions than his or her extent of academic integration in the institution subsequent to matriculation.

Expanding on the concept that the academic integration construct is critical for the non-traditional student population, several authors also argued that a community college student's first term is a pivotal point in her/his academic career. This is the case because students whose first academic experience in college is positive and successful seemed more likely to remain in school (Brooks-Leonard, 1991; Driscoll, 2007; Smith, 1999).

*Ability to influence academic factors:* In addition to the importance of academic factors in the persistence equation for non-traditional student populations, there is also an opportunity for colleges to (at least somewhat) influence these variables. In fact, while demographic and environmental variables do likely influence persistence behavior, and may indeed pull students from the institution, the institution in fact has little control over these factors (Bean & Metzner, 1985). On the other hand, community colleges can shape academic variables through policy and procedure. In this vein, Halpin (1990) argued that “while little can be done to influence background characteristics or environmental circumstances of community college students, the creation of institutional mechanisms is likely to result in greater levels of integration and hence persistence” (p. 27).

In the current study, the GED recipient population was characterized as non-traditional. As outlined in Table 5, there were several variables that emerged from

existing research as having a relationship to the persistence of non-traditional students. Of these, the current study chose to focus on academic factors because of the ability of colleges to somewhat influence these types of factors, and because there has been an emphasis put on academic integration by several conceptual models developed to explain persistence behavior of this student population (Bean & Metzner, 1985; Falk, 1995; Halpin, 1990; Pascarella & Chapman, 1983). The following section looks more closely at the specific academic variables chosen for analysis.

#### *Academic Factors*

After a review of existing research, the following academic variables emerged as being significant for the persistence of non-traditional student populations in postsecondary education: enrollment status, remedial course enrollment, performance in remedial courses, overall college GPA, and GED score. See Table 6 for a summary of these variables and where they were cited in the literature as being a significant factor related to the persistence of non-traditional students in postsecondary education. It should be noted that while degree completion was considered in many of the studies that looked at the academic success of non-traditional students in postsecondary education (Boesel, Alsalam, & Smith, 1998; Horn, 1996; Osei, 2001; Rose, 1999), this variable was purposefully excluded from the current study. This was the case because of the definition of persistence that was used. Persistence was defined as completion of a student's first term and enrollment in the subsequent term – thus degree completion was not a relevant measure of academic success in the context of the



current study and was therefore purposefully excluded. The following section looks more closely at each of the factors listed in Table 6.

*Enrollment status.* The number of credits attempted per term was a factor identified in Horn's (1996) report that characterized non-traditional students. Traditionally, students enrolled for 12 or more credit hours per term were considered full-time, whereas those enrolling for fewer than 12 hours were classified as part-time

Table 6: *Academic Variables*

| Variable                                 | Studies  |
|--|--|
| Enrollment status                        | Bean & Metzner, 1985<br>Brooks-Leonard, 1991<br>Feldman, 1993<br>Horn, 1996  |
| Enrollment in remedial courses           | Amey & Long, 1998<br>Boylan, 1999  |
| Academic performance in remedial courses | Boylan, Bonham, & White, 1999<br>Crane, McCay, & Poziemski, 2002<br>Illich, Hagan & McCallister, 2004<br>Kolajo, 2004<br>Kulik, Kulik & Schwalb, 1983<br>McCabe, 2000<br>Patty, 1989 |
| Overall college GPA                      | Bean & Metzner, 1985<br>Beltzer, 1985<br>Brooks-Leonard, 1991<br>Tinto, 1975   |
| GED score                                | Henry, 1999<br>Horn, 1996<br>Sharon, 1972<br>Smith & Goetz, 1988<br>Wolf, 1983   |

(Bean & Metzner, 1985). Part-time enrollment was commonly associated with non-traditional student populations who very often had a multitude of other commitments outside of school, such as family and work. In developing their well-known model of non-traditional student attrition, Bean and Metzner (1985) cited several studies conducted between 1969 and 1980 that “furnished very strong evidence that students who were enrolled on a part-time compared to a full-time basis were more likely to drop out of college” (p. 494). Bean and Metzner went on to include part-time enrollment as one of three defining variables in their theoretical model. Brooks-Leonard (1991) and Feldman (1993) also argued that the number of credits taken in any one term was related to persistence. Brooks-Leonard looked at factors related to first-to-second term persistence at a two-year public technical college in Indiana. Analyzing the demographic and academic information of 796 first-time students, she found that enrollment status was one of four variables related to persistence, with close to 80% of full-time students enrolling in the subsequent semester, as compared to only 43% of the part-time students. Examining the enrollment patterns of over 1,000 students at Niagra County Community College, Feldman’s findings agreed with Brooks-Leonard in that part-time students dropped out at a higher rate than those that were enrolled full-time. In fact, he concluded that part-time students were “2.23 times more likely to drop out than full-time students” (Feldman, 1993, p. 511).

Not all studies done on the effect of enrollment status agreed that it was a significant factor in predicting persistence. For example, both Vorhees (1987) and Osei (2001) found that this variable was not a significant predictor of student

persistence. In her study of GED recipient persistence at a four-year postsecondary institution, Osei (2001) commented on this conclusion by pointing out that it contradicted the findings of Bean and Metzner, and therefore the question as to what role enrollment status actually plays in non-traditional student attrition remained open.

There is not consensus in the literature as to the role enrollment status plays in postsecondary persistence. In addition to this disagreement, it is also important to note that none of the studies reviewed looked specifically at GED recipients in community colleges. While Osei (2001) did look at GED recipients, the study was done at a four-year institution rather than at a community college. Other studies, such as Brooks-Leonard (1991) and Feldman (1993), did look at the community college, and at non-traditional student populations, but did not identify the effect of enrollment status exclusively for GED recipients in two-year institutions. Rather, they both focused on first-time students enrolled in a community college, not specifying if these students entered the institution with a high school diploma or a GED. Finally, the Bean and Metzner (1985) study was even broader, looking at all non-traditional students enrolled in institutions of higher education. In order to gather additional information on the relationship of full/part time enrollment to the persistence of (specifically) GED recipients, this factor was thus included in the current study.

*Enrollment and performance in remedial courses.* As mentioned earlier in the section on remediation, there was compelling evidence in the literature of the general efficacy of remedial education. Several studies (Boylan, 1999; Crane, McCay, & Poziemski, 2002; Kolajo, 2004; Kulik, Kulik & Shwalb, 1983; McCabe, 2000)

concluded that remedial courses do prepare students for academic success and contribute positively to student persistence in postsecondary education. There was, however, a paucity of research that focused exclusively on the GED population in remedial courses. As a result of this gap, factors related to remediation were included in the current study.

*First term college GPA.* Tinto (1975) wrote “with respect to grade performance, many studies have shown it to be the single most important factor in predicting persistence in college” (p. 104). This of course was said in the context of traditional students attending four-year residential institutions. In recent years, research has shown this also to be true for non-traditional students. For example, in 1985 Bean and Metzner reviewed over 30 studies done between 1962 and 1985 that had looked at student persistence in postsecondary education. As a result of this literature review, they concluded that college academic performance (as measured by grade point average) has been a consistent and powerful predictor of persistence at various types of institutions and for different student populations. They did, however, offer a caveat that college grade point average may be relatively less predictive of persistence for part-time and older commuter students than for their more traditional counterparts. Brooks-Leonard (1991) agreed with this finding in her study to determine demographic and academic factors associated with first-to-second-term retention at a two-year technical college in Indiana. Specifically, she argued that the only academic factor found to be significantly related to retention, was first term GPA.

Finally, in a study looking specifically at GED recipients, Beltzer (1985) also found that first year GPA was associated with student persistence.

While the vast majority of studies agreed that college GPA was a significant factor with respect to student persistence, a few studies have found no relationship between these two variables. Amey and Long (1998), Osei (2001), and Long (2004), all looked at college GPA as a potential factor that would affect student persistence, and all found that there was no significant relationship between the two. Because this factor occurred often in existing research, and because there remains some question as to the nature of the relationship between college GPA and the persistence of GED recipients in two-year colleges, this factor was included in the current study.

*Mean standard GED test score.* According to Horn's (1996) definition of a non-traditional student, the mere fact of obtaining a GED qualifies a student as "non-traditional," and therefore puts her/him at an increased risk of attrition. Much research has been done on using GED test scores as predictors of academic performance, though the results of these studies have been varied (Rose, 1999).

In 1977, Rogers conducted a study examining the first semester college performance of GED recipients at a small Midwestern urban commuter institution. He found that GED score was not a useful predictor of academic success. A second study, conducted by Turner (1993), tested the correlation between GED score and the students' first semester cumulative GPA. Using a multiple regression analysis, she found no relationship between these two variables, and in fact argued that, "GED test scores are not a valid criteria [sic] to use to differentiate between students who will

and will not succeed in college classes” (Turner, 1993, p. 5). Rose (1999) agreed with this conclusion in her study on 251 GED recipients enrolled in a small four-year college. Also using a multiple regression analysis, Rose found that GED score was not a significant or reliable predictor of college GPA.

Although these studies do agree that GED scores cannot be used to predict student success, each study did not measure “success” in the same way, nor did they examine the same populations. Rogers (1977) looked at the GPA of students enrolled in their first semester in a single community college; Turner (1993) measured success, not using GPA, but rather looked to see if the student successfully passed a standardized college entrance exam (the College Level Examination Program, or CLEP); and finally, Rose (1999) focused on a four-year institution and included not just first year students, but also sophomores, juniors, and seniors, in her analysis. The applicability of the Turner and Rose studies is additionally limited by their choice of samples. Specifically, Turner only looked at 73 GED recipients, a very small sample at a single institution, and while Rose’s sample was larger (N = 251), 89% of the students were Caucasian, leading this researcher to question whether her findings could be generalized to a more ethnically diverse population.

Studies done in 1972 (Sharon), 1983 (Wolf), 1988 (Smith & Goetz), and 1999 (Henry) all found, in contrast to Rogers (1977), Turner (1993), and Rose (1999), that GED test score was a significant predictor of college academic performance. Each of these studies also added to the research in unique ways. Specifically, Sharon’s study, in addition to finding that GED test scores could be a predictor of student success, also

concluded that the predictive ability of the GED test is higher in community colleges than in four-year schools, and type of institution should therefore be considered as a moderator of the relation between GED score and GPA. Wolf, in a detailed investigation to clarify and extend the initial findings of Sharon, argued that despite a lack of high school GPA information for GED recipients, two-year college GPA can be predicted through the use of GED test scores. Finally, Smith and Goetz (1988) and Henry (1999) argued that because of the correlation between GED test scores and academic success, the former could and should be used as a placement tool by community college counselors and advisors, thus negating the necessity of additional placement testing for GED recipients enrolling in college classes.

As with the studies that found no relationship between GED test scores and persistence, however, those that did find a relationship between these two variables did not all measure student success in the same way. Some of the studies looked only at the first-semester GPA (Wolf, 1983; Smith & Goetz, 1988), while others looked at the students' cumulative GPA over the course of several terms (Henry, 1999; Sharon, 1972). Because GED test score occurred often in the persistence literature for non-traditional students, and because there is disagreement about the exact relationship this variable has to GED recipient persistence, this factor was included in the current study.

#### *Academic Factors: Operational Definitions*

As outlined above, the following five academic factors emerged from the literature review as having relationships with persistence in postsecondary education

of either non-traditional students, or (in some cases) more specifically with GED recipients: enrollment status, remedial course enrollment, performance in remedial courses, overall college GPA, and GED score. In the current study, these factors were operationally defined as the following seven independent variables:

- Number of credits enrolled in during the first term
- Type of courses enrolled in during the first term
- Ratio: Remedial courses to total course enrollment during the first term
- Type of remedial courses enrolled in during the first term
- Academic performance (i.e., grades received) in remedial courses
- Total first term GPA
- Mean standard GED score

The following section discusses why these seven independent variables were chosen.

*Enrollment status.* Throughout the literature, the most used definition for the concept of enrollment status was number of credits taken per term (Bean & Metzner, 1985; Brooks-Leonard, 1991; Feldman, 1993; Horn, 1996). Commonly, students enrolled for fewer than 12 credits were classified as part-time, while those who took 12 or more credits were seen as full time. Because this definition occurred frequently in existing research, the current study also operationalized enrollment status as the total number of credits taken during the student's first term. In addition, the current study added a second measure to represent the concept of enrollment status. The measure "type of courses enrolled in during the first term" was added in order to gather information on course taking patterns of GED recipients following their



transition to postsecondary education. No existing studies were located which looked at the patterns in which GED recipients enrolled in remedial and/or college-level courses upon transition. Thus, in order to gather this additional information the variable “type of courses enrolled in during the first term” was added.

*Remedial course enrollment.* Existing research focusing on non-traditional students in postsecondary education has often included remediation as a key factor in predicting persistence behavior (Boylan, 1999; Burley, 1994; Kulik, Kulik & Shwalb, 1983). In order to mirror “enrollment status”, the definition “total number of remedial credits taken during the first term” was initially considered for this factor. However, in order to obtain richer data, the current study chose to define this variable as “ratio: remedial courses to total course load”.

In addition, the current study added a second factor to measure the concept of remedial course enrollment. No existing studies were located that looked at the type of remedial courses this student population enrolled in following receipt of the GED credential. Thus, in order to gather this additional information the variable “type of remedial courses enrolled in during the first term” was included.

*Remedial course performance.* In existing research there have been several studies that have looked at the academic performance of students in remedial courses (Fisher & Sandiford, 2000; Kolojo, 2004; O’Neill, 1995). In these studies, performance was most often measured by GPA. There has also been research exploring the relationship between completion of remedial coursework and postsecondary persistence (Campbell & Blakey, 1996; McCabe, 2000; Platt, 1993). In

these studies, completion of remediation was most often defined in terms of receipt of a passing grade. The current study chose the second option, i.e., the variable “remedial course performance” was operationalized as grades received in each remedial course. This decision was guided by the fact that in the existing dataset, individual course grades were available, while GPA, for remedial courses only, was not. (GPA was included in the dataset, however, it was only available by student and not by individual courses).

*Overall college GPA.* Existing research focusing on the persistence of both traditional and non-traditional students in postsecondary education has shown GPA to be a key factor in predicting persistence behavior (Bean & Metzner, 1985; Beltzer, 1985; Brooks-Leonard, 1991; Tinto, 1975). As a result the current study included this variable, and defined it in the same way as all other studies (i.e., the cumulative numeric values of grades earned as measured on a scale from 1.00 to 4.00).

*GED score.* The GED examination consists of five individual tests: mathematics, science, social studies, language arts-writing, and language-arts reading. Each test is reported on a scale from 200 to 800. To earn the credential, a student must earn a minimum composite score of 2,250 (equivalent to an average score of 450) across the five tests, with no individual test score below 410. Because the examination does consist of these individual components it is possible to operationalize the variable “GED score” in a variety of ways, including: individual test scores, composite score (sum of all five individual examination scores), or mean standard score (composite score / five).

In choosing which definition to use, the current study looked at existing research to determine what the best fit would be. Because no existing research was found in which composite score was used as the operational definition of this variable, this definition was not used. Furthermore, because the studies that operationalized this variable as individual sub-test scores were looking to predict performance in subject specific areas rather than overall persistence and/or academic success (Smith & Goetz, 1988; Turner, 1993), this definition was also not chosen. The operational definition “mean standard score” was chosen because it occurred in many studies (Henry, 1999; Rose, 1999; Wolf, 1983) that had a similar purpose to the current study, namely looking at GED score as a way to predict overall academic performance in college courses.

#### *Demographic Variables*

The current study did not test for relationships or correlations between demographic variables and GED student persistence. However, in order to better understand the GED recipient population, background information on the students was collected. The determination of which demographic factors to include in this study was made by looking at existing research on GED recipient and non-traditional student persistence, as well as at what data was available in the existing data set from which the information for this study was drawn. Those demographic variables that appeared regularly in the research and were included in the existing data set were: age, gender, and ethnicity (Burley, Butner, & Cejda, 2001; Henry, 1999; Osei, 2001; Kothenbeutel, 1993; Wolf, 1983). It should be noted that two variables which occurred

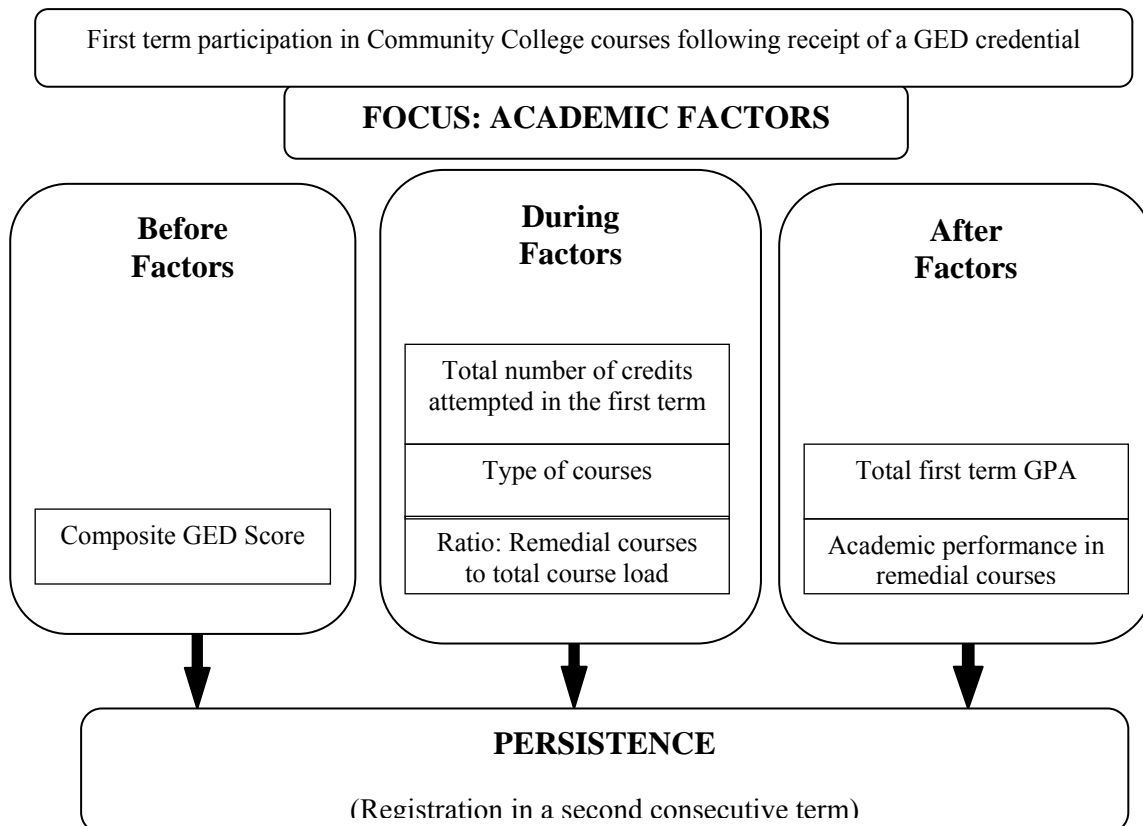
in the literature: (a) marital status and (b) previous schooling (i.e., how many years of formal schooling a student completed before dropping out and completing a GED), were purposefully excluded because they are not present in the existing data set from which the data for the study was extracted.

*Factors Affecting Student Persistence: Summary*

Academic integration has been shown to have a relationship with the persistence of non-traditional students (Bean & Metzner, 1985; Falk, 1995; Halpin, 1990), and, through policy and program design, community college leaders may be able to shape the academic experience of those GED recipients who successfully transition into their institutions. In order to make informed and effective programming decisions, it is therefore important for community colleges to better understand the relationship between selected academic variables and GED recipient persistence. Several academic factors emerged from the literature as having relationships with persistence in postsecondary education of either non-traditional students, or (in some cases) more specifically with GED recipients. These factors were: enrollment status, remedial course enrollment, performance in remedial courses, overall college GPA, and GED score. The following section outlines a proposed conceptual framework suggesting how these factors may be related to the persistence of GED recipients in community colleges.

*Proposed conceptual framework.* The academic factors which emerged from existing research as having some type of relationship to non-traditional student persistence fell into three distinct categories: (a) “before” factors: factors that occurred

before the first term of enrollment; (b) “during” factors: factors that happened during the first term of enrollment; and (c) “after” factors: factors that occurred at the conclusion of the first term of enrollment. The framework, as shown in Figure 5,



*Figure 5: Academic factors and GED recipient persistence: A conceptual framework.*

represents an expectation that each of these three areas will have some sort of relationship with student persistence. This expectation is based on several studies which showed that enrollment status (Bean & Metzner, 1985; Brooks-Leonard, 1991; Feldman, 1993), enrollment in, and successful completion of remedial coursework

(Boylan, 1999; Crane, McCay, & Poziemski, 2002; Kolajo, 2004; Kulik, Kulik & Shwalb, 1983; McCabe, 2000), and good academic performance (Bean & Metzner, 1985; Beltzer, 1985; Brooks-Leonard, 1991; Tinto, 1975) were all positively related to the persistence of non-traditional students.

With regard to the variable “GED score,” the conceptual model presented here suggests a positive relationship between this factor and persistence, despite disagreement in the existing literature as to the exact relationship between this variable and student persistence in postsecondary education. The positive relationship depicted in Figure 5 is based on some studies that did find this relationship to exist (Henry, 1999; Smith & Goetz, 1988; Wolf, 1983), as well as on anecdotal evidence presented by faculty, who have first-hand experience with this student population (J. Voth, personal communication, June, 2007).

Although the current study focused on academic factors, this researcher acknowledges that demographic and environmental variables do impact the persistence of GED recipients in community colleges in a variety of ways. As a result, these factors should be included in next steps following the conclusion of this study. For example, future research could take the findings of this study and expand the conceptual model by focusing on the interaction of environmental and/or demographic variables with those academic variables analyzed here.

### Literature Review Summary

Each year, over half a million individuals receive their GED (GED Testing Service, 2005), and yet only about one third of these students transition to postsecondary education, and an even smaller percentage successfully complete a certificate or degree (NCSALL, 2003). In order to meet the economic and social needs of the 21<sup>st</sup> century, it is important that these students see the GED credential, not as an endpoint, but rather as a way to gain access to, and to succeed in additional education and training. As more GED recipients realize the necessity of further education and make the transition to postsecondary education, it is the responsibility of community colleges to create an environment in which these individuals can be successful. In order to create such an environment, college leaders should better understand those variables that are related to student success and persistence.

Examining existing research, certain factors emerged as having relationships to the persistence of non-traditional students, and sometimes more specifically with the GED recipient population. These factors fell into three categories: demographic, academic, and environmental. Because of an emphasis put on academic integration in existing theoretical frameworks designed to explain persistence behaviors of non-traditional students, and because of the possibility of influencing academic factors through program planning, the current study chose to focus on academic factors. The specific academic variables chosen for inclusion in the current study also fell into three categories: before – factors that occurred before the first term of enrollment, during – factors that occurred during the student’s first term of enrollment following

receipt of the GED, and after – factors that resulted from enrollment in the first term. With the purpose of increasing an understanding of how these factors were related to the persistence of GED recipients in community colleges, the following research questions were addressed:

- Is there a relationship between selected academic factors and persistence of GED recipients in community college?
  - Is there a relationship between the *mean standard GED score* and persistence of GED recipients in community college?
  - Is there a relationship between the *total number of credits* enrolled in during the first term and persistence of GED recipients in community college?
  - Is there a relationship between the *type of courses* enrolled in during the first term and persistence of GED recipients in community college?
  - Is there a relationship between the *ratio: remedial courses to total course load* during the first term and persistence of GED recipients in community college?
  - Is there a relationship between the *type of remedial courses enrolled* in during the first term and persistence of GED recipients in community college?



- Is there a relationship between *total GPA* during the first term and persistence of GED recipients in community college?
- Is there a relationship between *academic performance in remedial courses* and persistence of GED recipients in community college?

In looking to answer these questions, literature was reviewed in areas of: the GED, transition, persistence, remediation, and factors affecting student persistence in postsecondary education. The following section summarizes how the review of this literature both substantiated the need for further research into GED recipient persistence in postsecondary education, as well as how it informed the design of the study.

#### *The Need for the Current Study*

Over the last several decades, the numbers of non-traditional students at community colleges has grown tremendously. According to McCabe (2000), this has been the case because, “in the 1960s, the nation urgently strived for equality, and higher education responded by providing opportunities for people who previously had been excluded” (p. 1). As a result, postsecondary education experienced a great democratization and focused on opportunities for African-Americans, Hispanics, and other underserved populations, including women, people with disabilities, and older adults (McCabe, 2000).

In response to this growth of the non-traditional student population at institutions nationwide, research has increasingly been conducted to better understand these populations. For example, since the mid 1980s, several theoretical models have been developed that attempt to explain non-traditional student attrition from postsecondary educational institutions (Bean & Metzner, 1985; Beltzer, 1985; Halpin, 1990; Horn, 1996; Tinto, 1993). Other research has looked at the remedial needs of non-traditional students (Crane, McCay, and Poziemski, 2002; Kolajo, 2004; O'Neill (1995); Shults, 2000) as well as the effect of certain demographic, academic, and environmental variables on non-traditional student performance and persistence (Bean & Metzner, 1985; Horn, 1996; Osei, 2001).

While much of this research did not specifically focus on the GED recipient population, it can be argued that GED graduates are in fact non-traditional, and the findings therefore do apply to them. Indeed, according to the definition of Horn (1996), GED recipients can be classified as non-traditional simply because they took the GED examination, rather than received a traditional four-year high school diploma. Despite the applicability of a portion of this definition to the GED recipient population, there are other characteristics of non-traditional students, as put forth by Horn, Villella and Hu (1991) and others that may or may not apply to GED recipients. For example, not all GED recipients enroll part-time, are over age 24, work full-time, or are single parents. Therefore, in order to get additional information regarding the relationship of academic variables to persistence *specifically* with respect to the GED

recipient population, it was necessary to examine this population separately from other non-traditional groups.

In order to add to the current knowledge base on performance and persistence of non-traditional students that has been generated by the work of researchers such as Bean and Metzner (1985), Beltzer (1985), and Rose (1997), the current study separated GED recipients from other traditional and non-traditional enrollees in community college and examined how selected academic factors were related to this specific group's persistence rates.

### *Study Design*

In addition to showing that there was a paucity of research on the application of existing theoretical models to the GED recipient population, the literature review also served to inform the design of this study. In looking at the studies across the main content areas (i.e., transition, persistence, and remediation), three recurring themes became apparent. Two design limitations, inappropriate comparison groups and limited scope, arose several times, as did a theme related to the definition of persistence. The following section discusses these themes and explains how they influenced the design of the current study.

*Inappropriate comparison groups.* While few studies have tested existing theoretical models of student persistence on GED recipients, there has been a large amount of research focused on the academic performance of GED recipients in comparison to that of high school graduates. Studies by Kroll (1993), O'Neill (1995), Soltz (1996), and Osei (2001) all examined the issue of academic performance by

GED recipients in postsecondary education. The findings of these studies were non-definitive, as some found there to be no difference in academic performance between GED recipients and high school graduates, some found that GED recipients were more successful, and some found that high school diploma holders were in fact more successful.

In her meta-analysis, Kroll (1993) argued that there were several reasons for a lack of agreement across studies. She argued that the studies were flawed because high school diploma graduates and GED recipients differ in many ways. Specifically, there are significant life status differences between GED recipients and high school graduates, and it is therefore inappropriate to conceptualize high school diploma students and GED students as being equal in all respects except certification status. For example, high school diploma groups often included both academically talented students using the community college as a stepping-stone to an advanced degree and “reverse transfer” students who had studied at a four year institution and were now at the community college in order to pursue professional certificates (Kroll, 1993). This was in contrast to the GED recipient groups, which most often consisted of students who possessed several risk factors such as being a single parent, working full-time while being enrolled, and enrolling on a part-time basis (Horn, 1996).

In order to better understand the academic performance and persistence of GED recipients, the current study therefore did not use a comparison group of high school graduates. Rather, the entire population and sample consisted of GED

recipients, and they were compared to each other, rather than to a group that may or may not have been appropriate.

*Limited scope.* The issue of limited scope appeared in many of the studies mentioned in this chapter. In her meta-analysis, Kroll (1993) pointed out that all but two of the sixteen studies she reviewed looked at GED recipient performance at single institutions. This characteristic was also evident in many of the studies that looked at the academic performance of GED recipients in postsecondary education (O'Neill, 1995; Soltz, 1996; Rose, 1998), as well as those that examined the effect of remediation on student success (Campbell & Blakely, 1996; Crane, McCay, and Poziemski, 2002; Kolajo, 2004; Illich, Hagan, and McCallister, 2004). In addition to studies only being done at single institutions, the issue of limited scope was also evident in sample sizes. For example, Rose (1998) only interviewed 12 students, O'Neill (1985) had a sample size of 47, and Coberly (1995) used a comparison group of 21 GED recipients, a number that was only 2.9% of the total sample size.

It is unrealistic to expect that the results of a study done at one institution, or on a very small sample size, could be generalized to the whole spectrum of GED student experiences at community colleges nationwide (Kroll, 1993). As a result, if the findings of the current study were to be replicated and generalized to a larger population, it was important to address this issue of limited scope. The current study did so by collecting and analyzing data on a sample of 4,785 unduplicated students

drawn from all of the GED recipients who enrolled in any of the 17 community colleges across the state of Oregon between 2003 and 2006.

*Definition of persistence.* In the studies reviewed in this chapter, the term persistence was not defined consistently. Some researchers defined it as degree completion (Boesel, Alsalam & Smith, 1998; Osei, 2001; Rose, 1998), while others only looked for enrollment beyond the term of initial entry into the institution (Brooks-Leonard, 1991; Campbell & Blakey, 1996; Halpin, 1990). Despite these different definitions, one important theme was discovered throughout the literature review. This theme was *the critical importance of a student's first term*.

In general, student persistence rates at community colleges are lower than in other postsecondary institutions, and the lowest rate of consecutive term persistence within the community college occurs from a student's first to second term (Brooks-Leonard, 1991). As early as 1977, Rogers argued that the first term is the most important for many students because their ideas and expectations concerning college can be shaped by these initial experiences. Twenty years later, Rose (1997) also emphasized this point when she wrote "the first few weeks are critical for many students. This time period is particularly crucial for students who are apprehensive about college and who have not been successful in past academic situations" (p. 133). In addition to the effect on student expectations and abilities, first to second term persistence rates are also critical because "they tend to be the lowest, and to set the stage for subsequent term to term rates" (Brooks-Leonard, 1991, p. 58). Finally, Horn

(1996) reinforced the importance of focusing on the students' initial terms when she stated:

Non-traditional students are highly likely to leave in their first year of postsecondary education. However, evidence from this study suggests that the gap in attrition between non-traditional and traditional students closes considerably from the second year on. Thus, it seems crucial that programs aimed at reducing non-traditional student attrition rates be implemented from the beginning. (p. 41)

The discovery that enrollment beyond the initial term of entry is of critical importance for all community college students, and particularly for non-traditional students, significantly influenced the study's design. In response to this finding, persistence of GED recipients in community colleges was defined as enrollment in two consecutive terms in a community college following receipt of the GED credential.

### *Conclusion*

Between 1980 and 1997, 34 million new jobs were created that required some form of postsecondary education, while about seven million jobs were eliminated that required only a high school diploma (Kallenbach & Zafft, 2006). In Oregon this trend is evident as well, with 30 percent of employment openings between 2004 and 2014 projected to require at least some postsecondary training. Furthermore, in today's economy, educational level is clearly linked to earning potential, with more education resulting in both lower rates of unemployment as well as higher average weekly earnings (Bureau of Labor Statistics, 2004). Census patterns show a similar pattern in

Oregon, with those who did not complete high school experiencing significantly higher unemployment than those who had some postsecondary training (Worksource Oregon, 2006). Despite these economic realities, only five to ten percent of GED recipients nationwide make it through one year of postsecondary education, and only about 1% obtain an associate's degree (Kallenbach & Zafft, 2006).

In order to increase the success rate of the GED recipient population, it is vital that educational leaders better understand what factors are related to their academic success. To contribute to an understanding of how these students can be more successful, the current study described the existence, strength, and direction of relationships between the dependent variable "GED recipient persistence in community colleges" and selected academic factors. These factors were:

- number of credits attempted during the student's first term;
- type of courses enrolled in during the student's first term;
- ratio of remedial courses to total course load during the student's first term;
- type of remedial courses enrolled in during the student's first term;
- first term overall college GPA;
- academic performance in remedial courses;
- mean standard GED score

The following section describes the design of the current study, including the research methodology, information about the researcher, method, data needed, participants, data collection methods, data analysis procedures, strategies to ensure soundness of data, and protection of human subjects.



## CHAPTER 3

### Methods

The purpose of this study was to reach a better understanding of the relationship between selected academic factors and the persistence of GED recipients following the receipt of the GED credential and subsequent enrollment in community college. The following chapter outlines the design for the current study and the rationale for the chosen approach. This includes the research methodology, information about the researcher, proposed method, data needed, participants, data collection methods, data analysis procedures, strategies to ensure soundness of data, and protection of human subjects.

#### *Methodology*

There is a need for researchers to be thoughtful about their work. They must see themselves as scholars who acknowledge the philosophical assumptions that underlie their practices, and who can situate themselves, and their experiences, within the wide continuum of what constitutes research (Bettis & Gregson, 2001). After personal introspection, and consideration of the research questions, this researcher chose to approach this study from a post-positivist perspective. There are different uses of the term post-positive in the literature. Some use this term to describe those methodologies that are interpretive in nature, methodologies such as critical social science, feminism, and postmodernism. I, however, am using this term as interpreted by Bettis and Gregson (2001). In this context, post-positivism is defined as a “humbler version of the scientific approach, one that no longer claims an epistemologically or

metaphysically privileged position” (p. 9). Because of the close resemblance to positivism, an examination of the tenets of this methodology will lead to a deeper understanding of the post-positivist approach chosen for this study.

*Positivism.* Positivism is a way of viewing the world that arose from a nineteenth-century school of thought by the Frenchman who founded sociology, Auguste Comte (Neuman, 2003). A positivist views reality and knowledge in very specific ways. From this perspective, reality is fixed, is seen as existing apart from our own perception, and follows general laws. Knowledge is directly influenced by the assumption that an objective reality exists. Positivists believe that it is only through experimentation that natural laws, embedded in this fixed reality, will reveal themselves. One therefore acquires knowledge by discerning already existing natural laws through experimental manipulation and observation. Furthermore, positivists believe that in order to discover these natural laws it is necessary for researchers to control for their own biases and strive for complete objectivity. While acknowledging that true objectivity is difficult to attain, positivists would argue that truly objective research is possible through the use of manipulative research methods and techniques (Denzin & Lincoln, 2000; Neuman, 2003).

Some of the characteristics of the positivist methodology resonated with the purpose of this study. Specifically, the notion that there exists an external, objective reality governed by natural laws provided a clear foundation for exploring what selected academic factors were related to GED recipient persistence in postsecondary education. As Neuman (2003) stated, “once people discover the laws that govern

human life, we can use them to improve how things are done, and to predict what will happen” (p. 71). In other words, learning “what works” to improve the persistence of GED recipients in community colleges could provide an opportunity to predict barriers, and therefore to improve the chances of future success for this student population.

*Post-positivism.* Despite the applicability of some key positivist concepts, this study was approached from a post-positivist perspective. The reason for this was that as a methodology this researcher believes that positivism was too rigid and too absolute. Post-positivism was appealing, because, while it did represent a reaction against this rigidity, it also maintained some of the beliefs, values, and assumptions about how the universe operates that were attractive in the positivist approach. For example, post-positivists also believe that there is an external, objective reality; however, they are very sensitive to the complexity of this reality and to the limits and biases of researchers who study it (Trochim, 2002). As a result of its complexity, reality can only be approximated rather than truly known. Because of this belief, post-positivists argue that the goal of research is to achieve agreement among researchers about the perceived nature of reality. Like positivists, post-positivists value objectivity; however, how it is defined and achieved differs between the two groups. For the latter, objectivity is not achieved through elimination of biases but rather through the use of multiple perspectives. According to Schutt (2006), post-positivists believe that “the goal of science is to achieve intersubjective agreement among scientists about the nature of reality” (p. 73), where intersubjective agreement is

defined as an agreement by different observers on what is happening in the natural or social world.

Post-positivists also have a distinct view of what constitutes a “true” explanation. An explanation in the post-positivist tradition is true when it: (a) is based on facts, (b) is logically connected to laws, and (c) is replicable (Neuman, 2003). Facts are seen as unbiased observations, and if there is disagreement over facts it is not because there are different possible interpretations, but rather because of “improper use of measurement instruments or sloppy or inadequate observation” (Neuman, 2003, p. 74). Additionally, there are laws, and these laws operate according to strict, logical reasoning. Researchers connect causal laws and observed fact with deductive logic (Trochim, 2002). Finally, replication is key. There is an objective reality out there that researchers are striving to approximate as closely as possible, and replication, because it repeatedly tests explanations against hard, objective facts, is therefore the way in which true knowledge accumulates.

This researcher agrees with the post-positivist notion that all measurement is fallible, and that in order to get the best measure of what is happening in reality, it is important to employ multiple measures and observations, and to rely on the “critical community of peers,” or the greater research community, to develop the most thorough and accurate understanding of reality that is possible. With regard to the current study, the goal was therefore to contribute to the greater research community’s current perception of reality (i.e., the true nature of GED recipient persistence in

postsecondary education), by describing relationships among selected academic variables and GED recipient persistence in community college.

*Post-positivist research guidelines.* According to Schutt (2006), in order to achieve an accurate understanding of the social world, the researcher operating within the post-positivist tradition must adhere to some basic guidelines when conducting research. The following are those that seemed to best fit with this study. First, Schutt argued that it is important to test ideas against empirical reality without becoming too personally invested in a particular outcome. In other words, there must be a commitment on the part of the researcher to remain open to all possibilities, rather than simply looking for expected and/or desired outcomes. A second guiding principle is the idea that all procedures should be documented and publicly disclosed so that conclusions can be evaluated by others. This is a critical step because “it is the community of researchers reacting to each others’ work that builds knowledge” (Schutt, 2006, p. 74). A third guiding principle is the act of clarifying assumptions. By taking the time to think about and disclose assumptions, researchers provide important information for those who seek to evaluate the research conclusions. Finally, according to Schutt, the goal of research is not just to understand individual cases, but rather to understand patterns that characterize many individuals. These guidelines will be revisited later in this chapter when strategies to ensure the soundness of data and data analysis are explored.

### *The Researcher*

As mentioned above, while post-positivists believe in the positivist notion that there is an external, objective reality, they also believe that understanding of this reality is limited by its complexity and by the biases and other limitations of researchers (Schutt, 2006). As a result, when using a post-positivist framework, it is important to acknowledge that the experiences, beliefs, and values of the researcher are embedded throughout the research process. In the case of the current study, I therefore believe that my personal background, and the knowledge that I have about community colleges and GED students, impacted my research. In fact, it played a key role from the very beginning of the process by heavily influencing the selection of the topic. My first-hand experience with this population in community colleges, and my informal observations of the participation and performance of GED recipients after they initially enroll in college classes, convinced me that lack of persistence was indeed a significant problem that should be addressed.

*Personal experience.* I have worked for 19 years in adult literacy, English as a Second Language, and GED preparation programs. Over the course of these two decades I have taught and worked with hundreds of students who studied for and obtained a GED. I have seen first hand the value that this credential brings to the lives of those who have, for many different reasons, been unsuccessful in traditional educational environments. As a result, I value the concept of a GED, and believe that it is a rigorous, valid, and necessary alternative that provides a second chance for individuals to access critical educational and training opportunities.

In my work at community colleges, I have also witnessed first hand the high failure rate of GED recipients who have transitioned into college programs. At one institution at which I was employed, a local analysis was done on one term of data to evaluate the success of GED recipients who were given their first term of credit classes free of charge. The results of this unscientific analysis revealed that for the 46 students who were issued tuition waivers in the fall term of 2005, over one third either took an incomplete or withdrew from at least one course during the term. When looking at individual courses, the lack of success becomes more pronounced because most of the students took more than one course during the term. In fact, these 46 students withdrew from 35 different courses, received an additional 14 no passes, 4 incompletes, 6 D's, and 6 F's (Portland Community College, 2006). These findings contributed to the perception on my part that lack of GED recipient success in community college credit programs was a significant problem that needed to be better understood.

### *Method*

Positivist and post-positivist methodologies are most commonly associated with a quantitative approach to research (Creswell, 2005). Quantitative research can be carried out using either experimental or non-experimental designs. This study used a non-experimental, or more specifically an explanatory correlational design. This design was used to describe and document aspects of GED recipient persistence in community colleges. The design also served as a starting point for hypothesis and theory generation around this topic. The current study described and quantified the

relationships between the chosen variables but did not determine if these were cause and effect relationships. The following section looks at how correlational design fit the current study and at the advantages and disadvantages of this design choice.

*Why correlational design?* According to Creswell (2005), correlational designs, through the use of correlational statistics: (a) aim to measure or predict the relationship between two or more variables, (b) study a single group of individuals (rather than two or more as in an experiment), and (c) are used when it is not possible or desirable to provide an intervention. The current study met these criteria in the following ways:

- the study's purpose was to determine the relationship between GED recipient persistence in postsecondary education and several independent variables
- only one group, namely GED recipients who enrolled in Oregon community colleges, was analyzed
- no intervention or manipulation of existing variables was done.

*Advantages of a correlational design.* An important advantage of this research design is that it acts as a foundation for future experimental studies. The first step in understanding GED recipient persistence is to describe how different variables are related to each other during the students' experiences in postsecondary education. After the strength and direction of relationships between certain variables are established, the next step is to determine cause and effect through the use of



experimental or quasi-experimental studies. The results of such research would inform practice and could assist community college leaders to design and maintain programs that result in the success of GED recipients upon transition to postsecondary education.

*Disadvantages of correlational design.* While explanatory correlational design fit well with the goals and methodological framework of the study, there is one important limitation to this design that should be mentioned. As stated above, because of a lack of manipulation and control of the variables, this type of design is unable to determine causal relationships. This means that this study is only the first step in determining how to increase GED recipient persistence in community colleges.

#### *Data Needed*

The data needed for the current study was guided by the following research questions:

- Is there a relationship between the *mean standard GED score* and persistence of GED recipients in community college?
- Is there a relationship between the *total number of credits* enrolled in during the first term and persistence of GED recipients in community college?
- Is there a relationship between the *type of courses* enrolled in during the first term and persistence of GED recipients in community college?

- Is there a relationship between the *ratio: remedial courses to total course load* during the first term and persistence of GED recipients in community college?
- Is there a relationship between the *type of remedial courses enrolled in* during the first term and persistence of GED recipients in community college?
- Is there a relationship between *total GPA* during the first term and persistence of GED recipients in community college?
- Is there a relationship between *academic performance in remedial courses* and persistence of GED recipients in community college?

Data was collected on GED recipients enrolled in Oregon community colleges in order to evaluate the relationships between selected academic factors and persistence. Following are descriptions of the dependent variable, the independent variables, and the operational definitions of each. (See Table 7 for a summary of all variables included in the study).

*Dependent variable.* A dependent variable is “an attribute or characteristic that is dependent on or influenced by the independent variable” (Creswell, 2005, p. 121). In the current study the dependent variable was “persistence of GED recipients in community college.” Persistence was defined as enrollment in two consecutive terms following receipt of the GED credential and matriculation into a community college.

Table 7: *Operational Definitions of the Independent and Dependent Variables*

| Dependent variable                                | Operational definition   |
|---|--|
| Persistence                                       | Enrollment in two consecutive terms in an Oregon community college following receipt of the GED credential. (Note: completion of the first term and enrollment in the second consecutive term as of the fourth week of the term).  |
| Independent variables                             | Operational definition   |
| Number of credits attempted during the first term | Total number of credits attempted during the student's initial term at an Oregon community college following receipt of the GED credential.  |
| Type of courses enrolled in during the first term | <p><i>College level</i> – Courses numbered as 100 or above and coded in the OCCURS system as either lower division collegiate (LDC) or professional technical preparatory (PT Prep).</p> <p><i>Pre-college level</i> – Courses numbered below 100 and coded in the OCCURS system as postsecondary remedial (PSR), English as a second language (ESL), Adult Basic Education (ABE), or GED preparatory (GED).</p> <p><i>Adult High School Diploma</i> – Courses coded in OCCURS as adult high school diploma preparation (AHS).</p> <p><i>Continuing Education</i> – Courses coded in OCCURS as non-reimbursable for FTE purposes (NR) or as professional technical supplementary (PT Supp). This included courses offered as continuing education units (CEUs) and community education.</p> <p><i>Apprenticeship</i> – Courses coded in OCCURS as professional technical apprenticeship (PTA).</p> |

| Independent Variables  | Operational Definitions   |
|--|---|
| Ratio: remedial courses to total course load during the first term | Total number of <i>pre-college</i> courses enrolled in during the student's initial term at an Oregon community college following receipt of the GED credential <i>divided by</i> the total number of courses taken during the first term.  |
| Type of remedial courses enrolled in during the first term         | Reading, writing, integrated reading/writing, mathematics, tutoring, English as a second language, or computer skills courses numbered below the 100 level.   |
| Overall first term college GPA                                     | Total GPA in all courses enrolled in during the student's initial term in an Oregon community college following receipt of the GED credential. GPA is the cumulative numeric values of grades earned as measured on a scale from 1.0 – 4.0. (4.0 = A, 3.0 = B, 2.0 = C, 1.0 = D).                           |
| Academic performance in remedial coursework                        | Grade received in each pre-college course. Grades included: A, B, C, D, and F. Other possible grades were NG, NR, or NB – indicating that the course was non-graded, WD – indicating withdrawal from the course, P or NP – indicating pass or no pass, or IN and IP – indicating incomplete or in progress. |
| Mean standard GED score  | The sum of the scores received on each of the five individual tests: mathematics, literature, writing, social studies, and science – divided by five. (Note: Only students who completed the English-language version of the test were included).   |

This definition was chosen because existing research showed that first to second term persistence rates are the most critical because they tend to be the lowest and to set the stage for subsequent term-to-term rates (Brooks-Leonard, 1991). As recently as

August 2007, Driscoll argued that: “the first semester in community college is a pivotal point in students’ academic careers. Students whose first academic experience in college is positive and successful are more likely to remain in school” (p. 2).

*Independent variable.* An independent variable is “an attribute or characteristic that influences or affects an outcome or dependent variable” (Creswell, 2005, p. 121). In the current study, seven independent variables were included. These variables were chosen because of their prevalence in the literature, and because they had been included in existing theoretical frameworks developed in recent years to explain the attrition and persistence behavior of non-traditional students. These variables were: (a) total number of credits attempted during the first term, (b) type of courses enrolled in during the first term, (c) ratio: remedial courses to total course load enrolled during the first term, (d) type of remedial courses enrolled in during the first term, (e) total first term GPA, (f) academic performance in remedial coursework, and (g) mean standard GED score.

In addition to understanding the operational definitions of each of the variables, it is also important to specify the exact data needed to answer the research questions. Table 8 shows the specific information that was collected in order to evaluate the relationships of the seven individual variables to the persistence of GED recipients in community colleges.

Table 8: *Data Needed*

| Independent variable   | Data needed  |
|--|--|
| Persistence  | Date that the GED examination was completed.<br>Dates and all terms student enrolled in any one of Oregon's community colleges.<br><br>All courses taken in any one of Oregon's community colleges.                    |
| Research questions   | Data needed  |
| Is there a relationship between the mean standard GED score and persistence of GED recipients in community college?  | The mean standard GED score for each GED recipient in the sample.  |
| Is there a relationship between the total number of credits attempted during the first term and persistence of GED recipients in community college?              | The total number of courses and the number of credits per course in which each GED recipient enrolled during the first term in an Oregon community college following receipt of the GED credential.                    |
| Is there a relationship between the ratio of remedial courses to total course load during the first term and persistence of GED recipients in community college? | The name and course number (example: Writing 121) of all courses in which each GED recipient enrolled during the first term in an Oregon community college following receipt of the GED credential.                    |
| Is there a relationship between the type of courses taken during the first term and persistence of GED recipients in community college?                          | The total number of <i>pre-college</i> courses and the total course load for each GED recipient during the first term in an Oregon community college following receipt of the GED credential.                          |
| Is there a relationship between the type of remedial courses taken during the first term and persistence of GED recipients in community college?                 | The name and course number (example: Writing 121) of all <i>pre-college</i> courses in which each GED recipient enrolled during the first term in an Oregon community college following receipt of the GED credential. |

---

| Research questions  | Data needed   |
|---|---|
| Is there a relationship between total first term GPA and persistence of GED recipients in community college?                                      | The total first term GPA for each GED recipient enrolled in an Oregon Community College following receipt of the GED credential.                                |
| Is there a relationship between grades received in remedial courses during the first term and persistence of GED recipients in community college? | The grades received by each GED recipient in each pre-college course in which they were enrolled during the first term following receipt of the GED credential. |

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### *Study Participants*

The following section specifies the population and the sample that this study used to address the research questions. Following identification of these groups, the sampling technique is also described.

*Population.* While the ideal population for this study would have been all of those GED recipients who enrolled in community colleges nationwide, taking a sample from this population was not realistic due to the size and geographic distribution of the group, as well as the financial and time resources available to the researcher. Furthermore, because of differences across states in GED instructional delivery systems, and differences in the administrative structure (as it relates to pre-college programming) of community college systems nationwide, it would likely be unwise to try and generalize findings discovered in Oregon to the rest of the country. As a result, the chosen population for the proposed study was GED recipients who will enroll in any of Oregon's community colleges following receipt of the GED credential in the future.

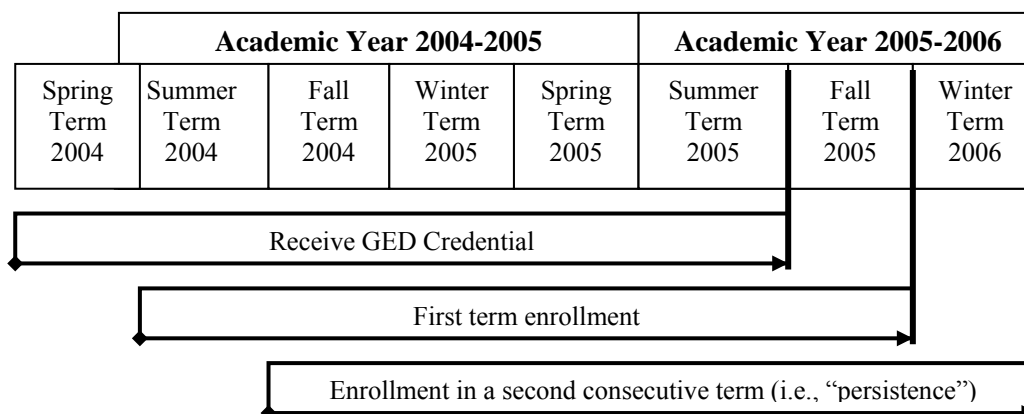
*Sample.* The sample for this study was drawn from the population of GED recipients who enrolled in any one of Oregon's community colleges following receipt of the GED credential. Specifically, the sample consisted of GED recipients who completed their GED in Oregon between July 1, 2003 (i.e., during or after summer term 2003) and June 30, 2005 and then enrolled for their first term in one of the 17 Oregon community colleges in one of the following terms: summer 2003, fall 2003, winter 2004, spring 2004, summer 2004, fall 2004, or winter 2005, spring 2005, summer 2005, fall 2005, winter 2006 or spring 2006. This timeframe was chosen for two reasons. First, in order to get a larger sample size, data was extracted from more than one academic year. Because spring term 2006 was the last term that complete data were available in the existing databases from which the data was extracted, the sample consisted of data from the academic years 2003-2004, 2004-2005, and 2005-2006. Working backward, a student would therefore have to have received the GED credential no later than the end of fall term 2005, in order for her/him to have the opportunity to enroll for two consecutive terms. See Figure 6 for a graphic representation of the last two years of this timeline.

#### *Data Collection Procedures*

The current study collected and analyzed existing data sets. Specifically, the researcher collaborated with the State of Oregon Department of Community Colleges and Workforce Development (CCWD) to conduct a data match between the Oregon State GED database and the Oregon Community College Unified Reporting System (OCCURS), a statewide database that has been in place since the mid 1990s.



OCCURS contains information on student demographics, enrollment patterns, and placement information for all 17 community colleges in Oregon, while the GED database contains scores for all students who took the GED in the State of Oregon.



*Figure 6:* Timeframe for choosing the study's sample.

The data match was done using student identification numbers and had as its goal identification of those students who completed a GED in Oregon between July 1, 2003 and June 30, 2005, and subsequently enrolled in an Oregon community college at any time between summer term 2003 and winter term 2006.

The types of data that were extracted from the existing databases for each student were: (a) student's age, gender, and ethnicity, (b) number of courses enrolled in during the first term following receipt of the GED, (c) number of credits enrolled in during the first term following receipt of the GED, (d) names of courses enrolled in during the first term following receipt of the GED, (e) the grade each student received in each of these courses at the conclusion of the first term following receipt of the GED, (f) the number of remedial courses enrolled in during the first term following

receipt of the GED, (g) the names of each remedial course enrolled in during the first term following receipt of the GED, (h) the grade each student received in each remedial course at the conclusion of the first term following the receipt of the GED, (i) total GPA in the first term following receipt of the GED, and (j) mean standard GED score.

### *Data Analysis*

This section discusses the descriptive and inferential statistical methods that were used to analyze the data extracted from the two existing databases, the Oregon state GED database and the OCCURS data system. Because the type of each variable played a key role in the selection of appropriate statistical tools, each of the chosen variables and their type is laid out in Table 9.

Table 9: *Variable Types*

| Variable name       | Categorical variables   | Code                  | Dependent or independent |
|---------------------|---|-----------------------|--------------------------|
| Persistence         | <ul style="list-style-type: none"> <li>• Not persist</li> <li>• Persist</li> </ul>  | 0<br>1                | Dependent                |
| Overall Course Type | <ul style="list-style-type: none"> <li>• Adult High School Diploma</li> <li>• Pre-College</li> <li>• Continuing Education</li> <li>• Apprenticeship</li> <li>• College Level</li> </ul> | 0<br>1<br>2<br>3<br>4 | Independent              |

| Variable name  | Categorical variables                | Code | Dependent or independent |
|--|--------------------------------------|------|--------------------------|
| Remedial Academic Performance                            | • Incomplete (IN)                    | 0    | Independent              |
|  | • Not Graded (NG)                    | 1    |                          |
|  | • No Pass (NP)                       | 2    |                          |
|  | • Withdraw (WD)                      | 3    |                          |
|  | • F                                  | 4    |                          |
|  | • D                                  | 5    |                          |
|  | • Pass (P)                           | 6    |                          |
|  | • C                                  | 7    |                          |
|  | • B                                  | 8    |                          |
|  | • A                                  | 9    |                          |
| Remedial Course Type                                     | • Tutoring (TUT)                     | 0    | Independent              |
|  | • Computer (COMP)                    | 1    |                          |
|  | • English as a Second Language (ESL) | 2    |                          |
|  | • Reading/Writing (RW)               | 3    |                          |
|  | • Reading (RD)                       | 4    |                          |
|  | • Writing (WR)                       | 5    |                          |
|  | • Mathematics (MA)                   | 6    |                          |
|  |                                      |      |                          |
| Continuous variables                                     |                                      |      |                          |
| Number of credits  | • Range from 1 – 12 or more          |      | Independent              |
| Overall GPA  | • Range from 0.0 to 4.0              |      | Independent              |
| Mean standard GED Score                                  | • Range from 420 to 800              |      | Independent              |
| Ratio of number of remedial courses to total course load | • Range from 0.0 to 1.0              |      | Independent              |

*Choice of statistics.* In order to answer the current study's research questions, both descriptive and inferential statistical methods were used. A summary of the approaches chosen for each question is presented in Table 10.

Table 10: *Statistical Tools by Research Question*

| Research Question   | Statistical Analysis Tool                                |
|---|--|
| Is there a relationship between “before” factors and persistence of GED recipients in community college?<br><br>(As measured by mean standard GED score)  | - frequency distribution<br>- binary logistic regression |
| Is there a relationship between “during” factors and persistence of GED recipients in community college?<br><br>(As measured by credits attempted, ratio: remedial courses to total course load, type of overall courses enrolled in, type of remedial courses enrolled in) | - frequency distribution<br>- binary logistic regression |
| Is there a relationship between “after” factors and persistence of GED recipients in community college?<br><br>(As measured by first term GPA and grades received in remedial courses)  | - frequency distribution<br>- binary logistic regression |

In order to answer each of the questions, both descriptive and inferential methods were used. First, frequency distributions were constructed for each of the independent variables in order to get a descriptive picture of the sample. Next a binary logistic regression technique was used to evaluate the existence, strength, and direction of relationships between each of the independent variables and the dependent variable “GED recipient persistence in community college.” Logistic regression, rather than multiple regression or discriminant analysis, was used because in this study the dependent variable was dichotomous (persist / not persist), and according to Tabachnick and Fidell (1996), logistic regression is better suited for cases when the independent variables are continuous but the dependent variable is dichotomous.

*Strategies to Ensure Soundness of Data, Data Analysis, and Interpretation*

As mentioned above, Schutt (2006) suggested that in order to achieve an accurate understanding of the social world, a researcher operating within the post-positivist tradition must adhere to some basic guidelines when conducting research. In order to ensure the soundness of the data, data analysis, and interpretation of the results, this study therefore committed to the following four guidelines: (a) testing in an objective manner, (b) clarifying assumptions, (c) maintaining a skeptical stance toward current knowledge, and (d) searching for regularities or patterns (Schutt, 2006).

*Testing in an objective manner.* In order to gather good data, perform a meaningful analysis, and accurately interpret the results, it is important to test ideas against external reality rather than becoming too personally invested in a particular outcome. In other words, it is important to recognize and control for (as much as possible) biases and/or confounding variables. Studies that successfully do so are said to have a high rate of validity. One type of validity, *internal validity*, refers to the extent that variables other than the independent(s) being studied may be responsible for part or all of the observed effect on the dependent variable. In other words, threats to internal validity are “problems that threaten our ability to draw correct inferences that arise because of the experimental procedures or the experiences of participants” (Creswell, 2005, p. 291). The traditional list of threats to internal validity such as history, maturation, selection, testing, and regression, have less relevance for judging the validity of the results in a correlational study (as compared with an experimental or

quasi-experimental study) because there are no experimental or control groups (Mitchell, 1985). According to Mitchell, the most salient threat for correlational studies is “the third variable that may be correlated with X or Y or both” (p. 196). In order to address the “third variable” threat, this researcher actively tried to conceptualize and measure as many academic variables as possible that could somehow impact GED recipient persistence in postsecondary education. These variables, which were chosen as a result of drawing on existing literature as well as on existing theoretical models designed to explain non-traditional student persistence, fell into three categories: academic pre-enrollment factors, academic enrollment factors, and academic performance factors.

*Clarify assumptions.* In all research there exist background assumptions and by “taking the time to think about and disclose these assumptions, researchers provide important information for those who seek to evaluate the validity of research conclusions” (Schutt, 2006, p. 74). The three main assumptions at the foundation of this study were: (a) It is desirable to increase the persistence rate of GED recipients in postsecondary education, (b) Educational leaders are able to influence/affect academic factors and therefore the persistence of GED recipients in postsecondary education, and (c) the data taken from the established systems (i.e., the Oregon state GED database and the OCCURS system) were reliable and valid.

*Maintain a skeptical stance toward current knowledge.* In line with a post-positivist methodology, the belief that there is an external reality must be tempered by the understanding that all observation is fallible and has error, and that all theory is

revisable (Trochim, 2002). For this study, this skepticism was a lens through which current research was reviewed. This practice led to the discovery of limitations and gaps in the current research, which in turn facilitated the formation of this study's research questions and design.

Maintaining a skeptical stance toward current knowledge can also be connected to the concept of *external validity*. External validity is important because it determines the extent to which the variable relationships can be generalized to other settings and other populations. In the case of this study, the researcher planned from the beginning to make a generalization from the sample, GED recipients who enrolled in any Oregon community college during a three-year window, to the larger population, GED recipients who enroll in any Oregon community college after receiving a GED credential. In order to do this effectively it was important to consider the special challenges associated with analyzing information from an existing data set. When using existing data it is “important to remember that the purposes for which they have been collected are often very different than those for which you might want to use them” (Muijs, 2004, p. 57). In other words, the data collected in the Oregon State GED database, and the OCCURS system, were not collected solely for the purpose of describing how different academic factors may or may not be related to the persistence of GED recipients in community colleges. It was important to keep this fact in mind during the course of the study, and to purposefully define each chosen variable, in order to ensure that the definitions chosen matched that of the data in the existing data sets.

*Search for regularities or patterns.* Post-positivists assume that there is some underlying order of relationships to external reality (Schutt, 2006). This study therefore strove to describe relationships that went beyond individual cases to a larger group. In order to maximize this generalizability, a large sample was used, as were appropriate statistical tests.

In searching for patterns it was important to look for consistency, or in research terms for a high level of reliability. According to Creswell (2005), reliability can be defined as: “individual scores from an instrument are stable and consistent. Scores should be nearly the same when researchers administer the instrument multiple times at different times. Also, scores need to be consistent” (p. 162). Three factors that can result in unreliable data are: (a) the questions on the instrument are ambiguous and unclear, (b) the procedures of test administration vary and are not standardized, and/or (c) the participants are tired, nervous, misinterpret questions, or guess on the test (Creswell, 2005). In terms of this study, reliability was for the most part a non-issue, because six of the seven independent variables (total number of credits, type of course enrollments, total number and type of remedial course enrollments, total first term GPA, and academic performance in remedial coursework) were all factual information, gathered from existing official college records systems.

For the independent variable “mean standard GED Score,” however, the issue of reliability needed to be explored in more detail because this variable came out of the administration of a standardized instrument. As stated above, a reliable instrument



should produce consistent scores when it is administered multiple times at different times. In the case of the GED examination, test designers have gone to great lengths to ensure test reliability. In fact, the GED testing service relies on a national panel of content experts and curriculum specialists to identify the skills and knowledge required for high school seniors for graduation. Experienced high school and adult educators develop test questions based on those needs. These questions are reviewed many times by other educators, content experts, and test development specialists to help ensure that the items measure what they are intended to measure (validity), perform consistently (reliability), and are free from bias. Test items that do not meet all of these criteria are deleted (Trenholm State Technical College, 2005). Since its inception, the GED Tests have undergone norming studies in 1943, 1955, 1967, 1977, 1980, 1987, 1996, and 2001. Each establishment of new norms reflected a new set of standards met when passing the GED examination. Test scores reported are based on the performance of graduating high school seniors from the most recent norming study. Therefore, the standard scores for all tests taken between January 1, 2002, and December 31, 2007, are based on the performance of U.S. graduating high school seniors in 2001 (Ezzelle & Hsu, 2007).

In addition to the established reliability of the GED examination, both the OCCURS system, and the Oregon State GED database were developed for the purpose of providing accurate research and data to those interested in postsecondary education trends and outcomes, and as Muijs (2004) pointed out, “this problem [reliability] is far less acute with data sets collected for research purposes” (p. 58).

### *Protection of Human Subjects*

This researcher completed the National Institutes of Health Human Participants Protection Education for Research Teams online course. The Oregon State Human Subjects policy was followed and approval was sought and granted from the Institutional Review Board (IRB) before undertaking the study. All subjects remained anonymous through the use of a coding system that eliminated individual names and student identification numbers. Because the data came from existing data sources, individual informed consent from students was not necessary.

### *Conclusion*

Working within a post-positivist methodological framework, this study used an explanatory correlational design to describe the relationship between selected academic factors and the persistence of GED recipients in community college. Descriptive and inferential statistical methods, namely frequency distributions and logistic regression, were used to determine the existence, strength, and direction of relationships on data extracted from two existing datasets: the Oregon state GED database and the state OCCURS student information system. The following chapter outlines the data analysis process in more detail and presents the results of these analyses.

## CHAPTER 4 Results

The purpose of this study was to better understand the relationship between selected academic variables and the persistence of GED recipients in community colleges. This chapter provides results of the data analysis done on information obtained by conducting a data match between the Oregon State GED database and the Oregon Community College Unified Reporting System (OCCURS), a statewide database that has been in place since the mid 1990s. OCCURS contains information on student demographics, enrollment patterns, and placement information for all 17 community colleges in Oregon, while the GED database contains both individual test and composite examinations scores for all students who have taken the GED in the State of Oregon.

The following section presents descriptive characteristics of the sample as well as inferential analyses related to each of the research questions. These questions were:

- Is there a relationship between the *mean standard GED score* and persistence of GED recipients in community college?
- Is there a relationship between the *total number of credits* enrolled in during the first term and persistence of GED recipients in community college?
- Is there a relationship between the *type of courses* enrolled in during the first term and persistence of GED recipients in community college?

- Is there a relationship between the *ratio: remedial courses to total course load* during the first term and persistence of GED recipients in community college?
- Is there a relationship between the *type of remedial courses enrolled in* during the first term and persistence of GED recipients in community college?
- Is there a relationship between *total GPA* during the first term and persistence of GED recipients in community college?
- Is there a relationship between *academic performance in remedial courses* and persistence of GED recipients in community college?

#### *Data Collection*

The current study looked at an existing data set in order to determine the existence of relationships between selected academic variables and the persistence of GED recipients in community college. The Oregon State Office of Community Colleges and Workforce Development (CCWD) performed a data match between two existing large datasets, the Oregon GED state database and the OCCURS system. Data were identified for extraction by flagging all students in the GED state database who had received their GED credential between July 1, 2003 and June 30, 2005, and then matching these students' social security numbers to the OCCURS system in order to identify those students who had enrolled in one of Oregon's 17 community colleges between fall term 2003 and winter term 2006. Following the identification of those students who met the above criteria, CCWD replaced each student social security

number with a researcher-created identification number. This was done in order to protect the anonymity of those students identified in the data match. Following the replacement of the social security numbers with a student record identification number, CCWD organized the extracted information into several Microsoft Excel files. These files contained demographic, GED examination, and course taking information for the 2003-2004, 2004-2005, and 2005-2006 academic years. See Table 11 for a summary of the specific information that was captured. CCWD's final step was to send all of this data, in Microsoft Excel format, to the researcher for further manipulation and analysis.

In order to best answer the current study's research questions, it was necessary to re-organize and add to the information received from the State. Of primary importance was the need to add a marker of persistence. Although the raw data included the date each student received her/his GED credential, and subsequent course taking behaviors, the data match did not provide any direct indication of which students persisted and which did not. In order to have persistence information available for analysis a new table was created by merging select information from the *enrmatch* and *gedstumatch* files. This new table contained each student's unique record identification number, the date the GED was earned, the term (or terms) each student was enrolled in college courses, and the names of each course enrolled in during these terms. A new blank field was also added to this table to provide a place to mark, for each individual student, whether or not he/she persisted.

Table 11: *Excel Files Produced by CCWD*

| Excel file name   | Field names | Field name definitions                 | Total number of <i>duplicated</i> records |
|---|-------------|--|---|
| <i>gedscorematch</i>  | xssn        | Unique student identification number   | 45,569                                    |
| This file provided scores for the separate GED tests for each individual student. | testnum     | Individual GED subject test            |   |
|   | testform    | Individual GED test form number        |   |
|   | stdscore    | Student score on individual test       |   |
|   | testdate    | Date individual test was taken         |   |
|   | rawscore    | Individual test raw score              |   |
|   | version     | Individual test version – 1988 or 2002 |   |

| Excel file name  | Field names | Field name definitions                             | Total number of <i>duplicated</i> records |
|--|-------------|--|---|
| <i>gedstumatch</i>   | xssn        | Unique student identification number               | 20,719                                    |
| This file provided one record for each term a student was enrolled within a two-year time frame, including the year they earned their GED and the subsequent year. | icode       | Code of college where student enrolled             |   |
|  | trmyr       | Term and year student was enrolled                 |   |
|  | trmgpa      | Total grade point average received in any one term |   |
|  | certdate    | The date the GED was earned                        |   |
|  | totscr      | Composite score of all five GED tests              |   |
|  | avgscr      | Average score of all five GED tests                |   |
|  | gender      | Student's gender                                   |   |
|  | race        | Student's ethnicity or race                        |   |
|  | birthdate   | Student's birthdate                                |   |

| Excel file name  | Field names | Field name definitions                       | Total number of <i>duplicated</i> records |
|--|-------------|--|---|
| <i>enrmatch</i>  | xssn        | Unique student identification number         | 52,208                                    |
| This file contained one record for each course in which a student enrolled during a two-year time frame, including the year they earned their GED and the subsequent year. | icode       | Code of college where student enrolled       |   |
|  | termyr      | Term and year student was enrolled           |   |
|  | crsid       | Individual college course identifier         |   |
|  | sect        | Individual college section number            |   |
|  | crsname     | Course title                                 |   |
|  | acti        | Activity code for FTE classification         |   |
|  | actidesc    | Course type for FTE classification           |   |
|  | creda       | Credits attempted                            |   |
|  | grade       | Grade or completion indicator                |   |
|  | crede       | Credits earned by the student for one course |   |



Following creation of the additional data table, the information for each individual student was looked at to determine if the student enrolled in at least two consecutive terms after the date he/she received the GED credential. If yes, he/she was marked as a *persister*, and if not, he/she was marked as a *non-persister*. (Note: to clarify, students were marked as not persisting if they only enrolled in one term following receipt of the GED, or if they enrolled in two terms – but not consecutively). Using this definition of persistence the final total sample size (persisters and non-persisters) was an unduplicated count of 4,785 students. During their time in the various community colleges across the state of Oregon, these students enrolled in a total of 14,080 courses.

It is important to note that the raw data provided from CCWD contained the records of 8,469 unduplicated students; however, the final sample used in this study consisted of only 4,785 students. The reason for this was that in the process of determining the persistence status of each individual student, several students were identified as having enrolled in community college courses only *previously* to receipt of the GED credential. In some cases students simply took college level courses before receiving the GED, but more commonly a student was enrolled in the college Adult Basic Education or GED preparation programs, and did not enroll for any courses following receipt of the GED credential. (Oregon is only one of a few states nationwide in which the community colleges are the primary provider of adult education services across the state, therefore participation in ABE programs appeared in the OCCURS system as college enrollment). Because the current study focused on

those students who had already made the transition to postsecondary education, and because the definition of persistence used in this study specified enrollment in college courses *following* receipt of the GED, those 3,684 students who did not meet these criteria (and the courses in which they were enrolled) were not included in the final data set.

After adding the persister information to the data received from CCWD, additional data tables were created (by merging and/or connecting the data in the original data tables received from CCWD) in line with the current study's research questions. See Table 12 for a summary of the information captured in these additional data tables.

### *Data Analysis*

After setting up each of the data tables described in Table 12, initial statistical analyses, consisting of frequency and percentage distributions were done on each of the variables. First, in order to have a better understanding of the makeup of the sample, descriptive statistics were done on the three demographic factors captured in the dataset: age at receipt of the GED, gender, and ethnicity. Next, descriptive analyses were done on the seven independent variables: (a) total number of credits attempted during the first term, (b) type of courses enrolled in during the first term, (c) ratio of remedial courses to total course load during the first term, (d) type of remedial courses enrolled in during the first term, (e) total GPA during the first term, (f) academic performance (i.e., grades received) in remedial courses during the first term, and (g) mean standard GED score.

Table 12: *Additional Data Tables Created from Existing Datasets*

| File name   | Field names | Field name definitions                        | Total<br><i>unduplicated</i><br>students |
|---|-------------|---|--|
| <i>Persist yes no demo</i>  | xssn        | Unique student identification number          | 4,785                                    |
| This file provided demographic information on each student in the sample. | persist     | Yes = Persister / No = Non-persister          |  |
|   | birthdate   | Student's birthdate                           |  |
|   | age at GED  | Student's age when GED received               |  |
|   | gender      | Student's gender                              |  |
|   | race        | Student's race or ethnicity                   |  |
| <i>Persist yes no total GED score</i>                                     | xssn        | Unique student identification number          | 4,785                                    |
| This file provided students' composite and individual GED scores          | persist     | Yes = Persister / No = Non-persister          |  |
|   | totscr      | Student's total score on all GED tests        |  |
|   | avgscr      | Student's average score on all five GED tests |  |

| File name   | Field names | Field name definitions   | Total number of <i>unduplicated</i> students |
|---|-------------|--|--|
| <i>Persist yes no courseid</i>  | xssn        | Unique student identification number   | 4,780  |
| This file provided information on all of the courses taken by each student. | persist     | Yes = Persister / No = Non-persister   |  |
|   | first term  | Term and year student first enrolled in the college following receipt of GED |  |
|   | crsname     | Course title   |  |
|   | grade       | Student's grade in each course   |  |
|   | actidesc    | Course type for FTE classification   |  |
|   | crsid       | College designation of each course – example WR90 or RD 115                  |  |
| <i>Persist yes no first term GPA</i>  | xssn        | Unique student identification number   | 4,780  |
| This file provided total first term GPA for each student in the sample.     | persist     | Yes = Persister / No = Non-Persister   |  |
|   | first term  | Term and year student first enrolled in the college following receipt of GED |  |
|   | trmgpa      | Total GPA received in the first term following receipt of the GED            |  |

| File name  | Field names  | Field name definitions                                      | Total number of <i>unduplicated</i> students |
|--|--------------|---|--|
| <i>Persist yes no # of classes</i>   | xssn         | Unique student identification number                        | 4,783  |
| This file provided the number of courses each student enrolled in during their first term. | persist      | Yes = Persister / No = Non-Persister                        |  |
|  | # of classes | Number of courses student enrolled in during the first term |  |
|  | crsname      | Course title  |  |
|  | grade        | Student's grade in each course                              |  |
|  | creditsa     | Number of credits attempted                                 |  |
| <i>Persist yes no # of credits</i>   | xssn         | Unique student identification number                        | 4,783  |
| This file provided the number of credits each student enrolled in during their first term. | persist      | Yes = Persister / No = Non-Persister                        |  |
|  | # of classes | Number of courses student enrolled in during the first term |  |
|  | crsname      | Course title  |  |
|  | grade        | Student's grade in each course                              |  |
|  | creditsa     | Total number of credits attempted                           |  |

| File name  | Field names   | Field name definitions   | Total number of <i>unduplicated</i> students |
|--|---|--|--|
| <i>Persist yes no remedial course info</i>   | xssn  | Unique student identification number   | 2,367  |
| This file provided information on only remedial courses taken by students in the sample during their first term. | persist   | Yes = Persister / No = Non-Persister   |  |
|  | first term  | Term and year student first enrolled in the college following receipt of GED                   |  |
|  | # of courses  | Number of courses student enrolled in during the first term                                    |  |
|  | crsname   | Course title   |  |
|  | crstype   | Type of pre-college course: Reading, writing, reading/writing, math, tutoring, computer skills |  |
|  | grade   | Student's grade in each course   |  |
|  | actidesc  | Course type for FTE classification purposes  |  |
| crsid  | College designation of each course – example WR90 or RD 115 |  |  |

In addition to descriptive analyses, the information gathered from the Oregon State GED database and the OCCURS system was also subject to inferential statistical tests. Specifically, binary logistic regression was done to evaluate the existence of statistically significant relationships between each of the independent variables and

persistence. Logistic regression is a statistical technique that allows researchers to assess how well an independent variable predicts a categorical dependent variable (Pallant, 2005). In the case of the current study, logistic regression, rather than multiple regression or discriminant analysis was chosen because the dependent variable (persistence) was indeed categorical (i.e., persist or not persist). Furthermore, because logistic regression allows independent variables to be either categorical or continuous, or a mix of both in one model, it was a good choice of statistical tool for this study. The following section presents a brief summary of the demographic characteristics of the sample, as well as the results of both the descriptive and inferential statistical analyses done on each of the independent variables.

#### *Demographic Characteristics*

In order to have a better understanding of the makeup of the sample, frequency and percentage distributions were done on the three demographic factors captured in the dataset: (a) age at receipt of the GED, (b) gender, and (c) ethnicity.

*Gender.* As seen in Figure 7, the sample was almost evenly divided between males and females, at 48% and 50% respectively. When looking only at persisters, females made up a higher percentage than males (54% versus 47%). However, when looking at non-persisters, males (53%) slightly outnumbered females (46%).

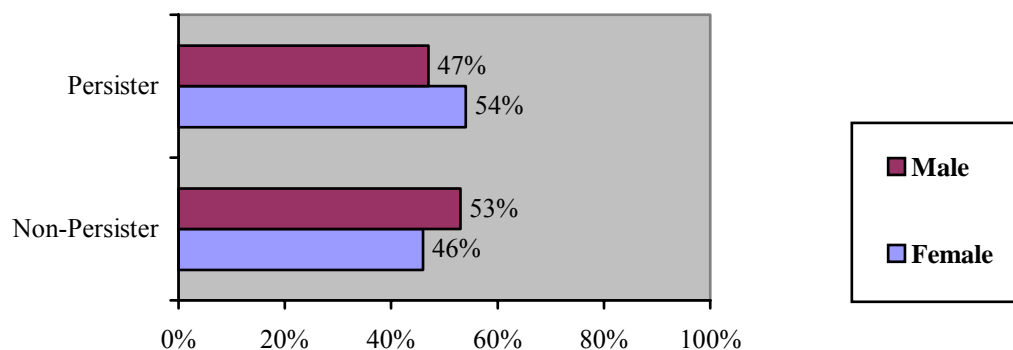


Figure 7: Persistence and gender.

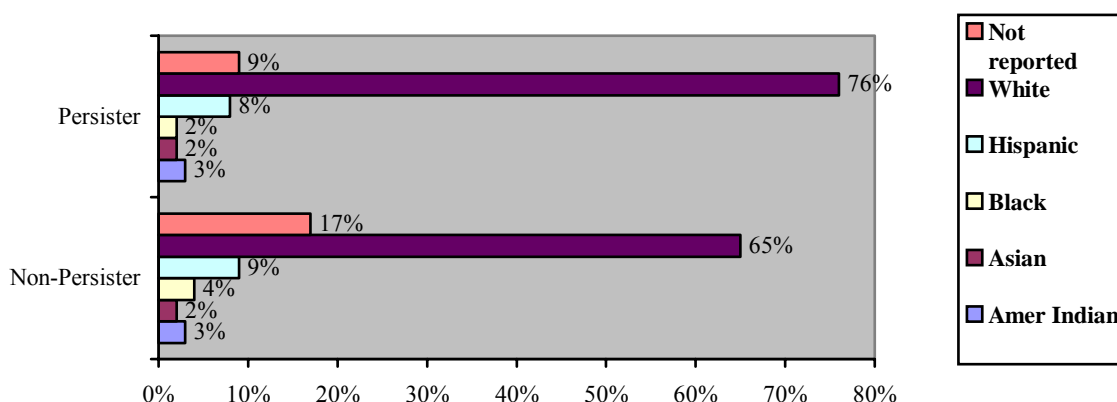
*Ethnicity:* As seen in Table 13, Whites, at 70%, made up the largest percentage of the sample. The next largest groups were Hispanics at 9% and Black, non-Hispanic and American Indian/Alaska Native at 3% each. Asians were the smallest group making up only 2% of the sample. Finally, 13% of the total sample was made up of those individuals who did not report their ethnicity.

Table 13: *Ethnicity Distribution of the Sample*

|                               | All Students |     |
|-------------------------------|--------------|-----|
| American Indian/Alaska Native | 130          | 3%  |
| Asian or Pacific Islander     | 101          | 2%  |
| Black, non-Hispanic           | 147          | 3%  |
| Hispanic                      | 419          | 9%  |
| White, non-Hispanic           | 3,348        | 70% |
| Not reported                  | 640          | 13% |
| <b>Totals</b>                 | <b>4,785</b> |     |



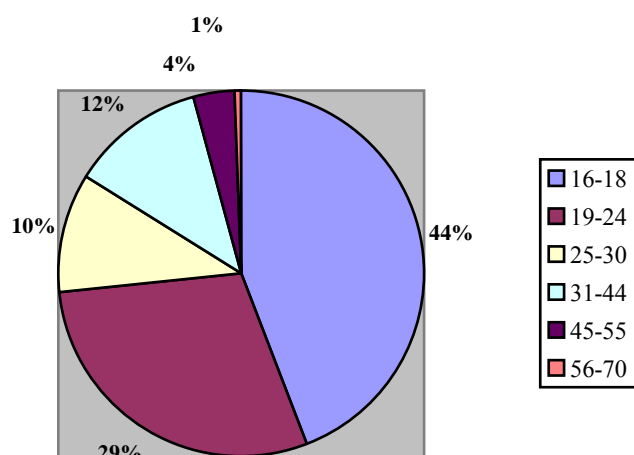
Figure 8 looks at persisters and non-persisters in terms of ethnicity. When looking only at persisters, Whites made up 76% of this sub-group, a slightly higher percentage than their share of the overall sample. Hispanics made up 8% of the persister sub-group, while Black, non-Hispanic, American Indian/Alaska Native, and Asians made up 2%, 3% and 2% respectively. Persisters that did not report their ethnicity made up 9%.



*Figure 8: Persistence and ethnicity.*

When looking only at non-persisters, Whites once again made up the largest portion of this group at 65%. This was slightly lower, however, than their share of the overall sample. Hispanics made up 9% of the non-persister sub-group, while Black, non-Hispanic, American Indian / Native,

*Age:* As seen in Figure 9, almost half of the sample, specifically 44%, received their GED when they were between the ages of 16 and 18. Another 29% of the sample was between 19 and 24, making three-quarters of the sample under the age of 24 when they received their GED. Older adults between the ages of 25-30 made up 10% of the total sample, whereas individuals between the ages of 31 and 44 made up 12%, and those aged 45-70 made up just over 4% of the total sample.



*Figure 9:* Persistence and age.

### *Independent Variable Analysis*

The following section presents the findings of both descriptive and inferential statistical analyses for each of the seven independent variables included in the current study. These variables were: total number of credits attempted during the first term, type of courses taken during the first term, ratio: remedial courses to total course load,

type of remedial courses taken during the first term, total first term GPA, grades received in remedial courses, and mean standard GED score.

*Total number of credits attempted during the first term.* As seen in Table 14, the largest number of students (e.g., 29% of the total sample) attempted zero credits during their first term. It should be noted that these students did take courses, however,

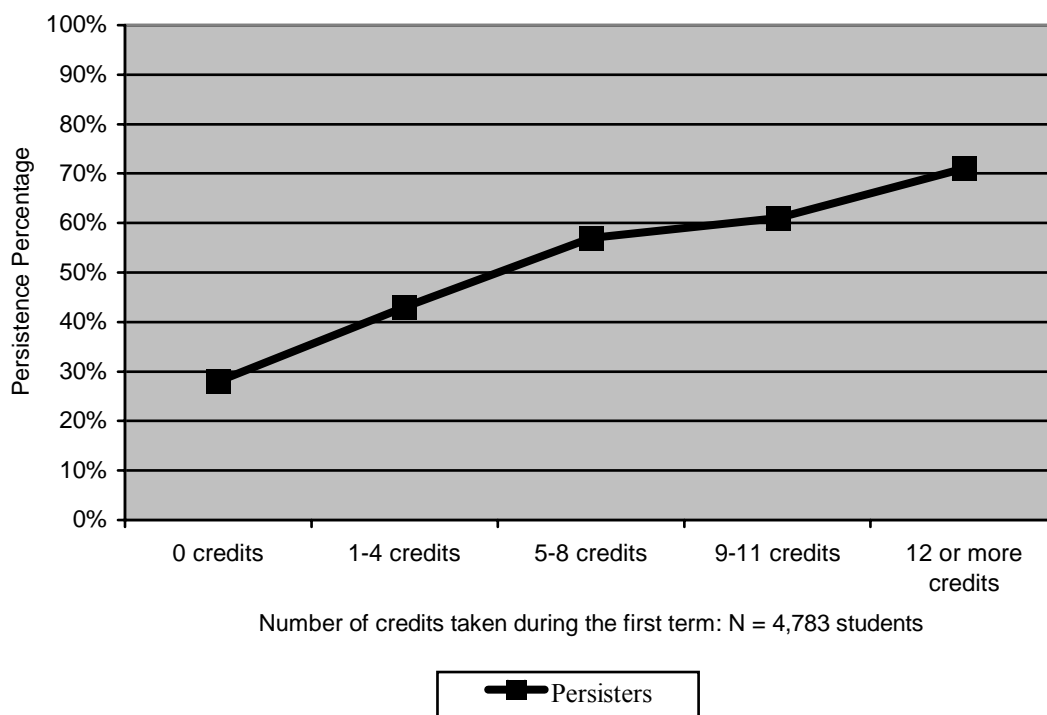
Table 14: *First Term Enrollment Status*

| Number of credits during first term | Number of Students | Percentage of total sample | Number of courses during first term | Number of Students | Percentage of total sample |
|-------------------------------------|--------------------|----------------------------|-------------------------------------|--------------------|----------------------------|
| 0                                   | 1,395              | 29%*                       | 1                                   | 1,692              | 35%                        |
| 1-4                                 | 774                | 16%                        | 2                                   | 834                | 17%                        |
| 5-8                                 | 814                | 17%                        | 3                                   | 635                | 14%                        |
| 9-11                                | 568                | 12%                        | 4                                   | 735                | 16%                        |
| 12 or more                          | 1,232              | 26%                        | 5 or more                           | 887                | 18%                        |
| Total                               | 4,783              | 100%                       | Total                               | 4,783              | 100%                       |

\* Many of these students enrolled in non-credit courses.

all were non-credit. For example, students enrolled in continuing education, community education, or non-credit adult education courses. Interestingly, the next largest group, or 26% of the total sample, enrolled full-time (i.e., for 12 credits or more). The remaining students enrolled either part or half time. Figure 10 clearly shows that the percentage of persisters steadily increased as the number of credits

taken during the first term increased. In fact, of those who enrolled for 12 or more credits, almost three-quarters, or 71%, persisted.



*Figure 10:* Number of credits during first term following receipt of the GED.

Additional information on the relationship of this variable to GED recipient persistence can be seen in the results of the binary logistic regression statistical analysis. Outputs from a binary logistic regression analysis provide several pieces of information about the relationship between an independent and dependent variable. First, the Beta-value gives information as to the direction of the relationship. A positive value indicates that as the independent variable increases so too does the likelihood of the dependent event (in this case persistence) occurring. In contrast, a

negative B-value indicates that as the value of the independent variable increases, the likelihood of persistence decreases.

Even more information about the relationship between the two variables can be learned from evaluating the odds ratio ( $\text{Exp}(B)$ ). This value describes the odds of the dependent “event” (i.e., persistence) occurring given a change in the independent variable (i.e., total number of credits attempted during the first term). Values greater than 1.0 indicate that the variable in question increases the odds of the dependent event occurring, values of less than 1.0 decrease the odds of the event occurring, and finally values of exactly 1.00 indicate an equal probability of the event either occurring or not – meaning the result cannot be accurately predicted, and that the relationship is not statistically significant (Pallant, 2005). To further explain the odds ratio, the analysis also produces a 95% confidence interval (95.0% C.I. for  $\text{EXP}(B)$ ), with both a lower and upper value. According to Pallant (2005) “this is the range of values that we can be 95 per cent confident encompasses the true value of the odds ratio” (p. 169). As just mentioned, in order for a relationship to be statistically significant (at  $p < .05$ ), the odds ratio cannot equal 1.00. Thus, if the value 1.00 is contained within the confidence interval, the relationship between the two variables in the analysis is not statistically significant.

Finally, the logistic regression output also includes a Cox & Snell R-Square value and a Nagelkerke R-Square value. These values provide an indication of the amount of variation in the dependent variable explained by the model (from a minimum of 0.0 to a maximum of 1.0). Values of, for example, .250 and .300, suggest

that between 25.0 per cent and 30.0 percent of the variability is explained by the variables in question.

Table 15 presents the binary logistic regression output for the variable “number of attempted credits in the first term”. In this case, the Beta-value was positive (B=.13)

Table 15: *Logistic Regression Results: Total Credits Attempted in the First Term*

|                          | B          | Cox & Snell R Square | Nagelkerke R Square | Wald          | Sig.       | Exp(B)      | 95.0% C.I. for EXP(B) |             |
|--------------------------|------------|----------------------|---------------------|---------------|------------|-------------|-----------------------|-------------|
|                          |            |                      |                     |               |            |             | Low                   | Up          |
| Step 1                   |            |                      |                     |               |            |             |                       |             |
| <b>Credits attempted</b> | <b>.13</b> | <b>.102</b>          | <b>.136</b>         | <b>459.45</b> | <b>.00</b> | <b>1.13</b> | <b>1.12</b>           | <b>1.15</b> |

\* p < .05

meaning that as the number of credits attempted in the first term rises, so too did the likelihood of persistence. Additionally, the odds ratio was greater than 1.00 (Exp(B) = 1.13), implying that for each one-unit increase in number of credits attempted, students were more likely to persist by a rate of 13%. Finally, the 95% confidence interval in this case ranged from 1.12 to 1.15. This meant that one could be 95% confident that that actual value of the odds ratio lay somewhere between these two values, and because the range in this case did not contain the value 1.00, the conclusion could be drawn that there was a statistically significant (at p < .05) between “number of credits attempted during the first term” and persistence.

Finally, the R-Square values suggest that between 10.2% and 13.6% of the variance can be explained by the variable “number of credits attempted during the first term.”

*Type of courses enrolled in during the first term.* The 4,785 unduplicated students in the sample took a total of 14,080 courses during the first term in which they were enrolled following receipt of the GED credential. The categories used in the current study for course type were: (a) pre-college, (b) college-level, (c) continuing education, (d) apprenticeship, and (e) adult high school completion. These categories were created by grouping course designations as they appeared in the OCCURS data system. See Table 16 for how these designations were grouped in the current study.

Table 16: *Type of Course Categories*

| OCCURS Code              | OCCURS Definition   | Study Category       |
|--------------------------|---|----------------------|
| ABE<br>GED<br>ESL<br>PSR | Adult Basic Education courses<br>GED preparation courses<br>English as Second Language courses<br>Post-secondary remedial courses                   | Pre-College          |
| LDC<br>PT Prep           | Lower Division Collegiate courses<br>Professional Technical preparation courses   | College-Level        |
| ACE<br>NR<br>PT Supp     | Adult and Continuing Education courses<br>Non-FTE-Reimbursable (community education) courses<br>Professional Technical Supplementary courses (CEUs) | Continuing Education |
| PT Appr                  | Professional Technical Apprenticeship courses   | Apprenticeship       |
| AHS                      | Adult high school completion courses  | Adult High School    |

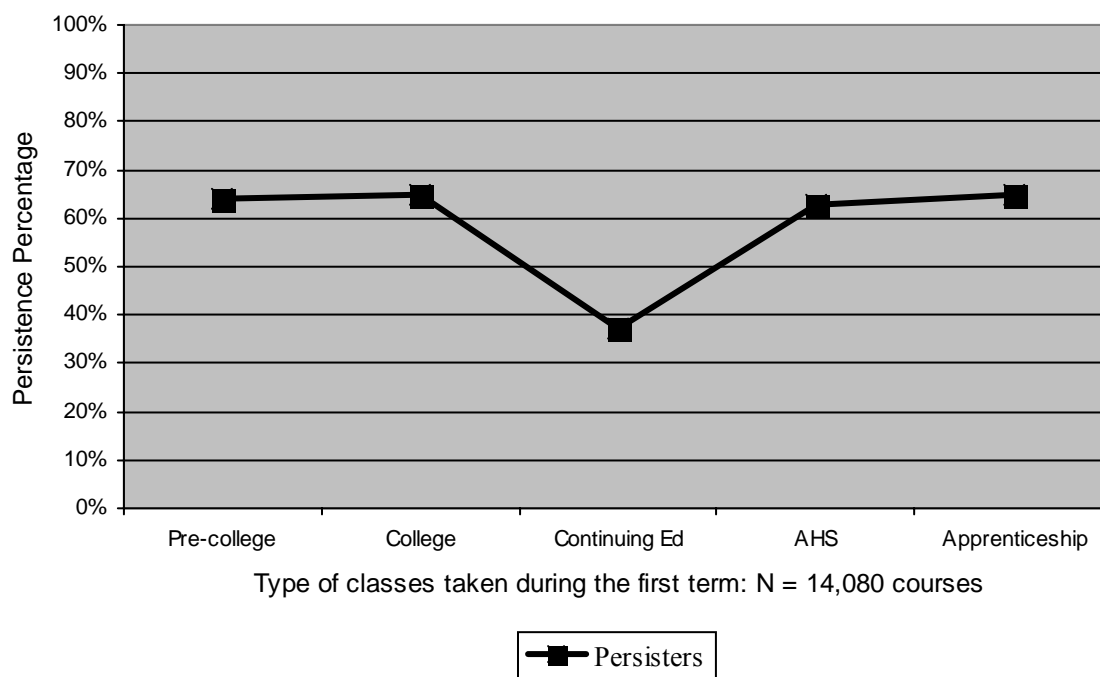
Of these five categories, more than half, or 60% of the total courses taken by GED recipients in their first term following receipt of the GED credential, were college-level courses. One quarter, or 25% were pre-college-remedial courses and the remaining courses were continuing education (i.e., community education and continuing education units (CEU) and career and technical apprenticeships). This information is summarized in Table 17.

Table 17: *Type of Courses Enrolled in During the First Term*

| Type of courses      | Total number of courses | Percentage of total sample |
|----------------------|-------------------------|----------------------------|
| Pre-college          | 3,480                   | 25%                        |
| College-level        | 8,420                   | 60%                        |
| Continuing Education | 1,762                   | 13%                        |
| Apprenticeship       | 68                      | >1%                        |
| Adult High School    | 350                     | 2%                         |
| <b>Totals</b>        | <b>14,080</b>           | <b>100%</b>                |

As shown in Figure 11, the persistence rates for pre-college, college-level, adult high school, and apprenticeship were all about the same (e.g., roughly two-thirds persisted in these categories). Looking at the continuing education category, however, the pattern was slightly different. Of the 1,762 students in the sample who enrolled in continuing education courses, only 37% enrolled in the following term. The frequency





*Figure 11:* Type of courses taken during the first term.

distribution for this variable therefore showed that the persistence percentage was the same regardless of the type of course a student enrolled in, with the exception of continuing education.

Table 18 presents the binary logistic regression output for the variable “type of courses enrolled in during the first term”. The Beta-value for this variable was positive ( $B=.09$ ), however, because the value was so close to 0.00, the existence of a practically significant relationship is likely quite small. This conclusion was reinforced by the confidence interval (CI) data. Although the CI range was above 1.00 (95% C.I. for  $EXP(B) = 1.07 - 1.13$ ), thus indicating a statistically significant relationship because of the proximity to 1.00, the practical significance of the relationship between “type of courses enrolled in during the first term” and

Table 18: *Logistic Regression Results: Type of Courses in the First Term*

|  | B           | Cox & Snell R Square | Nagelkerke R Square | Wald         | Sig.       | Exp(B)                | 95.0% C.I. for EXP(B) |             |
|--|-------------|----------------------|---------------------|--------------|------------|-----------------------|-----------------------|-------------|
|  |             |                      |                     |              |            |                       | Low                   | Up          |
| Step 1   |             |                      |                     |              |            |                       |                       |             |
| <b>Course Type</b>   | <b>.102</b> | <b>.004</b>          | <b>.005</b>         | <b>57.04</b> | <b>.00</b> | <b>1.10</b>           | <b>1.07</b>           | <b>1.13</b> |
| <b>Overall Course Type: Reference Category = College-level courses</b> |             |                      |                     |              |            |                       |                       |             |
|  | B           | S.E.                 | Wald                | Sig.         | Exp(B)     | 95.0% C.I. for EXP(B) |                       |             |
|  |             |                      |                     |              |            | Low                   | Up                    |             |
| Step 1   |             |                      |                     |              |            |                       |                       |             |
| Adult HS   | -.07        | .11                  | .53                 | .93          | .75        | .75                   | 1.16                  |             |
| Pre college  | -.10        | .04                  | 5.12                | .02          | .91        | .84                   | .99                   |             |
| Continuing ed  | -1.15       | .05                  | 450.51              | .00          | .32        | .28                   | .35                   |             |
| Apprenticeship   | .02         | .26                  | .08                 | .93          | .98        | .59                   | 1.61                  |             |
| Constant   | .63         | .02                  | 752.46              | .00          | 1.87       |                       |                       |             |

persistence was determined to be small. In fact, as shown by the R-Square values this statistical significance does not translate into practical significance as only less than one percent of the variance is explained by this variable.

Because “type of courses enrolled in during the first term” is a categorical variable, the logistic regression output also provides some comparison information between the different categories. As shown in Table 16, this variable consisted of five discreet categories: adult high school diploma courses, pre-college courses, continuing education courses, apprenticeship courses, and college-level courses. For the purposes of the regression analysis, the category “college-level courses” was designated as a

reference category, and the persistence of students in each of the other groups was compared to those students in this reference category. This particular category was chosen because the majority of courses taken by students in the sample were college-level, making it of interest to see how the persistence rate of students in other categories compared. The findings of this analysis are summarized in Table 19.

Table 19: *A Comparison of Students Enrolled in Different Course Types*

| Type of Course       | Probability of persistence<br><u>compared to students taking college level courses</u>  |
|----------------------|---|
| Adult High School    | Confidence interval contains 1.0 – indicating an inability to predict persistence in comparison to students taking college level courses. |
| Pre-college          | Confidence interval contains 1.0 – indicating an inability to predict persistence in comparison to students taking college level courses. |
| Continuing Education | Less likely to persist by a factor of .32 in comparison to students taking college level courses.   |
| Apprenticeship       | Confidence interval contains 1.0 – indicating an inability to predict persistence in comparison to students taking college level courses. |

In sum, with the exception of continuing education, the persistence rate was very similar (about 66%) for each of the course types (i.e., college-level, pre-college, adult high school, and apprenticeship). Furthermore, while the variable “type of courses enrolled in during the first term” did have a statistically significant relationship with persistence, because the odds ratio was so close to 1.00, and the R-

Square values indicate very low percentages of explained variance this researcher is skeptical that a practically significant relationship exists. This conclusion is supported by the fact that when using the college-level category as a reference, it was not possible to accurately predict whether or not students taking courses in three of the other four categories would persist at a higher or lower level than those students enrolled in college-level courses.

*Ratio of remedial courses to total course load during the first term.* Half of the sample, or a total of 2,411 students, did not take any remedial courses during their first term following receipt of the GED. Of the other 2,367 students, the largest percentage (30%) only enrolled in one remedial course. As the number of remedial courses increased, the number of students who fell into these categories decreased. This information is summarized in Table 20.

Table 20: *Number of Remedial Courses Taken During the First Term*

| Number of remedial courses taken during first term | Total Students | Percentage of total sample |
|--|----------------|----------------------------|
| 0  | 2,418          | 51%                        |
| 1  | 1,416          | 30%                        |
| 2  | 558            | 11%                        |
| 3  | 290            | 6%                         |
| 4  | 70             | 1%                         |
| 5+   | 33             | 1%                         |
| <b>Total</b>                                       | <b>4,785</b>   | <b>100%</b>                |

In addition to looking at the total number of remedial courses taken by GED recipients in their first term, looking at what percentage of each student's course load consisted of remedial coursework also provides valuable information on the course-taking behavior of this population in postsecondary education. As shown in Table 21, 51% of students took no remedial courses and therefore had a ratio of 0.0. For 18% of the sample, the ratio of remedial courses to total course load was about one-third. A ratio of two-thirds remedial was the norm for just 13% of the students, while only 5% showed a ratio of three-quarters or more. Finally, a full 13% of the overall sample took remedial courses only, thus showing a ratio of 1.0.

Table 21: *Ratio of Remedial Courses to Total Course Load*

| Ratio: Remedial/Total course load | Total Students | Percentage of total sample |
|-----------------------------------|----------------|----------------------------|
| 0.0                               | 2,411          | 51%                        |
| .01-.33                           | 874            | 18%                        |
| .34-.66                           | 642            | 13%                        |
| .67-.85                           | 254            | 5%                         |
| 1.0                               | 597            | 13%                        |
| <b>Total</b>                      | <b>4,778</b>   | <b>100%</b>                |

Figure 12 shows how persisters performed when the ratio of remedial courses to total course load varied from zero to 1.0. Students who took no remedial courses persisted at the lowest rate. There was then a big jump in persistence rates (from about

40% to about 70%), for those whose remedial course ratio was about one-third. As the ratio increased, the persistence percentage fell slightly, however, those students whose course load was 100% remedial still persisted at a higher rate than those students who did not enroll in any remediation (50% to 40% respectively).

Table 22 presents the binary logistic regression output for the variable “ratio of remedial courses to total course load during the first term.” In this case, the Beta-value was positive ( $B=.66$ ) meaning that as the ratio rose, so too did the likelihood of persistence. Additionally, the odds ratio was both positive and much greater than 1.00 ( $\text{Exp}(B) = 1.94$ ), implying that for each one-unit increase in the remedial course ratio, students were more likely to persist, and to do so at almost double the rate.

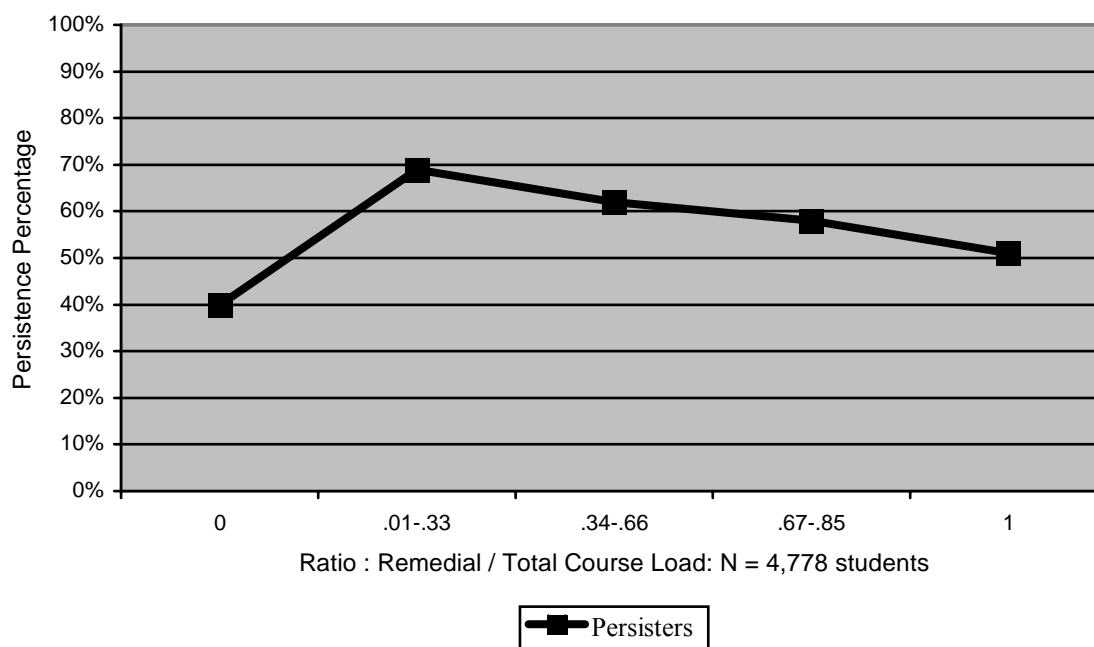


Figure 12: Ratio of remedial courses to total course load during the first term.

*Table 22: Regression Analysis Results: Ratio: Remedial Classes to Total Course Load*

|   | B           | Cox & Snell R Square | Nagelkerke R Square | Wald         | Sig.       | Exp(B)      | 95.0% C.I. for EXP(B) |             |
|---|-------------|----------------------|---------------------|--------------|------------|-------------|-----------------------|-------------|
|   |             |                      |                     |              |            |             | Low                   | Up          |
| Step 1  |             |                      |                     |              |            |             |                       |             |
| <b>Ratio of remedial courses to total course load</b> | <b>.102</b> | <b>.013</b>          | <b>.017</b>         | <b>60.82</b> | <b>.00</b> | <b>1.94</b> | <b>1.64</b>           | <b>2.29</b> |

\*  $p < .05$

Finally, the 95% confidence interval in this case ranged from 1.64 to 2.29. This meant that one could be 95% confident that that actual value of the odds ratio lay somewhere between these two values, and because the range in this case did not contain the value 1.00, the conclusion could be drawn that there was a statistically significant relationship (at  $p < .05$ ) between the variables “ratio of remedial courses to total course load” and persistence. Although the results indicate a statistically significant relationship, the R-Square values suggest that the practical significance of this relationship is quite small. In fact, according to these values, this variable only explains between 1.3% and 1.7% of the variance. This discrepancy between the indication of a strong statistically significant relationship, and the low percentage of variance will be explored later in this chapter.

In sum, according to this analysis, there was a statistically significant relationship between “ratio of remedial courses to total course load” and persistence of

GED recipients in community colleges following receipt of the GED credential, however, the practical significance is in question. Another interesting finding related to this variable was that more than half of the sample did not enroll in any remedial courses during the first term; however, the persistence rate for this group was actually lower than for those students who only enrolled in remedial courses (40% as compared to 51%).

*Type of remedial courses enrolled in during the first term.* The groupings used in this study for remedial course type were: (a) computer skills, (b) English as a second language (ESL), (c) mathematics, (d) reading, (e) reading/writing, (f) tutoring, and (g) writing. These designations were created by first filtering all of the course data by the OCCURS categories that this study defined as pre-college (i.e., adult basic education (ABE), GED preparation courses (GED), English as a Second Language (ESL), and post secondary remedial (PSR)). This subset of remedial course data was then sorted by the OCCURS code *crsid*, or the identifying letter code and number individual colleges give to each course. For example, the course identification code for a basic pre-college mathematics course is MA 20 and the course identification code for a basic writing skills course is WR 90. Listings of which individual courses were included in each of these five remedial categories are presented in Appendices B - G.

As seen in Table 23, the 2,367 individual students who enrolled in remedial courses during the first term following receipt of the GED credential took a total of 3,858 courses. Students enrolled primarily in mathematics courses, with 46% of the enrollments falling into this category. The remaining courses were fairly evenly

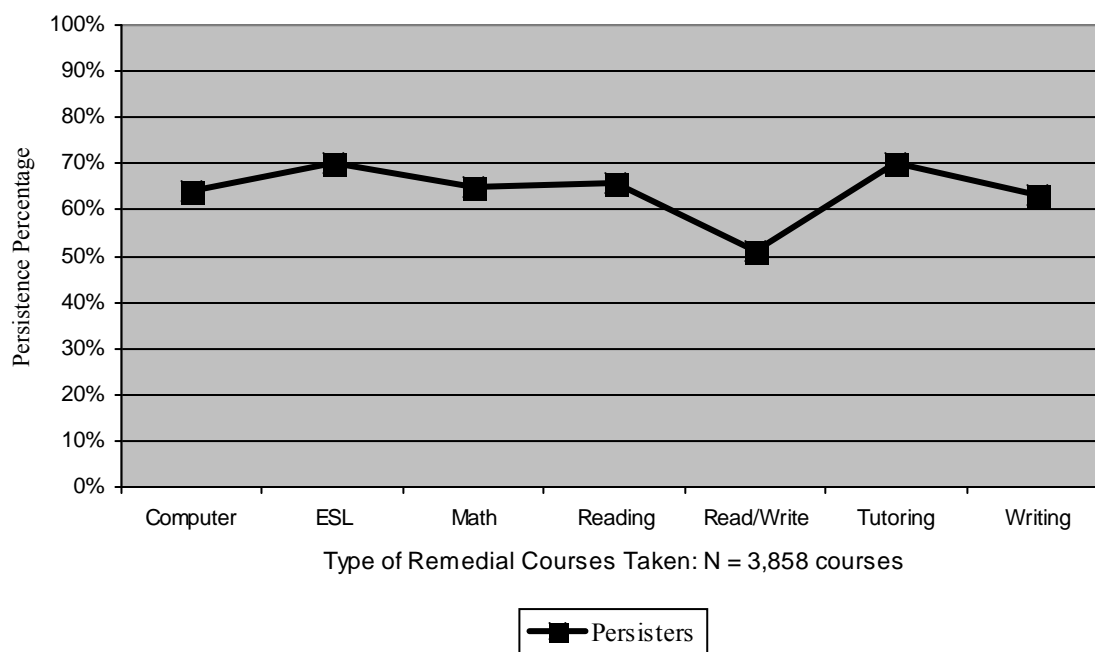


Table 23: *Type of Remedial Courses Taken During the First Term*

| Type of courses taken during first term | Total Courses | Percentage of the total sample |
|---|---------------|--------------------------------|
| Computer                                | 168           | 4%                             |
| ESL                                     | 169           | 4%                             |
| Mathematics                             | 1,782         | 46%                            |
| Reading                                 | 409           | 11%                            |
| Reading/Writing                         | 438           | 12%                            |
| Tutoring                                | 303           | 8%                             |
| Writing                                 | 589           | 15%                            |
| <b>Total</b>                            | <b>3,858</b>  | <b>100%</b>                    |

divided between writing (15%), reading/writing (12%), and reading only classes (11%). Some students also enrolled in tutoring (8%), computer skills (4%), and ESL (4%).

As with the variable “type of courses taken during the first term,” the persistence rates for students taking different types of remedial courses were generally about the same. In fact, looking at Figure 13 it becomes clear that regardless of whether or not students enrolled in computer skills classes, ESL, mathematics, reading, tutoring, or writing classes, roughly two-thirds in each category persisted. Looking at the reading/writing category, however, the pattern is a little different.



*Figure 13:* Type of remedial courses taken during the first term.

Of the 438 students in the sample who enrolled in blended reading/writing courses, only 51% enrolled in the following term. Therefore, for both type of course and type of remedial course (with one exception), the frequency and percentage distributions showed that persistence rates hovered around 66%, regardless of the type of course in which a student was enrolled.

Table 24 presents the binary logistic regression output for the variable “type of remedial courses enrolled in during the first term.” These results showed that there was no statistically significant relationship between these two variables. This is evidenced by the fact that the Beta-value for this variable was 0.00 and the odds ratio was 1.00. Additionally, according to the R-Square values this variable does not

Table 24: *Regression Analysis Results: Type of Remedial Courses*

| Type of Remedial Course          | B    | Cox & Snell R Square | Nagelkerke R Square | Wald  | Sig | Exp(B)  | 95.0% C.I. for Exp(B) |      |
|----------------------------------|------|----------------------|---------------------|-------|-----|---------|-----------------------|------|
|                                  |      |                      |                     |       |     |         | Low                   | Up   |
| Type of Remedial Course          | .00  | .00                  | .00                 | .07   | .80 | 1.00    | .96                   | 1.03 |
| Reference Category = Mathematics |      |                      |                     |       |     |         |                       |      |
|                                  | B    | S.E.                 |                     | Wald  | Sig | Exp (B) | 95% C.I. for Exp (B)  |      |
|                                  |      |                      |                     |       |     |         | Low                   | Up   |
| Tutoring                         | .25  | .14                  |                     | 3.14  | .07 | 1.28    | .99                   | 1.67 |
| Computer Skills                  | -.02 | .17                  |                     | .02   | .89 | .98     | .70                   | 1.36 |
| ESL                              | .26  | .18                  |                     | 2.11  | .15 | 1.30    | .92                   | 1.82 |
| Reading/<br>Writing              | -.56 | .12                  |                     | 27.25 | .00 | .57     | .46                   | .70  |
| Reading                          | .05  | .12                  |                     | .20   | .65 | 1.05    | .84                   | 1.32 |
| Writing                          | -.06 | .10                  |                     | .40   | .53 | .94     | .77                   | 1.14 |

explain any of the variance in the model. Because “type of remedial courses enrolled in during the first term” is a categorical variable, the logistic regression output also provided some comparison information between the different categories.

As shown in Table 24, this variable consisted of six discrete categories: tutoring, computer skills, reading/writing, reading, writing, and mathematics. For the purposes of the regression analysis, the category “mathematics” was designated as a reference category, and the persistence of students in each of the other groups was

compared to those students in this reference category. This particular category was chosen because mathematics courses made up the largest percentage of remedial courses in which students were enrolled. The findings of this analysis are summarized in Table 25.

Table 25: *A Comparison of Students Enrolled in Different Remedial Course Types*

| <b>Remedial Course Type</b>  | <b>Probability of persistence<br/>compared to students taking mathematics courses</b>   |
|--|---|
| <ul style="list-style-type: none"> <li>• Tutoring</li> <li>• Computer Skills</li> <li>• ESL</li> <li>• Reading</li> <li>• Writing</li> </ul> | Odds ratio range includes 1.00 – meaning we don't know if students taking this type of course are more or less likely to persist than those taking mathematics. |
| <ul style="list-style-type: none"> <li>• Reading/Writing</li> </ul>  | Less likely to persist than those taking mathematics courses by a factor of .57.  |

In sum, with the exception of reading/writing courses, the persistence rate was very similar (about 66%) for each of the course types (i.e., tutoring, computer skills, ESL, reading, writing, and mathematics). Furthermore, with an odds ratio of 1.00, and R-Square values of .000, the variable “type of remedial courses enrolled in during the first term” did not have a statistically or practically significant relationship with persistence. As with the variable “types of courses enrolled in during the first term”, this conclusion is supported by the fact that when using the mathematics category as a reference, it was not possible to predict accurately whether or not students taking

courses in five of the other six categories would persist at a higher or lower level than those students enrolled in mathematics courses.

*Total GPA during the first term.* As indicated in Table 26, the largest percentage of students, namely 35% of the total sample, received “no grade” in the courses they enrolled in during their first term. Students in this category enrolled in courses that were non-graded, primarily non-credit classes. Specific courses included in this group were, Adult Education, English as a Second Language, Community

Table 26: *Total First Term GPA*

| Total GPA     | Number of students | Percentage of sample |
|---------------|--------------------|----------------------|
| > 1.00        | 569                | 12%                  |
| 1.0 – 1.49    | 134                | 3%                   |
| 1.50 – 1.99   | 118                | 2%                   |
| 2.00 – 2.49   | 356                | 8%                   |
| 2.50 – 2.99   | 270                | 6%                   |
| 3.00 – 3.49   | 670                | 14%                  |
| 3.50 – 4.00   | 977                | 20%                  |
| No Grades     | 1,683              | 35%                  |
| Missing       | 8                  | n/a                  |
| <b>Totals</b> | <b>4,785</b>       | <b>100%</b>          |

Education, Continuing Education Units, and finally professional supplemental courses such as Food Handling and Flagger Training: Oregon Department of Transportation Certification. Beyond these 35%, about 40% of the remaining sample is evenly split between those earning less than a 2.0 GPA during their first term, and those earning between a 3.5 and 4.0 GPA. An additional 14% of the students earned a 3.00 - 3.49 GPA, with smaller percentages earning 2.00 - 2.49 (8%) and 2.50 - 2.99 (6%).

Looking at Figure 14, it is apparent that for students in this study, as GPA increased so too did persistence rates. For example, for those students who received a total first term GPA of less than 1.00, the persistence rate was 23%. This was in contrast to a persistence rate of 73% for those students who earned a first term GPA between 3.50 and 4.00. For this variable the total sample size for the regression

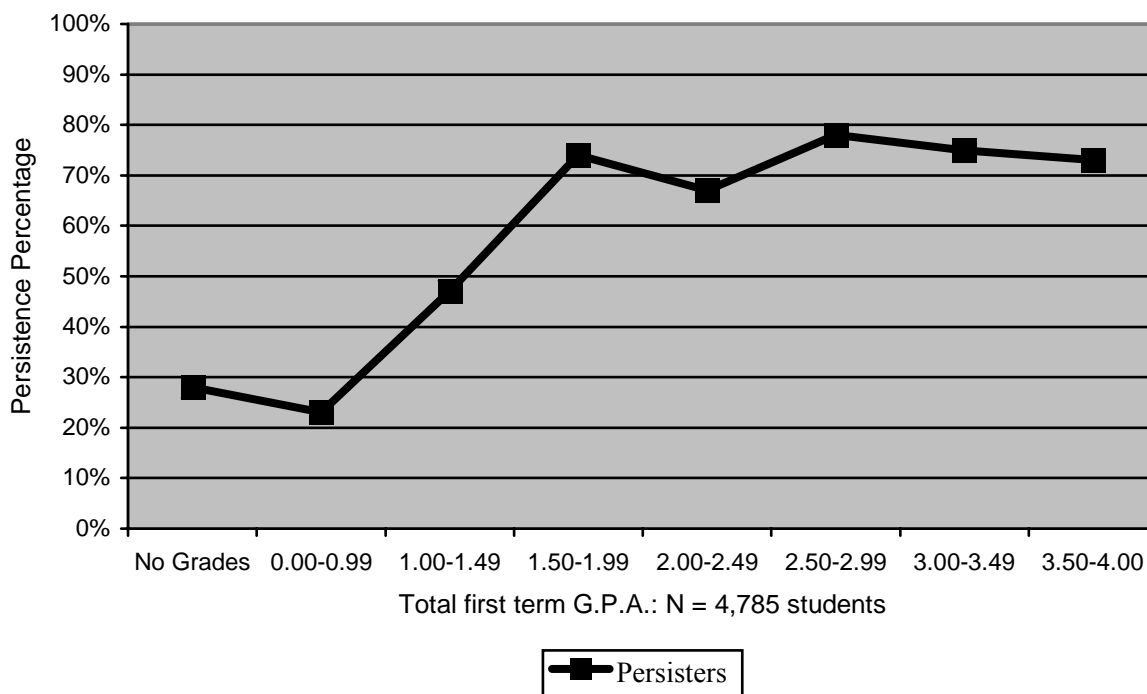


Figure 14: Total first term GPA.

analysis was 3,506 however, when the frequency and percentage distributions were done on this particular variable, the total sample size was 4,785. The difference between these two sample sizes is 1,279. This is the number of students who did not receive any grades for the coursework completed in the first term following receipt of the GED credential. As mentioned earlier, this was the case for students who only enrolled in non-credit courses. Although non-credit courses were taken into account when calculating persistence rates, these cases were purposefully excluded from the regression analysis in order to look just at students who received a grade for their coursework.

Table 27 presents the binary logistic regression output for the variable “total first term GPA.” In this case, the Beta-value was positive ( $B = .58$ ) meaning that as first term GPA rises, so too does the likelihood of persistence. Additionally, the odds ratio was both positive and greater than 1.00 ( $\text{Exp}(B) = 1.78$ ), implying that for each one-unit increase in first term GPA, students were 78% more likely to persist. The

Table 27: *Regression Analysis Results: First Term Total GPA*

|                   | B   | Cox &<br>Snell R-<br>Square | Nagelkerke<br>R-Square | Wald   | Sig | Exp(B) | 95.0%<br>C.I.for<br>EXP(B) |      |
|-------------------|-----|-----------------------------|------------------------|--------|-----|--------|----------------------------|------|
|                   |     |                             |                        |        |     |        | Low                        | Up   |
| First term<br>GPA | .58 | .149                        | .201                   | 378.48 | .00 | 1.78   | 1.68                       | 1.89 |

95% confidence interval in this case ranged from 1.68 to 1.89. This meant that one could be 95% confident that that actual value of the odds ratio lay somewhere between these two values, and because the range in this case did not contain the value 1.00, the conclusion could be drawn that there was a statistically significant (at  $p < .05$ ) relationship between “total first term GPA” and persistence. Finally, with R-Square values of .149 and .201, this variable explained between 14.9% and 20.1% of the variance. This is by far the largest percentage of any of the seven independent variables.

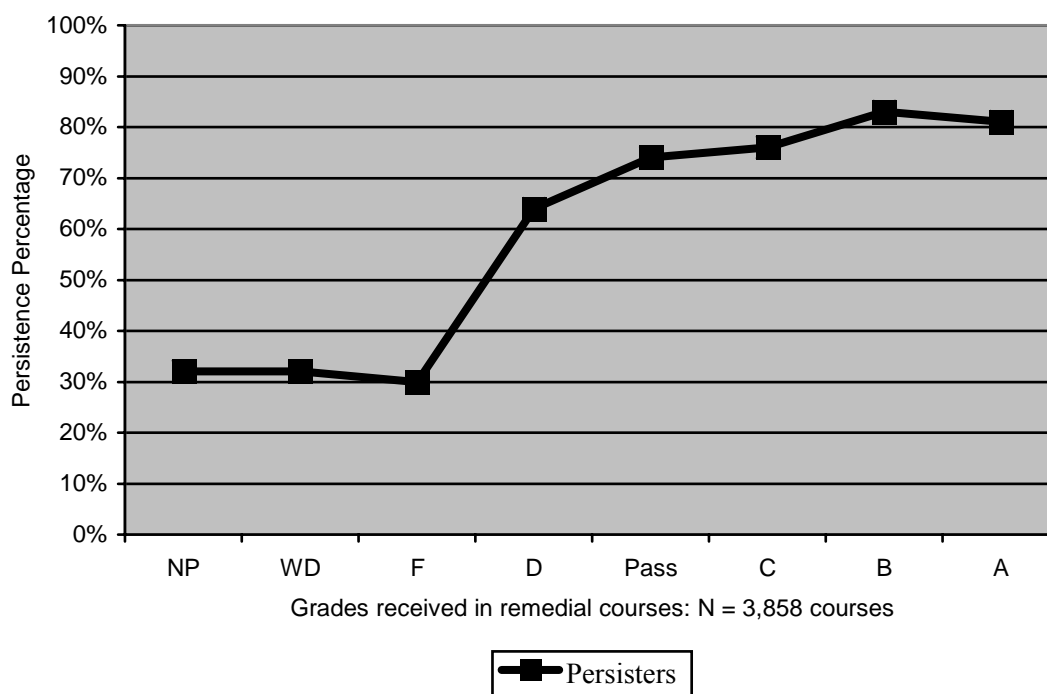
*Grades received in remedial courses during the first term.* As shown in Table 28, students received a variety of grades in their remedial classes. Similar to the information for total first-term GPA, the largest percentage of classes consisted of those courses that were not graded, primarily non-credit courses. The types of courses included in this 34% were GED preparation, ESL, basic skills study labs, and tutoring. Of those courses that were graded, the highest percentage (15%) were graded with an “A.” This was followed by 13% of the courses graded as a “B”, 8% graded as a “C”, 3% graded as a “D”, and finally 5% graded as an “F.” Some of the courses were taken as pass / no-pass. Courses graded as “pass” made up 8% of the total and those graded as “no-pass” made up 4% of the total. In sum, when looking at only those courses taken for a grade, the two most commonly received grades by GED recipients enrolling in remedial courses following the receipt of the GED were “A” and “B.”



Table 28: *Grades Received in Remedial Courses*

| Grade            | Grades received in remedial courses | Percentage of total sample |
|------------------|-------------------------------------|----------------------------|
| A / A+ / A-      | 567                                 | 15%                        |
| B / B+ / B-      | 516                                 | 13%                        |
| C / C+ / C-      | 290                                 | 8%                         |
| D / D+ / D-      | 119                                 | 3%                         |
| F                | 195                                 | 5%                         |
| WD (withdraw)    | 218                                 | 6%                         |
| P (pass)         | 316                                 | 8%                         |
| NP (no pass)     | 157                                 | 4%                         |
| NG (not graded)  | 1,255                               | 34%                        |
| IN (incomplete)  | 40                                  | >1%                        |
| IP (in progress) | 50                                  | 1%                         |
| X (missing)      | 135                                 | 3%                         |
| <b>Totals</b>    | <b>3,858</b>                        | <b>100%</b>                |

Figure 15 shows a clear pattern for those courses that were graded. Specifically, the better the grades students received in their remedial courses, the higher the chance that they would persist to a second term. For example, of those students who received “F’s” the persistence rate was 31% whereas for those students who received “A’s” the persistence rate was 81%.



*Figure 15: Academic performance in remedial courses.*

Table 29 presents the binary logistic regression output for the variable “academic performance in remedial courses.” In this case, the Beta-value was positive ( $B = .16$ ) meaning that as students received better grades, the likelihood of persistence increased. Additionally, the odds ratio and greater than 1.00 ( $\text{Exp}(B) = 1.17$ ), implying that as students received better grades they were 17% more likely to persist. The 95% confidence interval in this case ranged from 1.15 to 1.20. This meant that one could be 95% confident that that actual value of the odds ratio lay somewhere between these two values, and because the range in this case did not contain the value 1.00, the conclusion could be drawn that there was a statistically significant (at  $p < .05$ ) between “academic performance in remedial courses” and persistence.

Table 29: *Logistic Regression Results: Academic Performance in Remedial Courses*

|                                  | B          | Cox & Snell R-Square | Nagelkerke R-Square | Wald          | Sig        | Exp(B)      | 95.0% C.I. for Exp(B) |             |
|----------------------------------|------------|----------------------|---------------------|---------------|------------|-------------|-----------------------|-------------|
|                                  |            |                      |                     |               |            |             | Low                   | Up          |
| <b>Grade in Remedial Courses</b> | <b>.16</b> | <b>.116</b>          | <b>.160</b>         | <b>198.69</b> | <b>.00</b> | <b>1.17</b> | <b>1.15</b>           | <b>1.20</b> |
| Reference category = "A"         |            |                      |                     |               |            |             |                       |             |
|                                  | B          |                      | Sig                 | Wald          | Sig        | Exp(B)      | 95% C.I. for Exp(B)   |             |
|                                  |            |                      |                     |               |            |             | Low                   | Up          |
| Incomplete                       | -1.17      |                      | .24                 | 23.83         | .00        | .31         | .20                   | .50         |
| Not graded                       | -1.05      |                      | .12                 | 73.13         | .00        | .35         | .28                   | .45         |
| No Pass                          | -2.21      |                      | .20                 | 120.26        | .00        | .11         | .07                   | .16         |
| Withdraw                         | -2.23      |                      | .18                 | 151.98        | .00        | .11         | .08                   | .15         |
| "F"                              | -2.32      |                      | .19                 | 149.13        | .00        | .10         | .07                   | .14         |
| "D"                              | -.91       |                      | .22                 | 17.29         | .00        | .40         | .26                   | .62         |
| "P"                              | -.42       |                      | .17                 | 6.13          | .01        | .66         | .47                   | .92         |
| "C"                              | -.31       |                      | .18                 | 3.12          | .07        | .73         | .52                   | 1.03        |
| "B"                              | .08        |                      | .16                 | .23           | .64        | 1.08        | .80                   | 1.50        |

Finally, the R-Square values suggest that this variable explains between 11.6% and 16% of the total variance. This is not as high as the variable "first term GPA," however, it is still a fairly large percentage indicating that the variable "academic

performance in remedial courses” has a practically significant relationship with persistence.

Because “academic performance in remedial courses” is a categorical variable, the logistic regression output also provided some comparison information between the different categories. As shown above, this variable consisted of ten discreet categories: incomplete, not graded, no pass, withdraw, F, D, P, C, B, and A. For the purposes of the regression analysis, the category “A” was designated as the reference category, and the persistence of students in each of the other groups was compared to those students in this reference category. The findings of this analysis are summarized in Table 30.

In sum, as the grades received in remedial courses improved, persistence rates increased. Furthermore, with an odds ratio of 1.17, and R-Square values of .12 and .16 respectively, there was both a practical and a statistically significant relationship between the variable “academic performance in remedial courses” and persistence. The comparisons summarized in Table 30 re-enforce this conclusion in that students who received grades below a “C” were less likely to persist than those who received an “A”.

Table 30: *A Comparison of Students' Academic Performance in Remedial Courses*

| Remedial Performance | Probability of persistence<br>compared to students receiving an "A"  |
|----------------------|--|
| Incomplete           | Less likely to persist than a student receiving an "A" by a factor of .31  |
| Not graded           | Less likely to persist than a student receiving an "A" by a factor of .35  |
| No Pass              | Less likely to persist than a student receiving an "A" by a factor of .11  |
| Withdraw             | Less likely to persist than a student receiving an "A" by a factor of .11  |
| "F"                  | Less likely to persist than a student receiving an "A" by a factor of .10  |
| "D"                  | Less likely to persist than a student receiving an "A" by a factor of .40  |
| "P"                  | Less likely to persist than a student receiving an "A" by a factor of .66  |
| "C"                  | Odds ratio range includes 1.00 – meaning we don't know if students receiving a "C" are more or less likely to persist than those with an "A" |
| "B"                  | Odds ratio range includes 1.00 – meaning we don't know if students receiving a "B" are more or less likely to persist than those with an "A" |

*Mean standard GED score.* The GED test is made up of five individual examinations, mathematics, science, social studies, language arts-writing, and language arts-reading. Each test score is reported on a scale from 200 to 800. To

receive a credential, a student must earn a minimum standard score total of 2,250 (equivalent to a mean standard score of 450) across the five tests, with no individual score below 410. The maximum possible composite score is 4,000 (ACE, 2006).

As shown in Table 31, the largest percentage (21%) of students had a mean standard score between 522-560. Another 20% of the students scored between 452-480, and the third largest group, or 18% of those in the sample, scored between 562-600. Only 2% of the students scored in the lowest category and only 3% of the students scored at the upper end, scoring between 722 and 800.

Table 31: *Mean Standard GED Score (English-language version only)*

| Mean Standard Score | All Students | Percentage of total sample |
|---------------------|--------------|----------------------------|
| 420-450             | 79           | 2%                         |
| 452-480             | 976          | 20%                        |
| 482-520             | 588          | 12%                        |
| 522-560             | 1026         | 21%                        |
| 562-600             | 858          | 18%                        |
| 602-640             | 579          | 12%                        |
| 642-680             | 374          | 8%                         |
| 682-720             | 210          | 4%                         |
| 722-760             | 81           | 2%                         |
| 762-800             | 13           | 1%                         |
| <b>Totals</b>       | <b>4,784</b> | <b>100%</b>                |

Figure 16 shows that unlike the other variables examined thus far, there was not a large change in the percentage of persisters as the chosen independent variable increased or decreased. While there was a slight increase in persistence rates as the overall examination score increased, this percentage only rose by 10% between those who scored 420 and those who scored 720. In fact, it wasn't until the GED score reached the top of the scale that the number of persisters jumped significantly.

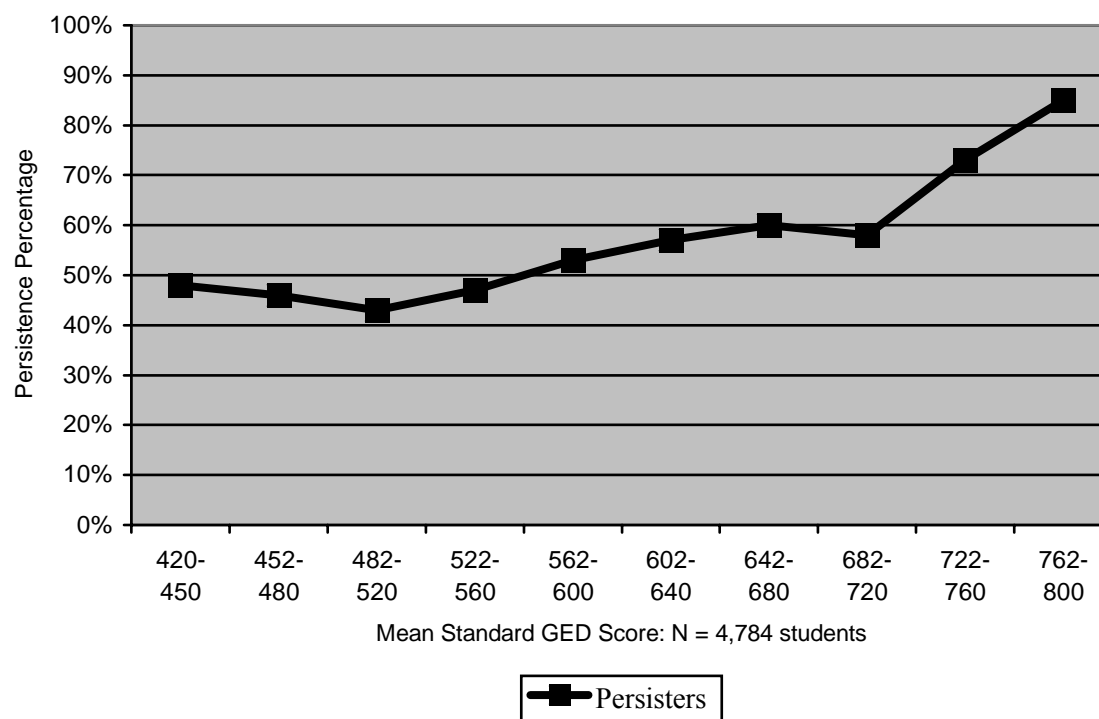


Figure 16: Mean Standard GED Score.

Table 32 presents the binary logistic regression output for the variable “mean standard GED score.” These results show that there was no statistically significant relationship between this variable and persistence. This was evidenced by the fact that

the Beta-value for this variable was 0.00 and the odds ratio was 1.00. Additionally, the R-Square values suggest that there is no practical significance as this variable only explains between 1.7% and 2.3% of the variance.

Table 32: *Logistic Regression Analysis Results: Mean Standard GED Score*

|                         | B   | Cox & Snell R Square | Nagelkerke R-Square | Wald  | Sig | Exp(B) | 95.0% C.I. for EXP(B) |      |
|-------------------------|-----|----------------------|---------------------|-------|-----|--------|-----------------------|------|
|                         |     |                      |                     |       |     |        | Low                   | Up   |
| Mean Standard GED Score | .00 | .017                 | .023                | 79.67 | .00 | 1.00   | 1.00                  | 1.01 |

#### *Individual Variables: Summary*

In sum, the binary logistic regression analysis done on each of the independent variables showed that the following variables did have significant relationships to persistence: number of credits attempted during the first term (odds ratio = 1.13 and R-Square values of .102 and .136), total first term GPA (odds ratio = 1.75 and R-Square values of .149 and .201), and grades received in remedial courses (odds ratio = 1.17 and R-Square values of .116 and .160). One variable, namely ratio: remedial courses to total course load, showed a statistically significant relationship (odds ratio = 1.94), however, the R-square values indicate that this relationship is not practically significant (R-Square values of .013 and .017). Finally, there were three variables that did not have significant relationships to persistence. These variables were: type of courses – all (odds ratio = 1.01 and R-Square values of .004 and .005), type of courses – remedial (odds ratio = 1.00 and R-Square values of .000 and .000), and mean



standard GED score (odds ratio = 1.00 and R-Square values of .017 and .023). This information is summarized in Table 33.

Table 33: Logistic Regression Individual Variable Analysis: Summary

|   | B          | Cox &<br>Snell R<br>Square | Nagelkerke<br>R-Square | Wald          | Sig        | Exp(B)      | 95.0%<br>C.I. for<br>EXP(B) |             |
|---|------------|----------------------------|------------------------|---------------|------------|-------------|-----------------------------|-------------|
|   |            |                            |                        |               |            |             | Low                         | Up          |
| <b>Credits<br/>attempted</b>              | <b>.13</b> | <b>.102</b>                | <b>.136</b>            | <b>459.45</b> | <b>.00</b> | <b>1.13</b> | <b>1.12</b>                 | <b>1.15</b> |
| Type of<br>courses –<br>All               | .09        | .004                       | .005                   | 57.04         | .00        | 1.01        | 1.01                        | 1.13        |
| Type of<br>courses –<br>Remedial          | -.04       | .000                       | .000                   | 39.69         | .07        | 1.00        | .96                         | 1.03        |
| Ratio:<br>Remedial<br>to total<br>courses | .66        | .013                       | .017                   | 60.82         | .00        | 1.94        | 1.64                        | 2.29        |
| <b>First term<br/>GPA</b>                 | <b>.56</b> | <b>.149</b>                | <b>.201</b>            | <b>501.95</b> | <b>.00</b> | <b>1.75</b> | <b>1.67</b>                 | <b>1.84</b> |
| <b>Grades in<br/>remedial<br/>courses</b> | <b>.16</b> | <b>.116</b>                | <b>.160</b>            | <b>198.69</b> | <b>.00</b> | <b>1.17</b> | <b>1.15</b>                 | <b>1.20</b> |
| Mean<br>Standard<br>GED score             | .00        | .017                       | .023                   | 79.44         | .00        | 1.00        | 1.00                        | 1.00        |

### *Grouped Variables*

In addition to analyzing each individual variable against persistence, logistic regression was also done on certain groups of variables in order to better understand the relative contribution of the multiple factors to the overall model. Specifically, the variables were grouped according to the conceptual framework presented in chapter

two: “before” factors, “during” factors, and “after” factors. The following section presents the findings of these analyses.

*“Before” variables.* For the current study, the only factor included in this category was “mean standard GED score.” As shown earlier, there is no statistically significant relationship between this variable and persistence (odds ratio = 1.00, Cox & Snell R-Square = .017, and Nagelkerke R-Square = .023).

*“During” variables.* The four variables in this category were: type of overall courses enrolled in during the first term, type of remedial courses, ratio: remedial courses to total course load, and total number of credits attempted during the first term. When all of these factors were included in their own model, the R-Square values showed that between 2.5% and 3.6% of the variance could be explained by this model. This percentage was higher than that of the “before” factors (with R-Square values of .017 and .023 respectively), however, as will be shown shortly it was not as high as that model which only contained the academic performance, or “after” factors. Looking at the other statistical results, of the four factors included in this model, the variable “total number of credits attempted during the first term” was the only one that had a positive and statistically significant relationship to persistence. See Table 34 for a summary of the logistic regression data for these variables.

*“After” variables.* The two variables in this category were: total first term GPA and grades received in remedial courses. When both of these factors were included in their own model the variable “total first term GPA” had the strongest relationship to persistence. Additionally, with a Cox & Snell R-Square value of .152

Table 34: *Logistic Regression Results: “During” Factors*

|                                     | B          | S.E.       | Wald          | Sig        | Exp(B)      | 95.0% C.I. for |             |
|-------------------------------------|------------|------------|---------------|------------|-------------|----------------|-------------|
|                                     |            |            |               |            |             | EXP(B)         |             |
|                                     |            |            |               |            |             | Low            | Up          |
| <b>Credits attempted</b>            | <b>.09</b> | <b>.01</b> | <b>164.76</b> | <b>.00</b> | <b>1.10</b> | <b>1.08</b>    | <b>1.11</b> |
| Type of courses –<br>All            | .01        | .02        | .40           | .53        | 1.01        | .98            | 1.05        |
| Type of courses –<br>Remedial       | -.06       | .01        | 19.41         | .00        | .95         | .92            | .97         |
| Ratio:<br>Remedial/total<br>courses | -.13       | .11        | 1.25          | .26        | .88         | .71            | 1.10        |

and a Nagelkerke R-Square value of .220, this particular model explained between 15.2% and 22.0% of the variance, making it the most significant of the three grouped models. See Table 35 for a summary of the logistic regression data for these variables.

Table 35: *Logistic Regression Results: Academic performance variables*

|                             | B          | S.E.       | Wald           | Sig.       | Exp(B)      | 95.0% C.I. for |             |
|-----------------------------|------------|------------|----------------|------------|-------------|----------------|-------------|
|                             |            |            |                |            |             | EXP(B)         |             |
|                             |            |            |                |            |             | Low            | Up          |
| <b>Total first term GPA</b> | <b>.74</b> | <b>.02</b> | <b>1029.07</b> | <b>.00</b> | <b>2.09</b> | <b>2.00</b>    | <b>2.18</b> |
| Grades in remedial courses  | .01        | .10        | 1.83           | .18        | 1.01        | .99            | 1.03        |

*All Variables*

The final logistic regression done for the current study was one in which all seven independent variables were included in the same model. This was done to see which of the variables showed a statistically significant relationship to persistence when all were included in the same model, and to see if there were any differences from results received when running each independent variable individually against persistence. Table 36 shows the results of this logistic regression analysis.

Table 36: *Logistic Regression Results: All Variables*

|                               |            |            |               |            |             |             | 95.0%       |    |
|-------------------------------|------------|------------|---------------|------------|-------------|-------------|-------------|----|
|                               |            |            |               |            |             |             | C.I.for     |    |
|                               | B          | S.E.       | Wald          | Sig.       | Exp(B)      | EXP(B)      |             |    |
|                               |            |            |               |            |             |             | Low         | Up |
| <b>Credits attempted</b>      | <b>.06</b> | <b>.01</b> | <b>60.62</b>  | <b>.00</b> | <b>1.07</b> | <b>1.05</b> | <b>1.08</b> |    |
| Type of courses – All         | .00        | .02        | .06           | .81        | 1.00        | .96         | 1.03        |    |
| Type of courses – Remedial    | -.06       | .01        | 18.13         | .00        | .94         | .92         | .97         |    |
| Ratio: Remedial/total courses | -.24       | .13        | 3.43          | .06        | .79         | .61         | 1.01        |    |
| <b>First term GPA</b>         | <b>.72</b> | <b>.02</b> | <b>925.28</b> | <b>.00</b> | <b>2.06</b> | <b>1.97</b> | <b>2.16</b> |    |
| Grades in remedial courses    | .02        | .01        | 4.26          | .04        | 1.02        | 1.00        | 1.04        |    |
| Mean Standard GED score       | .00        | .00        | 17.14         | .00        | 1.00        | 1.00        | 1.00        |    |
| Constant                      | -.08       | .30        | .07           | .79        | .92         |             |             |    |

When all variables were included in one model, there were only two variables that maintained positive statistically significant relationships to persistence. These were: number of credits attempted during the first term (odds ratio = 1.07) and total first term GPA (odds ratio = 2.06). Of these, total first term GPA was by far the strongest, with each one-unit increase in GPA indicating that students would be twice as likely to persist. In fact, the confidence interval values for six of the seven independent variables dropped when all factors were included in the model, and the only factor that showed an increased odds ratio and confidence interval was “total first term GPA.” In addition, the Cox & Snell R-Square value for this all-inclusive model was .163 while the Nagelkerke R-Square value was .235, meaning that between 16.3% and 23.5% of the variance can be explained by this model. These relatively high percentages indicate that this model does have practical significance. Table 37 summarizes this information.

### *Summary of Findings*

Using both descriptive and inferential statistical tools, the current study sought to understand the relationship between selected academic variables and the persistence of GED recipients in community colleges. Performing frequency and percentage distributions and binary logistic regression on all seven independent variables resulted in several findings.

Table 37: *A Comparison of Logistic Regression Results*

|                              | Model: Individual    | Model: All Variables |
|------------------------------|----------------------|----------------------|
|                              | 95.0% C.I.for EXP(B) | 95.0% C.I.for EXP(B) |
| Credits attempted            | 1.12 – 1.15          | 1.05 – 1.08          |
| Overall course type          | 1.01 – 1.13          | .96 – 1.03           |
| Remedial course type         | .96 – 1.03           | .92 - .97            |
| Ratio:                       |                      |                      |
| Remedial / Total course load | 1.64 – 2.29          | .61 – 1.01           |
| First term GPA               | 1.67 – 1.84          | 1.97 – 2.16          |
| Grade in remedial course     | 1.15 – 1.20          | 1.00 – 1.04          |
| Mean standard GED score      | 1.00 - 1.00          | 1.00 – 1.00          |

The major findings of the current study were:

- Students who received a GED credential in Oregon between July 2003 and June 2005 and subsequently enrolled in one of Oregon's 17 community colleges persisted in the postsecondary institution at a rate of 50% as defined by enrollment in two consecutive terms following receipt of the GED credential.
- Students who participated in remedial coursework during their first term persisted at higher rates than those who took no remediation.
- Mean Standard GED Score did not have a relationship to persistence.

- Enrollment status, as measured by the number of credits attempted during the first term, had a positive relationship to persistence.
- Academic performance in a student's first term had a strong, positive relationship to persistence.

The findings described in this chapter should give community college administrators additional tools to help support the success of the ever-growing population of GED recipients as they make the transition to postsecondary education. A discussion of these findings, and of their implications for the day-to-day work of community college faculty and staff takes place in the following chapter.

## CHAPTER 5

### Discussion and Recommendations for Future Research

Since the introduction of the current GED test series in 2002, the number of candidates who have tested nationally for the GED has increased by 22%, with just under half a million individuals receiving this high-school equivalency credential each year. This trend can also be seen in Oregon where the number of those tested increased by 25% between 2002 and 2005 (GED Testing Service, 2006). During this time, more than 60% of passers indicated that they took the tests for educational reasons (i.e., because they wanted to enter either a four-year college, two-year college, technical or trade program, or job training), although on average only about 28% actually transitioned to postsecondary education following receipt of the GED credential (Reder, 2007).

In Oregon, many of the GED graduates who do transition are drawn to community colleges because of easy access and relatively low costs. In their efforts to make the postsecondary education experience a positive one for GED recipients (and for the many other non-traditional students enrolling in community colleges across the state), college leaders in Oregon have been putting both time and resources into the following three areas: retention, transition, and remediation (K. Kulongoski, personal communication, July, 2007). The following section will discuss the findings of the current study in the context of these larger issues.



### *Retention*

Student retention in postsecondary education has, over the last 30 years, been a topic of interest to both college leaders and researchers. Questions such as why students stop-out or drop out, or why students transfer prior to completing their educational goals, have been repeatedly asked (Osei, 2001). Most of the early research in this area was done on traditional students attending four-year institutions. In recent years, however, the focus has expanded to include the ever-increasing population of non-traditional students enrolling in two-year colleges and commuter institutions (Bean & Metzner; 1985, Halpin; 1990; Rose, 1999).

The findings of the current study have contributed to this discussion by providing information on the persistence behavior of GED recipients in community colleges. Specifically, using binary logistic regression, the current study found that the academic factors: “total credits attempted during the first term,” “total first term GPA,” and “academic performance in remedial courses during the first term,” all had statistically significant relationships to persistence. The following section discusses the findings for each of these variables in the context of existing research.

*Finding: Number of credits attempted.* With respect to enrollment status, the current study found that the variable “total number of credits attempted during the first term” had a statistically significant relationship to persistence. Additionally, the analysis showed that with each one-unit increase in this variable, the probability of persistence increased by 13%. These findings agree with several other studies (Bean & Metzner, 1985; Brooks-Leonard, 1991; Feldman, 1993; Horn, 1996) reviewed in

Chapter Two, which stated enrollment status was a key factor when looking at persistence and attrition patterns in postsecondary education. For example, Bean and Metzner (1985) stated that there was “very strong evidence that students who were enrolled on a part-time compared to a full-time basis were more likely to drop out of college” (p. 494). In addition, Feldman (1993) concluded that part-time students were 2.23 times more likely to drop out than full-time students.

*Findings: Academic performance.* In addition to enrollment status, academic performance in a student’s first term was also found by the current study to have a strong and positive relationship to persistence. The findings indicated that the better a student did academically the more likely he/she was to persist to a second term. Specifically, regression analysis showed that for each one-unit increase in GPA, the odds of each individual persisting increased by 77%. In addition, for students taking remedial courses, the analysis showed that those students who received grades of “A” or “B” were most likely to persist.

The current study’s findings agree with research conducted by Beltzer (1985) and Brooks-Leonard (1991), as well as with an extensive review of the literature on student persistence in postsecondary education conducted by Bean and Metzner in the mid-1980s. Bean and Metzner (1985) concluded that college academic performance (as measured by grade point average) had been a consistent and powerful predictor of persistence at various types of institutions and for several different student populations. Finally, quite recently Driscoll (2007) argued that, “the first semester in community college is a pivotal point in students’ academic careers. Students whose

first academic experience in college is positive and successful are more likely to remain in school” (p.2).

*Future research.* As described in Chapter 3, the current study was conducted within a post-positivist framework. Researchers working within this methodology believe that the goal of research is to reach agreement on the objective nature of reality, and this objectivity is achieved through the use of multiple perspectives (Schutt, 2006). In order to have, what Schutt termed “intersubjective agreement,” replication is key. In fact, repeatedly testing explanations against hard, objective facts is the way in which post-positivists believe true knowledge accumulates. Because the current study was conducted within this philosophical framework, future research should focus on replicating its findings. In doing so, the “truth” about what factors influence GED recipients’ choices to remain – or not to remain in school, will eventually be uncovered.

With the goal of coming to intersubjective agreement in the area of predicting GED recipient persistence behavior in community colleges, future research could look again at academic factors and how they are related to the persistence behavior of GED recipients in community colleges outside of Oregon. It would be particularly interesting to look at the twelve other states that have a similar policy of using the community college system as the primary delivery mechanism for adult education programs.

In addition to replicating the current study by focusing on academic factors, future research is also necessary to determine on a broader scale what other variables

may predict which GED recipients will drop out of community colleges and which will not. The few academic factors examined in this study likely do not alone determine a student's decision to persist or not. The issue may be much more complex, possibly involving other academic factors not addressed in this study, as well as many other demographic and environmental variables. There are established conceptual frameworks that were developed with the express purpose of explaining attrition / persistence behavior of non-traditional students in postsecondary education (Allison, 1999; Bers & Smith, 1991; Halpin, 1990; Pascarella & Terenzini, 1980). There has, however, been a dearth of research applying these established frameworks specifically to the GED recipient population. Future research could therefore examine background, academic, and environmental variables, as well as the level of social integration (i.e., the major constructs of Bean & Metzner's (1985) model of non-traditional student attrition) of groups of GED recipients enrolled in postsecondary institutions.

It would also be interesting to explore the applicability of the Tinto Student Integration Model (1975) to the GED recipient population. While the current study acted on the assumption that GED graduates are non-traditional, an argument could be made that absent other non-traditional student characteristics (such as enrolling part time, being a single parent, being older, and/or being financially independent), GED recipients should be characterized as traditional students. There is in fact one study (Beltzer, 1985) that applied the Tinto model to GED graduates, and the results

supported the predictive validity of this model in identifying potential dropouts among this specific student population. Replications of the Beltzer study, or simply additional research on the applicability of traditional student postsecondary attrition models, could further enhance the understanding of what makes GED recipients successful in postsecondary education.

### *Transition*

As a reaction to low transition rates from adult education programs into postsecondary education, community colleges have in recent years begun to more actively assist adults in their transition to higher education (Berkeley Policy Associates, 2004; CAAL, 2005; Jobs for the Future, 2004). This interest in transition activities is evident throughout the country, however, relatively little is still known about what happens to adults with limited education who do enter community colleges (Prince & Jenkins, 2005).

The findings of the current study have contributed to this discussion by providing information on one factor that may influence a GED recipient's decision to transition, namely GED score. Specifically, the current study found that there was no relationship between Mean Standard GED Score and persistence. This finding was in agreement with several other studies done on the predictive ability of the GED examination for student success in postsecondary institutions (Rogers, 1977; Rose, 1999; Turner, 1993).

*Future research.* Although the findings of the current study did agree with some of the other research in this area, there are also several studies that have found

the exact opposite, i.e., that GED test score was a significant predictor of college academic performance (Henry, 1999; Sharon, 1972; Smith & Goetz, 1988; Wolf, 1983). In order to work towards the post-positivist ideal of intersubjective agreement, it is therefore advisable to conduct additional research on the predictive ability of the GED for student success in postsecondary education.

One specific area that may warrant further investigation is which operational definition is used for GED Score. For the current study, mean standard score was chosen as the operational definition because this is how much of the related research defined the variable (Henry, 1999; Rose, 1999; Wolf, 1983). However, in order to better understand the relationship (or lack thereof) between GED score and persistence, it may be useful to identify individual examination scores, rather than the mean standard score, as a set of independent variables. As mentioned earlier, the GED test is actually made up of five individual examinations: language arts - writing, social studies, science, language arts - reading, and mathematics. While students must achieve a minimum score on each sub-test in order to pass the overall examination, there is a fairly large range (about 400 points) within which students may score on each sub-test. The possibility therefore exists that two students may have very similar mean scores, however one may have scored, for example, very high on the mathematics sub-test and very low on the writing test, whereas the other student may have achieved the opposite. Because of this possibility, and because performance on specific sub-tests may have implications for the types of interventions and supports a

student needs, future research that looks at the relationship between persistence in postsecondary education and each of the five sub-tests is recommended.

### *Remediation*

Throughout the country, community colleges leaders are engaged in a national debate over remedial education. On one side, some parents, administrators, faculty, and legislators suggest that higher education should not be expected to deliver what others failed to provide; that those with skill deficiencies should have one chance, maybe two, and then they're out; and that remedial courses take too long and cost too much (Day & McCabe, 1997). In response to these arguments, others say that for the great many students with weak academic backgrounds and low placement scores, the investment of time and money in remedial courses is necessary if they are to have any hope of succeeding in college (Boylan, 1999).

Despite this debate, today's reality is that almost all community colleges offer remedial education courses. Given the increasing numbers of under-prepared students entering these programs, the question has naturally arisen as to whether remediation is effective in preparing students for success in college-level programs. The findings of the current study have contributed to this discussion by exploring the participation and performance of GED recipients in remedial coursework during their first term in college following the receipt of the GED credential.

Specifically, the current study found that the persistence rate of students who took remedial courses only (i.e., their ratio of remedial courses to total course load was 1.0), was higher than the persistence rate of those students who enrolled in no

remedial courses – 51% to 40% respectively. Additionally, the current study found a positive relationship between academic performance in remedial courses and persistence. In other words, those students who received grades of “A” and “B” persisted at higher rates than those who received lower grades. These findings agree with other researchers (Boylan, Bonham, & White, 1999; McCabe, 2000; Platt, 1993) in their conclusions that participation and academic success in remedial courses had a positive influence on student persistence in postsecondary education.

*Future research.* While there is a large body of research on the effectiveness of remedial education, very few studies have looked specifically to see if being a GED holder (versus being a high school graduate) plays a role in the efficacy of developmental education programs. In order to add to the findings of the current study, future research could focus on relationships between GED recipient performance in remedial education courses and persistence. In addition, little if no research has been done on the frequency that GED recipients participate in developmental education programs. One area to explore would be to determine at what rate GED recipients transition into remedial level courses versus placing directly into college-level programs upon transition to the community college. It would be useful in such studies to differentiate between institutions with mandatory placement policies and those without. The current study only evaluated participation in remedial courses in institutions with no mandatory placement policy, because in Oregon, community colleges recommend rather than require students take remedial courses based on placement examinations.



### Implications for Practice

The preceding suggestions for additional research in the area of GED recipient persistence in postsecondary education are in line with the philosophical framework (i.e., post-positivism) within which the current study was conducted. Specifically, post-positivists believe that true knowledge only accumulates through replication and through the use of multiple perspectives, all of which must agree on a perceived nature of reality. By recommending further research to confirm (or not) the findings of the current study, other researcher would contribute to the accumulation of knowledge in the area of GED recipient persistence in community colleges.

While the concept of intersubjective agreement influenced the preceding recommendations, a second post-positivist concept, that of researcher bias, influenced the discussion in the following pages. Specifically, I believe that my personal background and the knowledge that I have about community colleges and GED students, along with the findings of the current study, combined to create the conclusions and recommendations that are presented in the following section. Despite, this caveat, however, I believe these issues are important to consider for those practitioners working day-to-day on the front lines. The following section therefore presents strategies for increasing the number of classes students can/will take, as well as suggestions for facilitating improved academic performance. A discussion regarding the study's finding that the overall persistence rate for the sample was close to 50% is also included.

### *Strategies for Facilitating Full-Time Enrollment*

Because of the current study's finding that there is a positive relationship between number of credits attempted during the first term and persistence, as well as the findings of other research on the persistence of non-traditional students in postsecondary education, this researcher believes that it is worth exploring strategies that allow students to take as many credits/courses as they can handle early in their college careers. In order to do so, colleges should aim to identify and eliminate as many barriers to full-time enrollment as possible. While this is obviously a complex issue, there are two primary areas on which community college administrators could focus in order to facilitate an increase in the number of students who enroll for a higher number of credits. Based on personal experience and other research, these areas are finances and time.

*Finances.* In interviews with GED recipients, Rose (1998) and Wlodkowski, Mauldin, and Campbell (2002) both found that finances significantly influenced a student's commitment to college. In another study, Wlodkowski and Mauldin also found that non-traditional students who received financial aid were from 2.9 to 4.0 times more likely than non-financial aid recipients to persist (Wlodkowski, Mauldin, & Gahn, 2001). Finally, Osei (2001) found that receipt of financial aid was a statistically significant variable in predicting first year academic performance of GED graduates enrolled in a four-year institution. In addition to these research findings, anecdotal evidence from adult education professionals and community college administrators reflect the belief that financial concerns can be a strong mitigating

factor for persistence of GED recipients in postsecondary education (T. Greenfield, personal communication, May 22, 2006).

Across Oregon, community colleges have in part addressed this concern by developing policies that provide GED recipients with financial assistance in the form of class fee and tuition waivers when they enroll in community college credit classes following receipt of the GED credential. These fee waivers may be used in conjunction with federal financial aid and are often used as a way to encourage more GED recipients to transition to postsecondary education. While this is a step in the right direction, there are improvements that can be made to these processes.

Currently, all of the colleges in the state require that the free credits, ranging from three to eighteen, be used in the first term following transition. In other words, although some schools offer as many as 18 free credits, students may not use this waiver beyond their first term of enrollment. In addition, only two of the 17 colleges require GED recipients who use a tuition waiver to meet with an academic advisor, and none require meeting with someone (for example a financial aid advisor) who could help the student plan how they would pay for school following the first free term (K. Kulongoski, Oregon State Director of Adult Education, personal communication, July, 2007).

In order to reduce further those barriers that the waivers are meant to address, changes to the process, such as allowing students to use the free credits over multiple terms and/or requiring students to meet with financial aid advisors, could help Oregon

colleges move from just encouraging transition, to facilitating both transition and ongoing academic success of the GED recipient population.

*Time.* In addition to addressing financial issues, program developers can encourage student enrollment by addressing the issue of time. In Chapter Two, it was argued that GED recipients should be categorized as non-traditional students. According to the definitions of several scholars (Bean & Metzner, 1985; Horn, 1996; Pascarella & Terenzini, 1991; Vellella & Hu, 1991), characteristics of non-traditional students may include: having dependents other than a spouse, being a single parent, and/or working full or part-time. Possessing one or more of these characteristics often means that that student has limited time and is likely only to be free to take classes at untraditional times. It is therefore important for college administrators to engage in flexible class scheduling and to consider offering classes evenings, weekends, and in non-traditional configurations – such as in learning communities or through cohort models.

Additionally, a variety of instructional delivery methods should be considered. For example, the use of technology could provide different options, such as various combinations of distance learning and on-campus classes; and open-entry/open-exit, self-paced, or other flexible formats (Matus-Grossman & Gooden, 2002). Such options could reach students who are unable to attend the traditional on-campus two days per week two-hour daytime classes. Providing a menu of options would not only address the issue of complicated schedules, but it would also allow students who were unable to come to campus because of other common barriers, such as lack of childcare and

unreliable transportation, to enroll in more credits. This in turn, according to the findings of this and other studies, could increase the probability of students persisting beyond the first term.

### *Strategies to Facilitate Improved Academic Performance*

In order to increase the probability of persistence, colleges may want to work to facilitate first term academic success of GED recipients who have transitioned into their institution. There are several approaches that could be used to encourage academic success. Three such strategies are: improving the visibility and availability of support services, adhering to a policy of mandatory placement, and developing bridge programs.

*Support services.* The availability of support services is one important factor in promoting students' academic success (Helton, 2005; Rose, 1998). Support services are those activities that assist students with both academic and non-academic issues. Some standard services and approaches that can help students academically include pro-active advising, early warning systems, tutoring, peer tutoring, mentoring, learning communities, and supplemental instruction. While academic support services are obviously important to student success, those services that help students with other needs are also vital. For example, financial aid advising, counseling, and in-depth orientations can provide students with information and resources that will help them address barriers common to non-traditional students: barriers such as childcare and transportation needs, and schedule and financial challenges. It is important for community colleges also to recognize that not only do these services need to be in

place, but they must also be well aligned and coordinated across the campus. Indeed, according to Jenkins (2006), “seamless integration of services from the student’s perspective and collaboration among faculty, staff, and administration in providing these services are what seem to contribute most to student success” (p. 3).

For students who require remediation, there is a significant amount of research that shows students who successfully complete remedial coursework are likely to be successful in subsequent terms, sometimes at even higher rates than those who entered the institution college-ready (Boylan, 1999; Crane, McCay, & Poziemski, 2002). The key is to ensure that GED recipients who transition needing remediation are successful in these programs. Boylan, Bliss, and Bonham (1997) explored successful developmental programs in terms of their components. They found that there were relationships between the presence of certain components and various measures of academic success among developmental education students. Specifically, they found that the following components demonstrated the strongest positive relationship to student performance: (a) mandatory assessment and placement, (b) tutoring, (c) advising and counseling, and (d) faculty and staff development. In a similar study, Young (2002) found that exemplary remedial programs were characterized by validating environments and classrooms, mandatory assessment and placement, and institutional outreach and collaboration. Community colleges interested in promoting the success of GED recipients should consider evaluating their developmental education programs in the context of these components.

Even for those students who are placed directly into college-level coursework, support services are critical for ongoing academic success. In a study conducted by Helton (2005), GED recipients in the state of Ohio were interviewed to elicit their perceptions of what it took to transition successfully to postsecondary education. In this study, a common theme that emerged was that students' perceptions of postsecondary education were unrealistic. Many felt that since they had passed the GED on the first attempt, college would be a task they could manage successfully. Unfortunately, this did not always turn out to be the case. For example, one of the students in this study commented that, "I thought I had good preparation for college, being an avid reader, but my expectations were that I would breeze through chapters in my texts. I found that textbook reading is much different than the material I was reading" (Helton, 2005, p. 104). And another student had this to say: "I thought I knew what to expect and was prepared, but the work was much more complicated, especially the reading demands" (p. 103).

In addition to the work by Helton, other scholars have found that when students are having difficulty in classes the knowledge that support services are available often contributes to academic success (Rose, 1999). These services are particularly important to students who are highly apprehensive and who have not had prior success in an academic setting. Types of support services that are most common include: tutoring, peer tutoring, supplemental instruction, learning communities, mentoring, study groups, and orientation programs.

In sum, one strategy to consider in facilitating the academic success of GED recipients who enter community colleges is the provision of purposeful support services. A well constructed and organized transition program should acknowledge that some or many academic coping skills may have been missed due to dropping out of high school and/or due to characteristics typical of non-traditional students. The goal of this support would be to increase academic self-confidence and to improve academic learning skills. This, in turn, may contribute to academic success, which according to the findings of this and other research relates to increasing the probability that the student will persist.

*Mandatory placement.* In addition to providing comprehensive support services, another strategy for facilitating increased academic performance may be the implementation of a policy of mandatory placement. Mandatory placement is the process of requiring students to enroll in remedial coursework if they place below college-level work according to a placement examination. As presented in Chapter Two, there have been several studies that have shown the positive effect of remediation on student success (Boylan, 1999; Crane et al., 2002; Kolajo, 2004; Kulik, Kulik, & Schwalb, 1983; Prince & Jenkins, 2005). While there has been a great deal of research showing the effectiveness of remediation on student success, the concept of required placement is often seen as conflicting with the history of the open access college (Young, 2002). This conflict has resulted in many colleges following a “right to fail” policy (McCabe, 2000, p. 43). Those who adhere to this philosophy operate under the assumption that students know their own strengths and weaknesses and that



they will therefore choose courses and programs accordingly. In Oregon, community colleges recommend students take remedial courses based on mandatory placement examinations. Enrollment in the courses, however, is voluntary.

Because there is ample evidence that successful completion of remediation often results in overall academic success, it is important to ensure that students who need basic skills development enroll in remedial courses. According to Prince and Jenkins (2005), this is particularly important for students who start in Adult Basic Education programs. In a longitudinal study focusing on the academic performance of low-skilled adults in community colleges, these researchers found that both the receipt of financial aid and completion of developmental education courses were factors associated with a greater likelihood of success in college-level courses. Unfortunately, they also found that only about 33% of those who transitioned from Adult Basic Education programs actually enrolled in developmental education.

There are two findings from the current study that support the concept of mandatory placement. First, the current study found that the persistence rate of students who took remedial courses only (i.e., their ratio of remedial courses to total course load was 1.0), was higher than the persistence rate of those students who enrolled in no remedial courses – 51% to 40% respectively. In other words, this finding agreed with other researchers (Boylan, Bonham, & White, 1999; McCabe, 2000; Platt, 1993) in their conclusions that participation in remedial courses had a positive influence on student success and persistence. According to the National Postsecondary Student Aid Study (2004), 62% of GED graduates who entered as first

time freshmen in two-year institutions were enrolled in at least one remedial course. In contrast, only 49% of students in the current study enrolled in any remedial coursework during their first term. While this statistic could reflect the fact that more GED recipients in Oregon transitioned to two-year schools with college-level skills, it may also suggest that this student population is more likely to opt out of remedial courses. Because students in the current study who enrolled in remedial courses persisted at a higher rate than those who took no remedial coursework, a policy of mandatory placement may help to increase the persistence rate of GED recipients who make the successful transition to community college yet are still in need of improving their basic skills.

Second, the finding of the current study that academic performance was strongly related to persistence is yet another reason to consider the concept of mandatory placement. This finding implies that it is critical for students to experience academic success - in whichever course(s) they attempt. As a result, it seems logical to support policies, such as mandatory placement, that could assist students in their decision-making process, so that they would enroll in courses where they had the best chance of success.

*Bridge programs.* One final suggestion for facilitating GED recipient success in postsecondary education is the development and implementation of bridge programs. Bridge programs are courses that “bridge” the skills gap between adult education programs and college-level coursework. This strategy is gaining in popularity as several federal and state initiatives are providing resources to encourage

the transition of adult education students to postsecondary education (See Table 2 in Chapter Two for a summary of several of these initiatives). These programs often include: coaching in independent study skills, time management, note taking, using research tools, and other soft skills required for college-level work; various forms of career planning; instruction in college-level writing and levels of mathematics not usually covered by most GED preparation programs; case management to help students obtain support services; and the organization of students into cohorts to help create the interpersonal support they may otherwise not have (CAAL, 2005). In addition, the curriculum in bridge programs is taught in the context of problems and situations drawn from the contemporary workplace and the postsecondary classroom (Women Employed Institute, 2005).

Most adult education and community college leaders familiar with bridge programs argue: “they are a step beyond adult education programs in the educational sequence that leads to college” (CAAL, 2005, p. 41). Completion of such programs can provide students with both the academic tools and the knowledge of how to access support services that are necessary for success in the first term of college-level work. Additionally, such programs also provide the opportunity for students to do both short and long term goal setting, which has shown to be yet another factor in facilitating student success (Alamprese, 2005).

#### *Overall Persistence Rate*

According to Kallenbach of the New England Literacy Resource Center (2006), only five to ten percent of GED recipients make it through one year of

postsecondary education, and only about 1% obtain an associate's degree. The findings of the current study, however, showed that 50% of the sample persisted. The question that thus arises is why did such a high percentage of students in this study persist? There are perhaps many possibilities for this difference and the following discussion will focus on three: Age, the way adult education is delivered in the state of Oregon, and how persistence was defined in this study.

*Age.* Of the almost 5,000 students in the current study, the largest group, just under 44%, were between the ages of 16 and 18 when they passed the GED examination. An additional 29% were between the ages of 19 and 24 when they received their credential. This means that a total of 73% of the sample was under the age of 24 upon receipt of their GED. The fact that such a large percentage of the sample was of traditional college age may have had a positive influence on the high percentage of student persistence. Although this study did not look at the statistical correlation between age and persistence, the following discussion explores some possible connections between the age of the students in the sample and 50% persistence rate. It is recommended that future studies examine in more depth and in a more systematic manner, any correlation or cause and effect relationship between age and persistence of GED recipients in community colleges.

Some research has shown that younger students tend to be more successful in postsecondary education than older students. For example, in 1981 Pascarella, Duby, Miller and Rasher, in an attempt to evaluate pre-enrollment variables and academic performance as predictors of freshman year persistence, found that younger students

tended to persist at higher rates. In 2005, Prince and Jenkins also found age to be a significant factor. Specifically, they found that compared with students who started college later (i.e., at ages 25 –64), those who started college soon out of high school (i.e., at ages 18-24) were more likely to earn an Associates degree and were far more likely to transfer to a four-year institution and earn a Bachelor’s degree. Additionally, they found that 60% of older first time students didn’t earn any credential or transfer after six years, compared with only 40% of younger first time students (Prince & Jenkins, 2005). In line with the findings of the related research, the relatively high persistence rate of the students in the current study may therefore simply be a result of the fact that a large percentage of the sample were under the age of 24.

The high persistence rates may also be connected to the definition of a non-traditional student, and how closely GED recipients actually fit this definition. In a 1996 study conducted by the National Center for Education Statistics, a non-traditional student was identified by the presence of one or more of the following seven characteristics: (a) delayed enrollment into postsecondary education, (b) attended part-time, (c) financially independent, (d) worked full-time while enrolled, (e) had dependents other than a spouse, (f) was a single parent, or (g) did not obtain a standard high school diploma (Horn, 1996). Horn argued that these characteristics were risk factors because each had the potential to increase the risk of attrition. She used these characteristics to classify non-traditional students into three categories. Those with only one characteristic were termed minimally non-traditional, those with two or three were termed moderately non-traditional, and finally those possessing four

or more of the seven risk factors were termed highly non-traditional. Using these same characteristics, Berkner, Cuccaro-Alamin, and McCormick (1996) found that an increase in the number of risk factors was accompanied by a decline in persistence rates. According to Berkner et al., students having none of these factors were almost twice as likely to persist than were students with three or more. Or, using Horn's classifications, minimal non-traditional students were much more likely to persist than highly non-traditional students.

By default, all GED recipients have at least one risk factor because they did not obtain a standard high school diploma. However, this does not mean that all GED recipients possess the other six characteristics described by Horn (1996). In fact, it can be argued that 73% of the current study's sample did not possess the risk factor of delayed enrollment into postsecondary education because all of these students were aged 24 or under upon enrollment in their first community college term. Additionally, while the current study did not have access to data on the marital, family, or financial status of the students in the sample, there is a good possibility that because so many of them were young (i. e., 44% under the age of 18), there would not be a large number who had dependents other than a spouse, were single parents, or were financially independent. There is thus a good possibility that many students in the sample did not possess at least four of the seven risk factors (i. e., delayed enrollment, financial independence, having dependents other than a spouse, and being a single parent).

Of the remaining two risk factors, part-time enrollment and full-time employment, it is known from the results of the current study that 45% of the sample

enrolled in 11 credits or fewer during their first term following receipt of the GED credential, and would thus possess the risk factor of part-time enrollment. However, 26% enrolled for 12 credits or more, meaning that there were students in the sample that enrolled full-time, and thus would not possess the risk factor of part-time enrollment. Finally, because no data were collected on the employment status of the students in the study, it is not possible to project how many individuals may have been employed full-time while going to school.

In sum, because of the very large number of students 24 years of age and under, it is quite possible that a large percentage of the sample in this study only possessed somewhere between one and three of the risk factors identified by Horn (1996), making them only minimally or perhaps moderately non-traditional. As a result, because the work of Berkner et al. (1996) and Horn (1996) showed that an increase in the number of risk factors was accompanied by a decline in persistence rates, the persistence rate of the sample in the current study may therefore have been higher because it consisted of individuals who did not possess a high number of risk factors.

*Adult education in Oregon.* A second reason that the persistence rates in the current study may have been higher than those found in other research is related to the way adult education services are delivered in the state of Oregon. Two-thirds of the states in the U.S. manage the delivery of adult education programming through K-12 departments of education. These states account for 73% of adult education enrollments nationally. Oregon, however, is just one of 13 states, where adult education is under

the governance of postsecondary education agencies, usually community or technical college systems. Ninety-five percent of adult education providers in the state of Oregon are community colleges, with the Department of Corrections making up the final five percent (CAAL, 2004a).

According to the report “Oregon Shines” (Walker & Strawn, 2004), presently available data suggest that Oregon transition rates (from adult education programs to postsecondary education) are relatively high in comparison to other parts of the country. For example, between 1992 and 2002 “just over 15,000 adult basic education students entered postsecondary education within two terms of completing the adult education programs. This was almost three times the national average indicated in the 2002 National Reporting System (NRS) data” (p. 49). Throughout the state, directors of adult education programs attribute Oregon’s good record on transitions to strong orientation programs offered within the GED programs that emphasize continuation to postsecondary education. Additionally, they believe that strong collaboration between GED preparation programs and college academic advising departments, as well as the commitment of colleges to provide scholarships and college tuition grants for GED completers, facilitate the transition of GED completers to college-level programs (K. Kulongoski, personal communication, July, 2007). Finally, because most GED preparation programs are located on college campuses, GED students are able to identify themselves as college students before they even receive the GED credential (Walker & Strawn, 2004). All of these things contribute to an easier transition from pre-college to college-level programs.



Perhaps the strengths of the Oregon system that facilitate student transition also promote persistence. For example, opportunities for greater access to college student services, support from other instructional programs in the college, and the familiarity of GED preparation students with campus personnel and procedures are all factors emphasized by Oregon community colleges that may promote student success and persistence. In addition, many of these Oregon institutions incorporate transition to postsecondary of under-prepared students as an institutional goal, resulting in the dedication of both financial and human resources to achieving this end.

*Definition of terms.* A third explanation for why the persistence rate in the current study was much higher than found in other research may be related to how persistence was defined. The definition used in this study was enrollment in two consecutive terms in an Oregon community college following receipt of the GED credential. In other words, persistence was looked at in terms of the student completing their first term and then enrolling in a subsequent term. As mentioned in Chapter Two, most studies looking at persistence of both traditional and non-traditional students defined it as year-to-year (Campbell & Blakey, 1996; Feldman, 1993; Halpin, 1990) or in many cases in terms of degree completion (Boesel, Alsalam & Smith, 1998; Osei, 2001; Rose, 1998). When these definitions were applied to the GED recipient population, the numbers looked dismal. In fact, these and other studies have shown that only 5% to 10% make it through one year of postsecondary education and only 1% go on to receive a two-year degree (Kallenbach & Zafft, 2006).

The current study defined persistence, neither as finishing a full year nor as degree completion, but rather as the completion of the first term following receipt of the GED and enrollment in a second consecutive term. Students were only counted as “persisters” if they enrolled in two terms back-to-back. If a student enrolled in two terms, but with a break between of no enrollment, they were not counted as “persisters.” Additionally, students were counted if they enrolled in either credit or non-credit courses. Using a first to second term definition, GED recipients in this study showed a persistence rate of just under 50%. Even taking into account the earlier arguments that age and the unique Oregon adult education delivery system may have somewhat skewed the number of persisters, the difference between 50% completing a first term and 5% to 10% completing a first year should prompt further exploration. Additional understanding of what contributes to this difference in persistence rates may help practitioners develop more effective techniques to facilitate student success.

*Future research.* As a result of the finding that such a large percentage of the sample were young, future researchers may want to re-examine assumptions underlying the current conceptualization of the GED recipient population. For many years, individuals who have taken the GED Tests have been characterized as high school drop-outs who decided, when they were older, to use the GED as a second chance to qualify for further education, training, and employment opportunities. Additionally, these students have most often been viewed as non-traditional because they did not graduate from a traditional high school, but rather earned an alternative credential (Horn, 1996). The label “non-traditional” carries with it a myriad of

assumptions, such as the idea that these students are also likely to be single parents, have dependents other than a spouse, enroll only part time, be financially independent, and be working full time while enrolled.

Over the last 15 years there has been an increasing number of younger students receiving GED credentials. According to Jones and Kelly (2007), approximately 22% of all GEDs awarded in 1990 were to those between the ages of 16 and 18, whereas in 2005 this percentage had jumped up to 34%. This increase in the number of younger recipients nationwide, as well as the finding of the current study that three-quarters of the sample were under the age of 24 upon receipt of the GED, raises the question as to whether or not the traditional conceptualization of the GED recipient population remains accurate. Future research should examine whether or not a larger number of “traditional” students are in fact opting to complete a GED, rather than a high school diploma, for reasons that may be different from those in the past. If this were indeed true, it would have implications for the development and implementation of both GED preparation programs, as well as for college-level initiatives and support services designed with this student population in mind.

### *Summary*

The findings of the current study showed that certain academic factors had a statistically significant relationship to the persistence of GED recipients who were enrolled in an Oregon community college following the receipt of their GED credential. Specifically, the number of credits attempted during the first term, overall first term GPA, and the successful participation in remedial coursework were all

factors that appeared to contribute to higher persistence rates. Finally, the current study also found that there was no relationship between GED score and student persistence in postsecondary education.

As discussed earlier, these findings were in line with other research conducted over the past several years that looked at the persistence behavior of non-traditional students in postsecondary education. Within the post-positivist framework, the agreement of the findings of the current study with those of previous researchers indicates that we are one step closer to reaching intersubjective agreement (i.e., achieving agreement by different observers of what is happening in the natural or social world) and therefore to approximating to the best of our ability the “truth” with regard to the persistence behavior of GED recipients in community colleges. Despite this encouraging move, however, no concrete cause-effect conclusions can be drawn from the study’s findings because of the fact that a correlational (rather than an experimental) design was used. As a result, additional research looking at academic and other variables, as well as at GED recipient participation and performance in developmental education programs is recommended.

Finally, stemming from both the findings of the current study and extensive personal experience working with both GED recipients and community college programs focused on under-prepared students, some practical recommendations were proposed in the preceding pages. In this discussion several strategies were suggested that college administrators could explore in their work to increase the academic

success rates, and ultimately persistence, of this student population. These strategies were:

- Elimination of barriers to full-time enrollment through:
  - Providing financial incentives for completing the GED and making the transition to postsecondary education;
  - Encouraging the use of innovative and flexible instructional delivery methods;
- Provision of purposeful student support services to address both academic and non-academic issues;
- Implementation and enforcement of a mandatory placement policy;
- Development of bridge programs between adult education and college-level programs.

The finding of the current study that students persisted from a first to second term at a rate of 50% also raised the question as to why this percentage was so much higher than that presented in other related research. Some reasons for this may have been the demographic make-up of the sample (i. e., 73% under the age of 24), the way that adult education services are delivered in the state of Oregon, and/or the definition of persistence used in the current study. Whatever the reasons may have been for this relatively high persistence rate, this finding suggests that GED recipients can be successful in their first term as a college student. This result also suggests that early interventions may assist students to continue with their studies beyond the second

term. Community college leaders can use this information as a basis for further reflection and exploration in order to extend their current focus from successful transition, to both successful transition and continued academic success.

### *Study Limitations*

The findings of the current study showed that there were statistically significant relationships between several academic factors and the persistence of GED recipients in community colleges. However, because a correlational design was used, no conclusions of cause and effect can be drawn. Rather, these findings should be used to form hypotheses that can then be tested using either experimental or quasi-experimental designs.

A second limitation of the current study is the fact that it focused only on academic factors. As mentioned previously, existing research on the persistence of non-traditional students has shown that there are several other factors, such as demographic and environmental, that influence the persistence behavior of non-traditional students in postsecondary education (Bean & Metzner, 1985; Beltzer, 1985; Bers & Smith, 1991; Brooks-Leonard, 1991). Because a wide variety of factors do in reality influence a student's decision to persist or to drop out, the narrow focus of the current study should be seen as a limitation.

Another limitation of the current study is the fact that the data collection was restricted to those GED recipients who received their credential in the state of Oregon and then made the decision to stay in the state for their postsecondary experience. Adhering to these criteria meant that certain groups of students were excluded. For

example, students who received their GED in another state and then enrolled in an Oregon community college were not included in the analysis. Additionally, students who received their GED in Oregon (during the targeted time frame) but decided to attend a postsecondary educational institution in another state were also missed.

## CHAPTER 6

### Conclusion

According to the National Center for Education Statistics (2005), 93 million American adults, or 45% of the adult population, have limited reading, writing, and mathematics skills. This widespread lack of educational attainment among the adult population coupled with future demographic trends and changing demands of the 21<sup>st</sup> century workforce, should be of serious concern to future leaders.

One path open to those needing and/or wanting to improve their skills is the GED credential. Since the 1940s, there have been millions of adult Americans who have required a method to validate that their skills and knowledge were equivalent to a high school diploma. The GED examination was developed for this express purpose and continues today to be a vehicle for individuals to access further education, training, and employment opportunities (Baldwin, 1990). Access to higher education, however, is not enough. In order to be successful in the 21<sup>st</sup> century workforce, those individuals that do complete their GED must continue to build their skills through further education.

In Oregon, of those GED graduates that choose to continue their education, many go on to enroll in one of the 17 community colleges in the state. In order to create an environment in which these individuals can be successful, these colleges should have a good understanding of those factors that are related to the success and persistence of this student population. With the purpose of contributing to this understanding, the current study chose to focus on the relationship between academic



factors and the persistence of GED recipients in community colleges following the receipt of the GED credential. With this purpose in mind, the study addressed the following research question:

- Is there a relationship between selected academic factors and the persistence of GED recipients in community college following the receipt of the GED credential?

In order to answer this question, data was extracted from two existing databases, the Oregon State GED database and the Oregon Community College Unified Reporting System (OCCURS), a statewide database that has been in place since the mid 1990s. OCCURS contains information on student demographics, enrollment patterns, and placement information for all 17 community colleges in Oregon, while the GED database contains scores for all students who have taken the GED in the State of Oregon. A data match was performed between these two existing datasets in order to extract information on all of those students who completed a GED in Oregon between July 1, 2003 and June 30, 2005, and subsequently enrolled in an Oregon community college at anytime between summer term 2003 and winter term 2006. The final sample size was an unduplicated headcount of 4,785. These students enrolled in a total of 14,080 courses across the 17 Oregon community colleges during this time frame. Descriptive and inferential statistical analyses were performed on this data in order to determine the existence and/or strength of relationships between

selected academic factors and persistence of GED recipients enrolled in Oregon community colleges.

### *Findings*

The major findings of this study were as follows:

- Students who received a GED credential in Oregon between July 2003 and June 2005 and subsequently enrolled in one of Oregon's 17 community colleges persisted in the postsecondary institution at a rate of 50% as defined by enrollment in two consecutive terms following receipt of the GED credential.
- Students who participated in remedial coursework during their first term persisted at higher rates than those who took no remediation.
- Mean Standard GED Score did not have a relationship to persistence.
- Enrollment status, as measured by the number of credits attempted during the first term, had a positive relationship to persistence.
- Academic performance in a student's first term had a strong, positive relationship to persistence.

### *Final Thoughts*

The study of student persistence in postsecondary education is complex, involving a multitude of variables. In an effort to understand at least one small piece of the puzzle, the current study looked at whether or not relationships existed between selected academic factors and the persistence of GED recipients in community

college. It is the hope of this researcher that the findings of the current study, and the questions that these findings spark, will encourage practitioners to explore further issues related to the persistence of GED recipients, with the purpose of encouraging these students to not only enroll in college-level programs, but to complete them.

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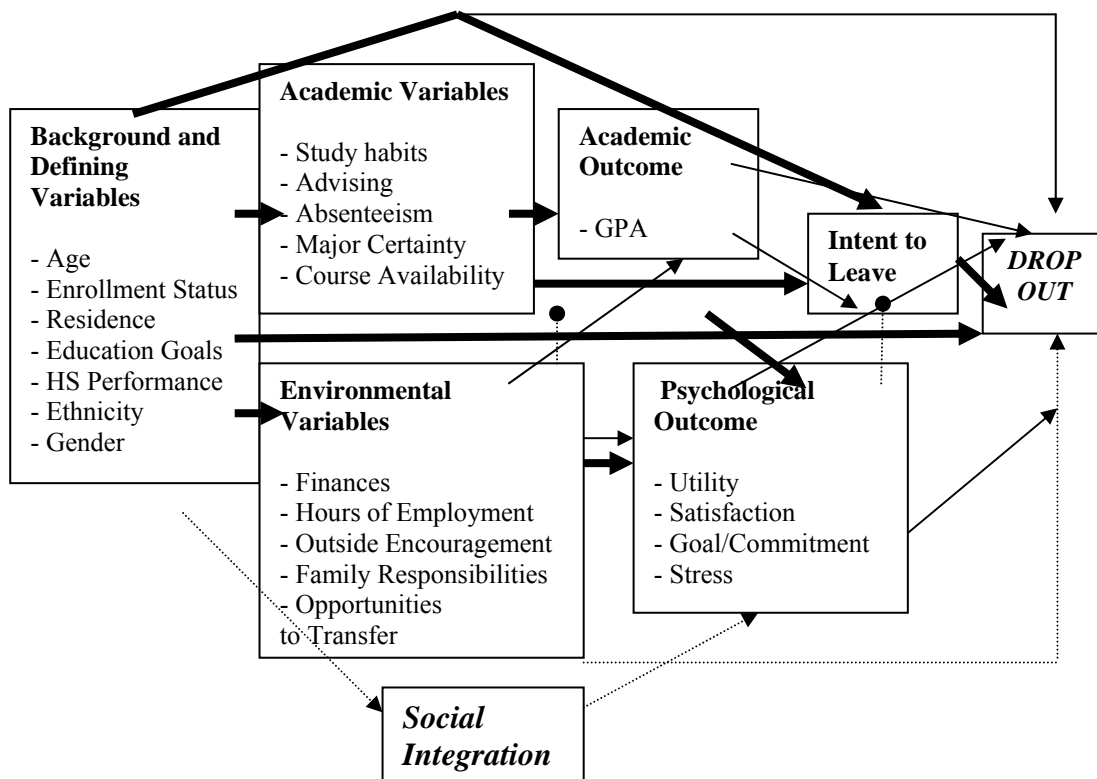
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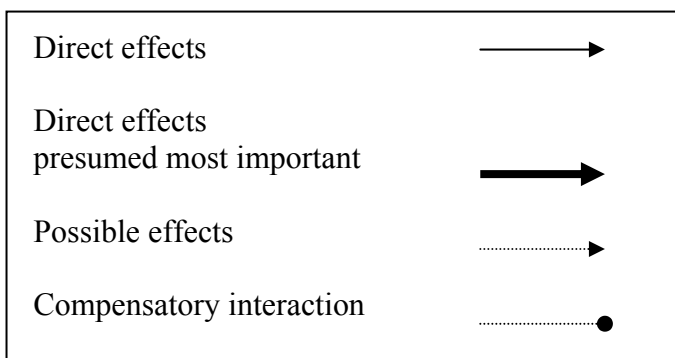
APPENDICES

Appendix A: Conceptual Model of Non-traditional Student Attrition

Bean & Metzner (1985) Model



**KEY**



Source: Bean & Metzner, 1985, p. 491

## Appendix B: Pre-College Courses in Writing

Note: If a course title has two or more corresponding course identification codes it is because different colleges use the same course title but have assigned their own course identification code.

| Course Title                         | Course Identification      |
|--------------------------------------|----------------------------|
| Applied Communications               | SC 16                      |
| Applied Spelling                     | SK 45                      |
| Basic Grammar                        | WR 93                      |
| Basic Writing                        | DWR 045<br>WR 10<br>WR 049 |
| Basic Writing I                      | WR 020                     |
| Basic Writing II                     | WR 040                     |
| Basic Writing III                    | WR 095                     |
| Basic Writing Skills                 | WR 90<br>WR 080            |
| College Writing Fundamentals         | WR 095                     |
| Elements of the Essay                | WR 060                     |
| English Grammar Review: Business     | WR 085B                    |
| English Composition                  | WR 095                     |
| English Grammar and Sentence Writing | WR 080                     |
| Fundamentals of Composition I        | WR 090<br>WR 20            |
| Fundamentals of Composition II       | WR 30                      |
| Fundamentals of English              | WR 090                     |
| Fundamentals of Writing              | WR 090                     |
| Introduction to Expository Writing   | WR 095                     |
| Introduction to Technical Writing    | WR 065                     |
| Paragraph Fundamentals               | WR 090                     |
| Paragraph Writing                    | WR 090<br>DWR 31           |
| Phonics for Spelling                 | SSP 013                    |
| Rhetoric and Critical Thinking I     | WR 060                     |
| Rhetoric and Critical Thinking II    | WR 065                     |
| Sentence Fundamentals                | WR 0525                    |
| Spelling                             | WR 075                     |
| Spelling Basics                      | SSP 013                    |
| Spelling II                          | WR 65                      |
| Spelling Improvement                 | SPL 025                    |
| Spelling Rules                       | SSP 014                    |

## Appendix B continued

|                          |                            |
|--------------------------|----------------------------|
| The Write Course         | WR 090                     |
| Using Computers to Write | SKD 030                    |
| Writing 50               | WR 050                     |
| Writing 80               | WR 80                      |
| Writing 90               | WR 90                      |
| Writing Center           | WR 0593                    |
| Writing Essentials       | WR 091                     |
| Writing Express          | DWR 047                    |
| Writing Improvement      | WR 035<br>WR 025<br>WR 015 |
| Writing Lab              | WR 0593                    |
| Writing Skills           | WR 040                     |
| Writing Skills Bridge    | DWR 040                    |

## Appendix C: Pre-College Courses in Reading

Note: If a course title has two or more corresponding course identification codes it is because different colleges use the same course title but have assigned their own individual course identification code.

| Course Title                    | Course Identification |
|---------------------------------|-----------------------|
| Basic Reading Bridge            | DRD 045               |
| Basic Reading Skills            | RD 080                |
| Building College Reading        | RD 080                |
| College Reading I               | RD 20                 |
| College Reading II              | RD 30                 |
| College Reading Skills          | RD 090                |
| College Textbook Reading        | RD 090                |
| Critical Thinking               | SK 41                 |
| Developing Reading Skills       | RD 080                |
| Developmental Reading           | READ 012              |
| Effective Reading               | RD 080, RD 035        |
| Effective Reading and Learning  | RD 90                 |
| Foundation Reading Skills       | RD 070                |
| Intermediate Reading Skills     | RD 090                |
| Introduction to College Reading | RD 90                 |
| Preparation/College Reading I   | RD 080                |
| Preparation/College Reading II  | RD 090                |
| Preparatory College Reading     | RD 080                |
| Preparatory Vocabulary          | SKD 085               |
| Print Reading                   | MFG 0104              |
| Reading                         | 0.793.011             |
| Reading 80                      | RD 80, RD 80A         |
| Reading 90                      | RD 90                 |
| Reading Improvement             | READ 011              |
| Reading Lab                     | RD 0593               |
| Reading Skills                  | RD 0751 / 0752 / 0753 |
| Reading                         | ABE                   |
| Rhetoric / Critical Thinking I  | RD 099                |
| Rhetoric / Critical Thinking II | RD 099                |
| Speed Reading                   | RD 40                 |
| Strategies: Effective Reading   | RD 090                |
| Study Skills Horticulture       | HOR 001               |
| Study Skills Music              | MUS 001               |
| Vocabulary Building             | DE 50<br>SSP 015 A/B  |

## Appendix D: Pre-College Courses in Mathematics

Note: If a course title has two or more corresponding course identification codes it is because different colleges use the same course title but have assigned their own individual course identification code.

| Course Title                       | Course Identification                   |
|------------------------------------|---|
| Algebra I                          | MTH 060                                 |
| Algebra II                         | MTH 065                                 |
| Algebra III                        | MTH 095                                 |
| Algebra Review                     | MTH 095                                 |
| Applied Arithmetic and Pre-Algebra | MTH 20                                  |
| Applied Geometry for Technicians   | MTH 076                                 |
| Applied Math                       | SC 11                                   |
| Basic Math                         | MTH 20<br>MTH 020<br>MTH 10<br>MTH 010  |
| Basic Math – Arithmetic            | MTH 20<br>MTH 020                       |
| Basic Math I                       | Math 010                                |
| Basic Math II                      | MATH 020                                |
| Basic Math Lab                     | ALC 62 / 63                             |
| Basic Math R & C                   | MTH 20                                  |
| Basic Math Review                  | MTH 020                                 |
| Basic Math Self-Directed           | MTH 020                                 |
| Basic Mathematics                  | MTH 020                                 |
| Basic Mathematics Applications     | MTH 025                                 |
| Beginning Algebra                  | MTH 060                                 |
| Beginning Algebra I                | MTH 60<br>MATH 060                      |
| Beginning Algebra II               | MTH 65<br>MATH 065                      |
| Business Math                      | MTH 30                                  |
| Calculator Workshop                | SS1.127                                 |
| Conceptual Arithmetic              | MTH 10                                  |
| Conquering Math Anxiety            | MTH 15                                  |
| Developmental Math                 | MTH 010                                 |
| Elementary Algebra                 | MTH 060<br>MTH 065<br>MTH 70<br>MTH 070 |

## Appendix D continued

|  |                                |
|--|--------------------------------|
| Fundamentals of Algebra I              | MTH 60                         |
| Fundamentals of Algebra II             | MTH 65                         |
| Fundamentals of Arithmetic I           | MTH 10 / 10B / 10C             |
| Fundamentals of Arithmetic II          | MTH 020<br>MTH 11B             |
| Graphing on TI-82                      | SS1.127                        |
| Intermediate Algebra I                 | MTH 94                         |
| Intermediate Algebra II                | MTH 95                         |
| Intensive Elementary Algebra           | MTH 070 A/ B                   |
| Intermediate Algebra                   | MTH 095, MTH 95                |
| Introduction to Technical Math         | MTH 55                         |
| Introduction to Algebra and Geometry   | MTH 052                        |
| Introduction to Intermediate Algebra   | MTH 70                         |
| Introduction to Algebra                | MTH 060                        |
| Introduction to Math                   | SK8                            |
| Introductory Algebra                   | MTH 070                        |
| Introductory Algebra – First Term      | MTH 60                         |
| Introductory Algebra – Second Term     | MTH 65                         |
| Introductory Algebra – Part III        | MTH 63                         |
| Learning Skills Lab: Math              | DLL 006                        |
| Math                                   | 0.793.011                      |
| Math for Introductory Physical Science | MTH 052                        |
| Math Lab                               | MTH 0760                       |
| Math Renewal                           | MTH 020                        |
| Math Skills                            | DMTH 040                       |
| Math WCJC                              | 0.793.011                      |
| Math/Algebra I                         | 0.793.011                      |
| Mathematics Improvement                | MTH 015                        |
| Mathematics Improvement/Pre-Algebra    | MTH 025                        |
| MTH 010A / Women in Transition         | MTH 010A                       |
| Number Reasoning                       | MTH 022                        |
| Practical Geometry                     | MATH 025<br>MTH 20<br>DMTH 045 |
| Professional / Technical Applied Math  | MTH 45                         |
| Professional Technical                 | MTH 33                         |
| Study Skills Math                      | SS1.127<br>MTH 001             |
| Technical Math I                       | MTH 081<br>MATH 063            |
| Survey of Math Fundamentals            | MTH 061                        |
| Technical Mathematics I                | MTH 050                        |
| Whole Numbers, Fractions, Decimals     | MTH 010A                       |

## Appendix E: Pre-College Courses in Tutoring

Note: If a course title has two or more corresponding course identification codes it is because different colleges use the same course title but have assigned their own individual course identification code.

| Course Title                       | Course Identification |
|------------------------------------|-----------------------|
| Basic English Language Skills Lab  | ALC 52                |
| College Writing Center             |                       |
| Disability Services Tutoring       | SS1.165               |
| English Tutoring Session           | ENG 050               |
| LC Tut Level 1                     |                       |
| LC Tut Level 2                     |                       |
| Math Tutoring Session              | MATH 020H             |
| Study Skills: Tutorial             | SS1.134               |
| TC Tutorial RVC                    |                       |
| TRIO Peer Tutoring                 |                       |
| Tutoring Lab                       | ED 0593               |
| Tutoring Practices                 | DEV 078               |
| Tutoring / Communication Skills    |                       |
| Tutoring / Developmental Education |                       |
| Tutoring / Math                    |                       |
| Tutoring / Professional Technical  |                       |
| Tutoring / Science                 |                       |
| Tutoring AAB 1                     |                       |
| Tutorial Lab                       |                       |
| Tutoring GED                       |                       |



## Appendix F: Pre-College Courses in English as a Second Language (ESL)

Note: If a course title has two or more corresponding course identification codes it is because different colleges use the same course title but have assigned their own individual course identification code.

| Course Title                          | Course Identification     |
|---------------------------------------|---------------------------|
| Academic Listening / Speaking         | ESL 0793R                 |
| Advanced Communication Skills         | ESL 035                   |
| Advanced ESL                          | ESL 0793K                 |
| Advanced Grammar A                    | ESL 045                   |
| Beginning Reading and Writing         | ESL 050                   |
| Beginning Listening A2 / B1 / B2      | ELL 0712L / 0721L / 0722L |
| Beginning Reading A2 / B1 / B2        | ELL 0712R / 0721R / 0722R |
| Beginning Speaking A2 / B1 / B2       | ELL 0712S / 0721S / 0722S |
| Beginning Writing A2 / B1 / B2        | ELL 0712W / 0721W / 0722W |
| English as a Second Language          | ESL 0749, ESL 020         |
| English for Foreign Born              | 0.792                     |
| English for Immigrant Nurses          | ESL 017                   |
| ESL in the Workplace                  | ESL 0150                  |
| English Second Language               | KALC 020                  |
| ESL A – Integrated Skills             | ESL 0721                  |
| ESL B – Integrated Skills             | ESL 0722                  |
| ESL C – Integrated Skills             | ESL 0723                  |
| ESL D – Integrated Skills             | ESL 0724                  |
| ESL Computer Lab                      | ESL 070                   |
| ESL Conversation                      | XESL 0792                 |
| ESL Integrated Skill 1 / 2 / 3 / 4    | XESL 0794                 |
| ESL Language Lab                      | XESL 0794                 |
| ESL Level 5 Read/Write                | ESL 2041                  |
| ESL Multi-Skill 1                     | XESL 0792                 |
| ESL Read/Write 3                      | XESL 0792                 |
| ESL Tutoring                          | ESL 010                   |
| ESL V                                 | XESL 0793                 |
| ESL/Volunteer                         | XVLP0761                  |
| ESL High-Beginning / Low Intermediate | ESL 88A                   |
| ESL Integrated High Beginning         | ESL 85C                   |
| ESL Integrated Low Intermediate       | ESL 85D                   |
| Introduction to Academic Listening    |                           |
| Introduction to College Reading       |                           |
| Introduction to College Writing       |                           |

## Appendix G: Pre-College Courses in Reading / Writing

Note: If a course title has two or more corresponding course identification codes it is because different colleges use the same course title but have assigned their own individual course identification code.

| Course Title                                   | Course Identification             |
|--|-----------------------------------|
| ABE Pre-Beginning                              | DEV 077                           |
| ABE / GED Basic Skills                         |                                   |
| ABE: Intermediate II                           | ABE 0744                          |
| ABSE III                                       | SKD 0500                          |
| Adult Basic Ed / GED                           | ABE 0745<br>DE6 GED               |
| Adult Basic Education                          | 000.7901                          |
| Adult Basic Skills Multilevel                  | DEV 095                           |
| Basic Skills / GED Preparation                 | 0.790 B                           |
| Basic Skills / GED Preparation:<br>Corrections | .7905                             |
| Life Skills                                    | .7906                             |
| LC ABE Level 1                                 | LC 7450 TH                        |
| Lrng Skills Lab (ABE)                          | ABE 0593                          |
| Learning Skills Lab                            |                                   |
| Special Projects / Directed Study              | 000.902                           |
| STS: Pre-Employment Training                   | STS 5PT                           |
| Study Skills                                   | SS1.125 / SS 090                  |
| ABE Secondary                                  | ABE 0744                          |
| ABE / GED Level 1                              | KALC 050                          |
| GED  | 0.793.0.12<br>GED 50<br>XSKD 3012 |
| GED Facilitated Study                          | XGED 0794K                        |
| (GED) High School Equivalency Prep             | 000.793                           |
| GED Preparation                                | GED 015 / GED 011                 |
| Health   | 0.793.0.11                        |
| Cultural Awareness                             | 0.793.0.11                        |
| Workforce Preparation                          | WKFC 0773                         |
| Workforce Workshop                             | SC 25                             |
| Basic Skills Study Lab                         | ALC 55                            |
| DWP Learning Skills                            | DEV 030                           |
| Learning Skills I                              | DE 31                             |
| Language Skills I and II                       | LGS 075, LGS 090                  |

## Appendix H: State of Oregon Letter of Support



Public Service Building  
255 Capitol Street NE  
Salem, Oregon 97310  
Phone (503) 378-8648  
Fax (503) 378-3365  
www.odccwd.state.or.us

February 1, 2007

Karen Sanders  
17574 Schalit Way  
Lake Oswego, OR 97035

Dear Karen:

It is with pleasure that I write on behalf of the Oregon Community Colleges and Workforce Development agency in support of your research project, *Academic factors related to the persistence of GED recipients in community college*. DCCWD agrees to provide the following:

A data match between the OCCURS and State GED databases. There will be two samples:

- 1) Sample 1 will include any student who passed the GED between July 1, 2003 and June 30, 2004 and then enrolled in an Oregon community college in any of the four full terms following GED completion.
- 2) Sample 2 will include any student who passed the GED between July 1, 2004 and June 30, 2005 and then enrolled in an Oregon community college in any of the four full terms following GED completion.

The following raw data will be extracted from OCCURS and the GED database in the form of three files: student records, enroll file records, and course file records:

- student ethnicity, age, and gender
- course name and course number for EACH course the student enrolled in during their first term following receipt of the GED credential - and identification of which term that was (i.e. Writing 121 - fall term 2005)
- for each course - the final grade received
- for each student - total first term GPA
- for each student - the individual scores on each of the five GED subtests AND the composite GED score - and the date the GED was passed
- number and name of courses enrolled in the term immediately following the first term - this could be fall 04, winter 05, spring 05, summer 05, fall 05, winter 06, or spring 06.

Upon completion of the data match CCWD staff will remove all identifying information and assign each record a unique number. The extracted data will be given to Karen in an Access database format. If possible, given staff workloads, the data will be available for analysis by March.

Sincerely,  
Cam Preus-Braly  
Commissioner

