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SUPPORT SERVICES AND PROGRAMMATIC INTERVENTIONS FOUR-YEAR
INSTITUTIONS HAVE IN PLACE TO ASSIST AND GRADUATE STUDENTS
WITH LOW ACADEMIC CREDENTIALS: A MIXED METHODS STUDY

DISSERTATION

A dissertation submitted in partial fulfillment of the
requirements for the degree of Doctor of Philosophy in the
College of Education
at the University of Kentucky

By

Nada El Majzoub

Lexington, Kentucky

Director: Dr. Rous, Professor of Educational Leadership

Lexington, Kentucky

2013

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SUPPORT SERVICES AND PROGRAMMATIC INTERVENTIONS FOUR-YEAR
INSTITUTIONS HAVE IN PLACE TO ASSIST AND GRADUATE STUDENTS
WITH LOW ACADEMIC CREDENTIALS

This mixed methods study investigates the influence of student characteristics and institutional support services and interventions on graduation rates. Regression analysis was conducted using a dataset constructed from multiple publically available resources to estimate graduation rates. Regression results showed High School Grade Point Average to be the highest estimator of graduation rates, among other student and institutional characteristics. The results confirmed existing findings on the influence of student pre-college and demographic characteristics on graduation rates for students with academic needs. Content analysis of survey data from office of support service personnel at public four-year institutions shows institutions implement a wide array of support services, with a focus on Summer Bridge Programs to support college readiness in underprepared students. Content analysis of interviews with Academic Support Staff indicates institutions focus attention on students with low academic credentials through support services and interventions practiced in unique ways at the institutional level. Findings from the study were used to construct a model for use by institutions to improve support services and programs provided to students with low academic credentials regardless of their pre-existing characteristics.

KEY WORDS: Support Services, Programmatic Interventions, Graduation, Low Academic Credentials, Student Success.

Nada El Majzoub

Student's Signature

August 23, 2013

Date

SUPPORT SERVICES AND PROGRAMMATIC INTERVENTIONS FOUR-YEAR
INSTITUTIONS HAVE IN PLACE TO ASSIST AND GRADUATE STUDENTS
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August 23, 2013

Date

For my Parents

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The day I decided to come to the United States and study at the University of Kentucky is sparks remarkable memory so dear to my heart. I packed my stuff and came to a country I had never seen outside the television machine. After more than 17 hours of flying, I found myself walking on the University of Kentucky campus exploring with a sense of estrangement and puzzlement.

My father did not have a college degree and my mother barely knows how read. I grew up in an environment where college education was a remote pursuit, but I had a father who thought outside the box and aspired to pursue his lost dream of going to college in his six children, and I am one of them. Without my father's support, I was not going to be here today writing this acknowledgement. Without him, I was not going to have the stamina and the motivation to obtain a PhD. Thank you, my father, for being the person to motivate, support and supplicate. Thank you, my mother, for the love and pride you took in your youngest daughter who had to live 6 years of her life away from you. Thank you my siblings who now look at their baby sisters and wonder where those years have flown by and how she became a Doctor all of a sudden. Thank you, my friends and study buddies for sharing the emotional burden of writing a dissertation with me. A big thank you to my committee members, Dr. Brea Perry, Dr. Wayne Lewis, Dr. Jeffery Bieber and Dr. John Harris for all the guidance and support you gave to me throughout the process of writing this dissertation.

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CHAPTER 1

INTRODUCTION

Statement of the Problem

In 2007, 57% of college students in 5,773 institutions around the United States graduated within 6 years of enrollment, while the other 43% either dropped out or took longer than 6 years to graduate (Knapp, Kelly-Reid, & Ginder, 2009). According to the National Center for Educational Statistics (NCES), 40% of admitted college students are not academically ready and need to enroll in compensatory programs, also known as remedial or developmental programs, before they start college level course work (Knapp et al., 2009). High attrition rates are witnessed among students who start their education after completing college compensatory programs, more so among students who take compensatory classes at a junior college and transfer to a degree granting institution (Grubb, 1991, 2001).

Attrition rates among students who initially start underprepared, either at a community college or four-year institution, is a critical issue and requires institutional attention. Academically underprepared students have access to higher education, but access should be supplemented with academic and nonacademic support. For underprepared students who aspire to obtain a college degree, lack of academic preparation is a barrier and can delay their graduation.

The interest in this study comes from the belief that policymakers and educational leaders should commit to research related to student educational attainment. In addition, retention and degree completion are among the most significant indicators of institutional

effectiveness for legislators, taxpayers and the community at large (Alexander Astin & Oseguera, 2005). Since institutions of higher learning have the capacity to enhance students' chances for degree completion, research and collection of data to track students' progress should be an integral part of the institutional mission (Alexander Astin & Oseguera, 2005).

What is important for student persistence in college is experiencing success in and outside the classroom (DesJardins, Ahlburg, & McCall, 2002). Students who are engaged academically and socially, and experience a smooth transition from high school to college and one semester to another are more likely to persist and graduate with a degree (Tinto, 1975, 2005). However, it takes tremendous effort to keep students in higher education institutions, and it is not the solely the student's responsibility to work toward completing a degree. Persistence in college is a complex personal, social and academic enterprise that requires institutional-community-personal partnership (Moxley, Najor-Durack, & Dumbrigue, 2001). This partnership assesses student needs and customizes a support system that supports students until graduation (Moxley et al., 2001).

Purpose of the Study

The study examines support services and programmatic interventions to facilitate graduation for students with academic needs or students who start college with low academic credentials. In the first stage of the research, first-time, full-time students with low academic credentials (FFSLAC) are defined in order to investigate the support services and interventions that target this population of students. In the second stage of the study, institutional conditions are examined to determine how institutional characteristics interact with student characteristics and how this interaction influences degree attainment.

Finally, in the last two stages of the research, surveys and in-depth interviews are conducted in order to fully understand how support services and programs can be effectively used to the benefit of FFSLAC.

Degree attainment and graduation rates could be influenced by a host of institutional factors that range from institutional mission, to instruction, to strategic planning, to state and federal funding, among others. These factors influence educational attainment of students without distinguishing between those who are academically prepared and those who are not.

Support services and programmatic interventions, however, specifically target the academically underprepared, while they are made available for those who are academically prepared. The study builds on the assumption that support services and programmatic interventions increase retention and improve graduation rates among students who need academic support. Also, it is assumed that public four-year institutions are obligated to provide open access to students regardless of their social merits – or academic merits at some institutions. Nevertheless, students who are socially disadvantaged are not always academically ready because of the quality of education they receive prior to enrolling in post-secondary institutions. In consequence, once the academically underprepared make a transition to higher education, institutions of higher education are responsible for retaining them given the many factors that can play against their persistence. Support services and programs are examples of manifestations of institutional responsibility toward students who are at-risk of failing academically.

Research Questions

The following research questions guide this study:

1. How do colleges and universities in the United States define “students with low academic credentials”?
2. What are institutional and students characteristics that best estimate graduation rates?
3. How do institution-specific support services and programmatic interventions influence academic performance and graduation of students with low academic credentials?

Definition of Terms

Several terms used throughout the study that have specific meaning in the literature related to academic preparedness and developmental or remedial education. The following terms will be used in this study.

Academic preparation or college readiness. Based on Knowledge and Skills for University Success (KSUS) (Conley, 2003, 2005, 2007a, 2007b), college ready students or students who are academically prepared to succeed in entry level college course work possess: (1) habits of mind: critical thinkers, problem solvers, curious about learning, willing to accept critical feedback and are able to make adjustments based on such feedback, open to failure when it occurs and able to overcome it, and are able to handle ambiguous learning tasks; (2) basic skills such as the ability to express themselves in writing and speaking, have a good command of technology, and can make use of resources in an appropriate manners.

American College Testing (ACT) defines college readiness as the ability “to enroll and succeed—without remediation—in a credit-bearing course at a two-year or four-year institution, trade school, or technical school” (p.5). College success means competency in credit-bearing first-year college courses as English composition, algebra, introductory social science, and Biology (ACT, 2007).

Developmental or remedial students. Remedial or developmental students are those who start college with a lack in academic skills and abilities and are in need of rapid intervention to get ready for college level course work (Moss & Yeaton, 2006; Weissman, Silk, & Bulakowski, 1997). Students need remediation for academic, social, psychological or socioeconomic reasons (Spann, 2000). Some scholars use the terms remedial and developmental interchangeably (Merisotis & Phipps, 2000). Others researchers (Casazza, 1999; Moss & Yeaton, 2006) contend that remediation refers to fixing or correcting a deficit or compensating a basic skill, while developmental education focuses on the intellectual, social and emotional growth of the learner over time.

Regardless of the terminology, remedial or developmental programs are designed to help students gain skills needed for college-level course work. These programs offer courses in reading, writing and mathematics that are below college-level course work (Merisotis & Phipps, 2000). These programs can include “identification of skill deficit students, advisement, placement, courses, and academic support for the remediation and retention of skill-deficit students” (Weissman., Bulakowski, & Jumisko, 1997, p. 187).

Transfer students. Alexander Astin (1993) identifies different types of transfer students: (1) students who transfer from two-year college to four-year or degree granting college or university; (2) students who transfer from four-year degree granting college or

university to another four-year or degree granting college or university. Alexander Astin (1993) also identifies a reverse transfer from four-year degree granting college or university to a two-year college, and two-year to two-year institution transfer.

Degree completion or degree attainment. Degree attainment is defined as the number of years of schooling completed or degree earned (E.T. Pascarella, 2006). The process of degree attainment cannot be separated from student persistence or retention in college (Ernest T. Pascarella & Terenzini, 1991). “Individual persistence can legitimately be considered a necessary, if not sufficient, condition for degree attainment” (Ernest T. Pascarella & Terenzini, 1991, p. 173). Alexander Astin (1993) uses the term “retention” to refer to degree attainment. Retention is student persistence at an institution regardless of whether or not this student completes a degree. Alexander Astin (1993) measures retention by counting the years that degree completers take to graduate with a degree or the number of years students spend in college without obtaining a degree. However, those who stay in college more than four years and do not complete a degree are more likely to be considered “not retained” than retained. Alexander Astin (1993) argues there is no perfect measure for retention since any college drop-out can return to college.

Degree attainment is ultimately influenced by where students start their college education (Ernest T. Pascarella & Terenzini, 1991). The type of institution, quality, control, size, and racial and gender composition have influence on degree attainment (E.T. Pascarella, 2006; Ernest T. Pascarella & Terenzini, 1991). Other conditions related to students within a certain institution, such as demographic characteristics, parent’s education, financial aid, advising, relationship with faculty, major of study, achievement, and residence can influence degree attainment (E.T. Pascarella, 2006; Ernest T. Pascarella

& Terenzini, 1991). Tinto (1987) also emphasizes the influence of academic and social integration of college students on degree attainment.

Attrition. Attrition or student departure is defined as leaving the college or university before completing a degree at the university where initial enrollment takes place (Tinto, 1987). Tinto (1987) developed a comprehensive model that contains different patterns of student departure from four-year and two-year institutions. Four- or two-year entrants who do not complete their degrees within four to six years of enrollment depart in multiple directions. Some might just “stop out” for a while and then come back to the initial institution to obtain a degree. However, those who come back after a “stop-out” might drop out again and depart from the entire system of higher education. Another direction or pattern of departure Tinto (1987) describes is transfer. Students who transfer to another institution exhibit a pattern of departure regardless of whether they obtain a degree, “stop-out” then resume or depart from the entire system of higher education.

Context of the study

Carnegie’s Undergraduate Profile Classification guided the institution selection for participation in this study. Institutions were filtered by “level” (4-year-institution or above) and “control” (Public institution). This category of institutions includes 691 colleges and universities. One third of these institutions were randomly selected using statistical software STATA. The sample includes 230 institutions with various enrollment profiles, such as exclusively undergraduate four-year institutions, very high undergraduate enrollment, high undergraduate enrollment, majority undergraduate, and majority graduate/professional.,

Theoretical Framework

Astin's Input-Environment-Output model serves as a theoretical framework for the proposed study. Astin identifies *Input* as the characteristics of students upon enrollment in higher education. *Environment* can be institutional programs, policies, faculty, peer, academic and nonacademic experiences students are exposed to within the institution of higher learning. *Output* is the characteristics with which students graduate (Alexander Astin, 1993). Astin used Input-Environment-Output to guide his research on the influence of academic institutions as well as students' pre-college traits on cognitive and non-cognitive development in college (Alexander Astin, 1993). This framework will guide this study to determine how student pre-college characteristics as well as institutional support services, programmatic interventions and practices help students with initial academic needs persist and graduate with a degree.

Students enter an institution with a variety of attributes (e.g., gender, social class, race, ethnicity), abilities, skills, and levels of prior academic preparation (e.g., academic and social skills), and attitudes, values, and knowledge about higher education (e.g., goals, commitments, motivations and expectations) [...] they enter an institution with specific attributes (e.g., level, mode of control, size, location and resources). (Tinto, 2005, p. 326)

This theoretical framework suggests once students find themselves in an institution committed to their success, they are more likely to persist regardless of their backgrounds and prior knowledge and skills (Tinto, 2002, 2005, 2006).

Significance of the Study

First, the study examines the influence of support services and programmatic interventions on degree attainment of students who start with low academic credentials. The vast majority of the U.S. colleges and universities implement support services and programs to retain students and ease their transition from high school to college, and from one semester to another (Bruffee, 1993; Seidman, 2005). However, outcomes vary from one institution to another, and retention rates are lower than twenty years ago, particularly among academically underprepared students (Seidman, 2005). Such findings suggest there is a combination of factors that interact with support services and make them successful at some institutions and ineffective at others.

Second, this study is timely given the pressing needs to increase degree attainments in higher education and give students who come from disadvantaged backgrounds the opportunity to obtain a degree. According to Lehmann (1963) significant changes in attitudes and values between freshman and senior students take place at the end of senior year. In his study of 1052 students at the University of Michigan, he found after four years of college education, students demonstrated changes in intellectual skills, knowledge, value orientation, religious beliefs and social and political views (Lehmann, 1963). Despite the fact this study did not examine non-college groups, it can provide some evidence on the change students undergo as a result of college attendance. Tinto (1987) argues, “college education may lead individuals to discover their likes and dislikes and uncover the occupations that are compatible with their interests and abilities” .

Limitations of the Study

One major limitation of the study is the inability to generalizability of findings given since conclusions are based on the graduation rates of one year. The study is cross-sectional and examines one graduating class, thus impacting generalizability. Studies may yield more valid results using longitudinal data. In addition, the qualitative stages of this study, inherently affect the ability to generalize findings beyond the sample participating in the surveys and interviews. As with all qualitative methods, the measures used provide indirect information filtered through the participants' viewpoints. Researcher's bias in interpretation of the data must be considered.

Additionally, the exploratory nature of this study presents a big limitation. The quantitative data showed relationship between variables and graduation rates, and the qualitative data deeply explored institutional practices that might have influenced these graduation rates. However, the interview sample was very small and no student-level data was used to empirically show how much influence the use of services and programs has on graduation rates. The major assumption that institutions with higher graduations rates are doing something different from the institutions with lower graduation rates was not validated. There are many factors that interact within the institutional setting and influence graduation rates and that could be examined, but the study studied support services and programs only.

A related limitation is the use of aggregate level data. The study was built on graduation rates reported in a Common Data Sets, and these data sets do not dichotomize graduation rates by academic characteristics. Aggregate level data was used because the

scope of this dissertation study was limited and obtaining student-level data from a large number of institutions was beyond the limit of this dissertation.

Another limitation in this study is the small number of Academic Affairs Staff who agreed to participate in the study. One of the reasons could be the timing of the interviews. The request for the interviews was sent at the end of the fall semester while universities were getting ready for Christmas break. Reminders were sent at the beginning of the spring semester but the timing was also difficult for the academic support staff. Better timing to send request for interviews might result in more participation.

Chapter 2

REVIEW OF LITERATURE

Institutions of higher education are not static; nor are the societies they serve. In the 17th century, in order to be admitted to college, students needed to know Latin, Greek and arithmetic (Altbach, Gumport, & Berdahl, 2011). At that time, Harvard College granted degrees to students who developed the ability to read the Latin version of the Old and New Testament, think logically and lead an honest life and conversation (Brubacher & Rudy, 1997; Cohen & Kisker, 2009; Lucas & Tucker, 1996). Sweeping changes took place over the past centuries in the world of higher education. Today, skills and knowledge required and learned in college are as complex as the world in which we live.

In this chapter, a review of the literature will be presented. The review will begin with a history of higher education followed by a brief description of the higher education landscape today. The review also presents literature that looked at how open access to higher education started and the major ramification and influence of open access on quality of education. The chapter continues to review major studies that looked at academic skills and preparedness for college-level course work, and how high school prepares students for college today. Subsequently, literature on developmental education and how institutions remedy lack of academic preparedness is reviewed. Finally, literature that offers definitions of students with low academic credentials since 1950's is reviewed followed by a review of how a select of higher education institutions define this population of students.

Transformation of Higher Education between the 17th and the 20th Century

The first model of higher education was adopted in the 17th century from the English colonial higher education model (Goodchild & Wechsler, 1997; Lucas & Tucker, 1996). Harvard College was the first successful institution that followed the English heritage and implemented an instructional curriculum of classical languages, rhetoric, mathematics, grammar, and some science (Cole, 2009; Finkelstein, 1997; Lucas & Tucker, 1996). The idea of university did not exist at that time; rather there were denominational or sectarian colleges founded to train ministers (Cole, 2009; Livingston, 2010; Lucas & Tucker, 1996). College of the 18th century served the elites and reinforced their social connections to distinguish them from the rest of the society. The college mission was to endow students with reason, to be able to solve problems and fulfill their duties toward God (Brubacher & Rudy, 1997). During the second half of the century, sectarian control started to loosen as secular authorities emerged and were represented in higher education (Lucas & Tucker, 1996). Secular learning began to emerge with the introduction of new subjects such as mathematics and natural sciences (Herbst, 1976; Lucas & Tucker, 1996).

At the beginning of the 19th century, going to college was accessible for a limited number of students from outside the circle of power, prestige and class (Potts, 1977). The 1820's and 1830's were the most expansive decades in the history of higher education with the proliferation and expansion of denominational colleges (Church & Sedlak, 1997; Geiger, 2005; Lucas & Tucker, 1996). College started to become "locally prominent, economically accessible, academically attractive, and generally popular in the eyes of the significant and increasing portion of the American public" (Potts, 1977, p. 125). The

number of institutions of higher education increased, as did enrollment by 80 percent (Geiger, 2005; Goldin, 2001).

After the civil war (1861-1865), the industrial and technological revolution changed the landscape of higher education (Lucas & Tucker, 1996). “The business” of higher education contributed to the production and dissemination of new kinds of knowledge (Goldin, 2001; Goldin & Katz, 1998). The new knowledge and application of science to technology expanded public institutions. Interest in chemistry and physics grew as the advancement of manufacture of materials like steel, petroleum and drugs flourished (Kevles, 1860). Firms sought skillful and well-trained physicists, chemists, engineers, and social scientists and turned to higher education for the workforce needed. Consequently, colleges developed and offered greater specializations within scientific fields, such as biology, agriculture, social sciences and others (Goldin & Katz, 1998).

In the 19th century the concept of university was adopted from the German model that introduced research and residential campuses (Cohen & Kisker, 2009; Livingston, 2010; Lucas & Tucker, 1996). A great number of professors migrated to Germany to gain research experience and bring new knowledge back to the U.S. (Cole, 2009). Later, the British model of undergraduate education, i.e., college units within a larger university system was adopted (Cole, 2009). Research activity, less religious affiliations, community services, disciplines that elevated farming, industry and mechanics were among the constituents that distinguished the university from college and Cornell was the first university with these constituents (Cohen & Kisker, 2009).

The 19th century university model combined research and teaching, which started with John Hopkins University (Cole, 2009; Geiger, 2005). The major premise was that a

university “had an ‘obligation’ to teach the idea of the ‘freedom’ to conduct research, but it had an ‘obligation’ to teach” (Cole, 2009, p. 20). Subsequently, other colleges, such as Harvard, converted to an undergraduate model and adopted both teaching and research as primary goals of the institution (Cole, 2009).

With passage of the Morrill Act of 1862-1890, the second half of the 19th century witnessed a significant increase in public land grant institutions (Brubacher & Rudy, 1997; Cole, 2009; Nevins, 1962). The College Land Grant Morrill Act granted funds and financial incentives to institutions to grow the scientific fields and research, and gave opportunities to women and students from various ethnic backgrounds to access higher education (Cole, 2009; Geiger, 2005). Higher education began to shift to teaching what was needed and wanted by society (Lucas & Tucker, 1996).

The 20th century was the era of mass higher education in the U.S. (Cohen & Kisker, 2009). The century has been identified as a golden age for higher education as college degrees were no longer reserved for the elite (Cohen & Kisker, 2009; Geiger, 2005; Thelin, 2004). In the previous century, increase in enrollment was primarily contributed to increase in institutions, but toward the end of the century the number of institutions remained steady while enrollment increased (Geiger, 2005). The 20th century brought a

growing sense of mutual dependence between academia and the larger society. The terms for a compact between these two forces slowly emerged, coming in the form of an exchange. The university would produce the highly trained workforce that the increasingly technological and specialized

society needed, as well as discoveries about nature and man that could yield a practical benefits for American citizens (Cole, 2009, p. 53).

Of significance to higher education, the Servicemen's Readjustment Act, also known as the GI Bill, was also passed in this century (Linder & Wainger, 1945). The GI Bill allowed millions of veterans to pursue tuition free college education. Three years later, the Report of the President's Commission on Higher Education for Democracy was released to redefine the social role higher education played after years of inadequacy following the World War II (Education & Zook, 1947).

After World War II, the Great Depression and the beginning of the Cold War between Soviet Union and the United States, higher education assumed a societal function. The United States came out of WWII as the most powerful nation in the world (Cohen & Kisker, 2009). The U.S. announced war on Communism and wanted to maintain the industrial eminence, and higher education was the right route, particularly because universities had been engaged in research on war-related issues since WWI (Cohen & Kisker, 2009).

Federal support of higher education increased, particularly for research in physical sciences (Geiger, 2005). Equal educational and employment opportunities were granted to African Americans with the President Truman initiatives to end racial inequality in 1948 (Cohen & Kisker, 2009). Brown vs. Board of Education further reinforced desegregation initiatives in 1954, and Civil Right Act of 1964 gave black students access to higher education (Olson, 1973). Between 1945 and 1975, enrollment in higher education increased by 500 percent (Cohen & Kisker, 2009). In 1975, the number of 2-year colleges reached a total of 1,200 (Cohen & Kisker, 2009). Nonetheless, elite universities, such as

Yale, Harvard and Princeton, leaned toward strict selectivity that gave access to the few based on their academic and social wealth (Geiger, 2005). Elite colleges increased their “social exclusiveness” caring less about size of their institutions and more about the quality of education they offered (Geiger, 2005).

Although the first half of the 20th century brought positive changes, the century ended with rising challenges. Among the challenges was shrinking federal funding that required institutions to raise tuition, restructure and eliminate programs, and freeze new hires (Zusman, 1999). The notion of consumerism emerged as institutions of higher education competed for students, donors and grants (Thelin, 2004). Junior colleges or public two-year colleges that offered open admission were on the rise, and enrollment in these colleges increased more than fifteen fold between 1950 and 1980 (Thelin, 2004). These efforts by two-year colleges brought enrollment in higher education to 10 million students by 1980 (Livingston, 2010).

Higher Education Today

Today the image of higher education is often portrayed with negativity and pessimism (Brewer, Gates, & Goldman, 2002). Competition for students, erosion in educational quality and standards, rising tuition and costs, reallocation of resources, and program elimination are among some of the major problems facing higher education in the 21st century (Brewer et al., 2002).

Some have purported consumerism has changed college education into an easier, less demanding enterprise for students. Students of the current era have more freedom to choose their courses, have pass/fail options that protect their GPA, and can gain easy extra credit without significant intellectual gain (Lucas & Tucker, 1996). Students today have

little understanding of the intellectual development savored during the course of learning (Lucas & Tucker, 1996). Such trends are reinforced by poor instruction coming from inexperienced teaching assistants, a growing number of adjunct instructors, professors who are concerned more about research than teaching and an entire consumerist culture that commodifies learning (Lucas & Tucker, 1996). According to Arum and Roksa (2011), learning is minimal on college and university campuses, and more than 45% of students reportedly do not experience any gain in critical thinking skills, writing skills, or reasoning during the first two years of their college education.

Open Access, Educational Quality and College Readiness

Brewer et al. (2002) purports higher education today sells opportunities to more than 15 million students. This increase in enrollment has brought students with different abilities, including those who graduate in the bottom tier of high school classes to college campuses (Lucas & Tucker, 1996). Some speculate the consequences of open access have lowered academic standards (Lucas & Tucker, 1996). Increased enrollment has also occurred for students from low socio-economic backgrounds and minority groups. Therefore, a large percentage of students come to college without adequate academic readiness or preparation for educational standards more compatible with the backgrounds of more advantaged students (Attewell, Lavin, Thurston, & Levey, 2006; Breneman, Abraham, & Hoxby, 1998; Grubb, 1991; Knapp et al., 2009; Parker, 2007; Parsad, Lewis, & Greene, 2003).

College readiness is “the level of preparation a student needs to enroll and succeed – without remediation – in a credit-bearing general education course at a post-secondary institution that offers a baccalaureate degree or transfer to a baccalaureate”(Conley, 2007a,

p. 5). According to Conley (2007a) college ready means understanding college expectations, acquiring new knowledge, and developing intellectually. In other words, to be college ready, students must successfully graduate from high school; complete a definite set of courses; and should demonstrate proficiency in basic literacy skills (Greene & Forster, 2003).

Skills and Knowledge Acquired in High School

Conley (2005) emphasizes students need to complete four years of English language, and two years each of mathematics, natural sciences, social sciences, and foreign language to perform adequately in college. He also suggests, in mathematics, students are required to graduate from high school with a solid understanding of basic mathematics operations, algebraic concepts, trigonometry, pre-calculus, a certain level of mathematical reasoning, systematic thinking, and inductive and deductive logic thinking (Brown & Conley, 2007; Conley, 2003, 2005, 2007a, 2007b, 2008, 2012) (see Table 1). In the subject of English, students need to start college with the ability to read and understand complex, challenging and progressive texts of different styles and traditions. Students need to develop analytical skills, comprehension skills, and the ability to understand and accept different beliefs, values, attitudes and traditions (Conley, 2005). Reading competency enhances writing skills, which allows students to articulate thoughts, positions, arguments and ideas about a variety of topics (Conley, 2005). In addition, student basic research and critical thinking skills should be cultivated in high school English classes so that students graduate with the ability to ask questions, develop research plan, understand the concept of plagiarism, learn how to cite and how to utilize resources and so on (Conley, 2003, 2005) (see Table 1).

Table 1

Conley’s Knowledge and Skills for University Success - English and Mathematics

English Content Standards	Mathematic Knowledge and Skills
<p>I. In reading and Comprehension, successful students</p> <ul style="list-style-type: none"> a. Employ reading skills and strategies to understand literature b. Use reading skills and strategies to understand informational text c. Are able to understand the defining characteristics of texts and recognize a variety of literary forms and genres d. Are familiar with a range of world literature e. Are able to discuss with understanding the relationships between literature and its historical and social context f. Are able to read and interpret visual images, including charts graphs <p>II. In writing, successful students</p> <ul style="list-style-type: none"> a. Apply basic grammar conventions in an effort to write clearly b. Know the conventions of punctuation and capitalization c. Know the conventions of spelling d. Use writing conventions to write clearly and coherently e. Use writing to communicate ideas and concepts, 	<p>I. In computation, successful students</p> <ul style="list-style-type: none"> a. Know basic mathematical operations b. Know and carefully record symbolic manipulations c. Know and demonstrate fluency with mathematical notation and computation <p>II. In Algebra, successful students</p> <ul style="list-style-type: none"> a. Know and apply basic algebraic concepts b. Use various appropriate techniques to solve basic equations and inequalities c. Distinguish between and among expressions, formulas, equations and functions d. Understand the relationship between equations and graphics e. Understand algebra well enough to apply it procedurally and conceptually to a range of common problems f. Demonstrate the ability to work with formulas and symbols algebraically <p>III. In trigonometry, successful students</p> <ul style="list-style-type: none"> a. Know and understand basic trigonometric principles <p>IV. In geometry, successful students</p> <ul style="list-style-type: none"> a. Understand and use both

Table 1 Continued

English Content Standards	Mathematic Knowledge and Skills
<p>f. emotions, and descriptions to</p> <p>g. the reader</p> <p>h. Use and prioritize a variety of strategies to revise and edit their written work to achieve the greatest improvement in the time available</p> <p>III. In research Skills, successful students</p> <p>a. Understand and use research methodologies</p> <p>b. Know how to find a variety of sources and use them properly</p> <p>IV. In critical thinking skills, successful students</p> <p>a. Demonstrate connective intelligence</p> <p>b. Demonstrate the ability to think independently</p>	<p>b. basic plane and solid geometry</p> <p>c. Know analytic (that is, coordinate) geometry</p> <p>d. Understand basic relationships between geometry and algebra</p> <p>V. In mathematical reasoning, successful students</p> <p>a. Know important definitions and why definitions are necessary and are able to use mathematical reasoning to solve problems</p> <p>b. Are able to work with mathematical notations to solve problems and communicate solutions</p> <p>c. Know a select of list mathematical facts and know how to build those facts</p> <p>d. Understand the appropriate use as well as limitation of calculators</p> <p>e. Are able to generalize and to go from specific to abstract and back again</p> <p>f. Demonstrate active participation in the process of learning mathematics</p> <p>g. Recognize the broad range of applications of mathematical reasoning</p> <p>VI. In Statistics, successful students</p> <p>a. Apply concepts of statistics and data analysis in the social science and natural sciences</p>

In addition to math and English, students are expected to graduate from high school with a good grasp of science. They need to know key chemistry concepts, basic principles and laws in physics, general knowledge of cell structure in biology and how scientific knowledge is important for them in the society (Conley, 2005) (see Table, 2). In social sciences, students need to come to college ready to analyze and evaluate scientific documents and recognize bias in themselves and in the readings they are exposed to (Conley, 2005) (see Table, 2).

Table 2

Conley’s Knowledge and Skills for University Success - Natural Science and Social Science

Natural Sciences Standards	Social Sciences Knowledge and Skills
<p>I. In general foundation skills, successful students</p> <ul style="list-style-type: none"> a. Understand the steps that make up the scientific method, that is to observe, hypothesize, test and revise and know the difference between a hypothesis and a theory b. Know basic mathematics conventions c. Able to recognize and use basic algebraic forms d. Demonstrate the ability to work algebraically with formulas and symbols e. Know and understand basic trigonometric principles f. Understand the relationships between geometry and algebra g. Demonstrate the ability to solve problems h. Understand that mathematics is symbolic language, that fluency requires practice, and that 	<ul style="list-style-type: none"> I. In general knowledge and skills, successful students <ul style="list-style-type: none"> a. Have a basic understanding of the social sciences II. In history, successful students <ul style="list-style-type: none"> a. Know significant periods and events in United States history b. Know significant periods and events in world history c. Understand historical perspective and historical analysis III. In economics, successful students <ul style="list-style-type: none"> a. Understand basic concepts of economics IV. In Geography, successful students <ul style="list-style-type: none"> a. Have a basic understanding of the

Table 2 Continued

Natural Sciences Standards	Social Sciences Knowledge and Skills
<p>mathematics is the language of all scientific pursuit</p> <p>i. Successful students understand and apply concepts of probability and statistics</p> <p>j. Understand and apply concepts of measurement</p> <p>II. In science and the society, successful students</p> <p>a. Understand scientific enterprise</p> <p>III. In environmental science, successful students</p> <p>a. Understand concepts related to environmental science</p> <p>b. Understand concepts related to geology</p> <p>c. Understand the interaction of environmental and biota and some of the consequences of that interaction</p> <p>IV. In biology, successful students</p> <p>a. Know general structure and function of cells</p> <p>b. Understand genetic principles that guide the inheritance of biological traits</p> <p>c. Understand the organization and classification of living system</p> <p>d. Understand the concepts of biological change and the evolutions of species</p> <p>V. In chemistry, successful students</p> <p>a. Understand the nature of the physical and chemical properties of matter</p> <p>b. Know principles of atomic structure and bonding</p> <p>c. Understand and apply</p>	<p>tools and concepts of geography</p> <p>V. In political science (Civics), successful students</p> <p>a. Have basic understanding of types of government</p> <p>b. Have a basic understanding of the U.S. political system and its history</p> <p>VI. In sociology, successful students</p> <p>a. Have an understanding of social problems, social structure, institutions, class, groups, and interaction</p> <p>VII. In inquiry, research and analysis, successful students</p> <p>a. Understand the scientific method of inquiry and investigation</p> <p>b. Are able to read and interpret data</p> <p>c. Know how to find a variety of resources of information, and how to analyze, evaluate, and use them properly</p> <p>d. Are able to identify and analyze problems appropriate to the social science discipline being studied</p> <p>VIII. In communication, successful students</p> <p>Are able to communicate clearly and coherently</p>

Table 2 Continued

Natural Sciences Standards	Social Sciences Knowledge and Skills
<p>principles that explain chemical reactions</p> <p>I. In physics, successful students</p> <p>a. Understand the concept of energy</p> <p>b. Understand motion and the principles that explain motion</p> <p>c. Know the kinds of forces that exist between objects</p>	

Students are expected to come to college having learned a foreign language (Conley, 2005). Learning a foreign language incorporates not only the mastery of grammar and vocabulary, but also appreciation of the culture where the language is spoken. By learning a second language, students learn about the geography, history, customs, habits, traditions and beliefs of the people the language represents (Conley, 2005). In addition, learning a foreign language develops student learning strategies and study skills (Conley, 2005) (see Table, 3). Last but not least, among the skills students need to come to college with are technical, cultural, historical and aesthetic skills. These skills are learned in arts classrooms in high school (Conley, 2005) (see Table 3).

Table 3

Conley's Knowledge and Skills for University Success - Second Language and art knowledge and skills

Second Languages knowledge and skills	Art Knowledge and Skills
<p>I. In communication skills, successful second-language students</p> <p>a. Can use a language other than their first to exchange information and interact with other in realistic</p>	<p>I. In art history, successful student possess</p> <p>a. Technical knowledge and skills</p> <p>b. Cultural and</p>

Table 3 Continued

Second Languages knowledge and skills	Art Knowledge and Skills
<p>contexts</p> <ul style="list-style-type: none"> b. Are able to express personal meaning in a language other than their first language in a variety of genres and formats c. Construct meaning from authentic spoken and written sources that are in a language other than their first language <p>II. In culture, successful second-language students</p> <ul style="list-style-type: none"> a. Are aware of products, practices, and perspectives in target culture and are able to apply to that knowledge in communicative context <p>III. In structure, successful second-language students</p> <ul style="list-style-type: none"> a. Have a basic knowledge of English syntax, semantics and discourse structures and are able to compare these with analogous forms in the target language <p>IV. In learning behavior, successful second-language students</p> <p>Demonstrate awareness of the process of learning a second language and to apply a variety of strategies to that learning process</p>	<p>historical knowledge and skills</p> <ul style="list-style-type: none"> a. Aesthetic and art criticism knowledge and skills <p>II. In dance, successful students possess</p> <ul style="list-style-type: none"> a. Technical knowledge and skills b. Cultural and historical knowledge and skills c. Aesthetic and art criticism knowledge and skills <p>III. In music, successful students possess</p> <ul style="list-style-type: none"> a. Technical knowledge and skills b. Cultural and historical knowledge and skills c. Aesthetic and art criticism knowledge and skills <p>IV. In theatre, successful students possess</p> <ul style="list-style-type: none"> a. Technical knowledge and skills b. Cultural and historical knowledge and skills c. Aesthetic and art criticism knowledge and skills <p>V. In visual arts, successful students possess</p> <ul style="list-style-type: none"> a. Technical knowledge and skills b. Cultural and historical knowledge and skills <p>Aesthetic and art criticism knowledge and skills</p>

Conley (2007a) identifies other key components of college readiness that interact and influence each other: key cognitive strategies, key content, academic behaviors and contextual skills and awareness. Key cognitive strategies are “patterns of intellectual

behavior that lead to the development of mental processes and capabilities necessary for college-level work” (Conley, 2007a, p. 13). As students master key cognitive strategies, they acquire content knowledge and learn new facts and concepts. Students also develop key academic behaviors, such as self-awareness, self-mentoring, self-control, and study skills. Finally, contextual skills and awareness allow students to develop good understanding of the college and the university culture, norms, values and all forms of interactions that do not always look like what they are exposed to at home (Conley, 2007a).

Skills and Knowledge Students Develop in College

The literature identifies a wide array of skills and knowledge students ideally develop in college in preparation for the society and workplace. (Rubin & Morreale, 1996) indicate a college education should teach students how to communicate effectively, i.e., listen and articulate thoughts for better academic achievement as well as success in workplace. Effective communication skills help student succeed in college when they ask questions, speak out their thoughts and integrate spoken messages they are exposed to in class. As they move on to workplace, they become ready to speak, listen, work in teams, negotiate, and interact within a diverse and multicultural environment (Rubin & Morreale, 1996).

Click (1996) looked at writing skills as a pivotal tool for students’ development in college. Effective writing skills can enhance critical thinking and construction and retention of knowledge (Click, 1996). Carter-Wells (1996) talked about the importance of critical reading that entails other skills, such as analysis, synthesis and making inferences. (B. C. Dougherty & Fantaske, 1996) proposed the importance of problem solving skills,

i.e., “the search for a clear and concise statement of the problem along with the efficient generation of a selection and implementation of alternative” (B. C. Dougherty & Fantaske, 1996, p. 56). In addition, Facione, Facione, and Giancarlo (1996) proposed the importance of motivation skills to think, judge, critique, conceptualize, and solve problems.

Pre and Post-college Preparation

Although 70% of high school students graduate every year, 32% of admitted college students are considered college ready based on their SAT or ACT score (Greene & Forster, 2003). According to the National Center for Educational Statistics (NCES), 40% of incoming college students need college preparatory programs (Knapp et al., 2009). Consequently, in 2007, 57% of full-time bachelor’s degree seekers attending 5,773 institutions in the U.S. graduated within 6 years of enrollment (Knapp et al., 2009). In 2009, graduation rates dropped to 55.5% (NCHEM, 2011). The low completion rates may be attributed to a host of reasons, one of which is college readiness (Conley, 2005).

Problems with academic preparation start in high school (Conley, 2007a; Hanushek, 2002; Perna & Thomas, 2009). There is a weak connection between the secondary and post-secondary education systems in the United States; each system has a different mission, to the extent that being competent in high school does not always guarantee college readiness (Howell, 2011).

Some scholars have identified state-mandate testing required by No Child Left Behind (NCLB) among the primary factors that hinders student preparation for college (Brown & Conley, 2007; Perna & Thomas, 2009). They argue state mandated testing has reduced academic rigor of the high school curriculum, requiring the vast majority of high

schools to teach to the test versus teaching what is needed for student higher-order thinking and cognitive development (Perna & Thomas, 2009).

Brown and Conley (2007) analyzed the degree of alignment between what is taught in high school to prepare for the state mandated tests and skills required for college readiness and found high school covers only a portion of what is needed for college readiness. In English, his analysis showed 3% alignment between items on state mandated tests and research skills required in college; 30% alignment for critical thinking; 50% alignment for writing; 83% alignment for reading. In mathematics, analysis showed 3% alignment between items on state mandated test and trigonometry skills required in college; 60% for geometry; and 63% for Algebra. High schools often did not offer any statistics courses. These results suggested students could be unevenly or inadequately prepared for college (Brown & Conley, 2007).

The negative consequences of state mandated tests could be intensified at schools with students from low socio-economic status and low performing students (Moore. & Shulock, 2009; Moore. et al., 2010; Perna & Thomas, 2009; Tierney & Hagedorn, 2002). A study by Moore. et al. (2010) showed one third of high school graduates in the academic year of 2006-07 were academically prepared. Among the graduating class, 22% of Hispanic and 17.20% of African American students were college ready, compared to 40.37% of white students (Moore. et al., 2010). Nationally, 20% of African American students, 17% of Hispanic students and 37% of white students are college ready (NCHEM, 2011). A study by (McGraw, Lubienski, & Strutchens, 2006) reported black students leave high school with less mathematical knowledge than their white peers, and their skills are often comparable to those of 8th grade students.

The consequences may be greater for low performing and minority students because the latter may lack family support and may have little knowledge about college admission processes and financial aids (Perna & Thomas, 2009). (Harrell & Forney, 2003) reported first generation Hispanic students were more disadvantaged than other racial groups as they come from families who do not have knowledge about how the system of higher education works, such as cost of tuition and credit hour system.

High School Preparation Program Initiatives

In the light of weak alignment between high school curriculum and college standards, College Board in coordination with some high schools offers Dual enrollment and Advanced Placement (AP) programs to high school students to enhance their college readiness (Conley, 2005). Dual enrollment programs expose high school students to college-level course work during their junior and senior years. These programs enhance student chances of getting ready for college especially for students who go to low-performing high schools in rural areas or inner cities. Programs are often free or discounted (Conley, 2005). Students can take a sequence of 2 to 4 classes at the college level and College 101. These courses are transferable and align with the general education requirement standards (Conley, 2005). Advanced Placement (AP) programs offer 35 courses in 19 subjects linked to examinations that test knowledge and skills students need during the first year of college. AP develops students “mastery of content knowledge and key concepts as well as analytic and writing skills consistent with college work” (Conley, 2005, p. 50).

Ideally college preparatory programs that start in high school play a crucial role in helping students get ready for college. However, a study by N. Hoffman, Vargas, and

Santos (2009) showed only 5% of high school students were enrolled in dual enrollment programs. Also the AP model has limitations and a small number of students have access to it (Conley, 2005). Therefore, post-secondary institutions are still faced with a high percentage of high school graduates who are not college ready.

Compensatory College Programs

Performance and test scores that show no to low preparation of students often require remediation or developmental education at the post-secondary institution level (Bailey., Jeong, & Cho, 2010). Developmental/remedial programs typically involve fourteen to sixteen weeks of mandatory compensatory coursework (Breneman et al., 1998). Often times, these programs offer courses in reading, writing, mathematics and study skills to degree aspiring students who graduate from high school with skill deficit and need a rapid intervention to get ready for college level coursework (Merisotis & Phipps, 2000; Moss & Yeaton, 2006; Weissman. et al., 1997)

The remedial or developmental programs were designed to serve as a bridge between low-performing high schools and degree granting institutions (Shaw, 1997). Minority and economically disadvantaged students appear to be the major beneficiaries from these programs (Bragg, 2001; Mazzeo, 2002; Shaw, 1997; Wang, 2009). However, the effectiveness of these preparatory programs has been subject to much scrutiny and criticism (Bragg, 2001; Mazzeo, 2002). Grubb (2001) argues that the focus of developmental/remedial programs has been on “Skills and drills” (p.2). The majority of these programs focus on “arithmetic procedures, punctuation and vocabulary, math problems of the most contrived sort, and passages from texts that have been simplified for

low reading levels” (Grubb, 2001, p. 2). Therefore, even after completing remedial/developmental programs, student skills may remain lacking.

Evidence on the effectiveness of remedial/developmental education remains sparse (Bahr, 2009; Collins, 2010). Rigorous research and institutional data that track student academic performance prior and after completion of these programs are lacking; therefore it is hard to determine the effectiveness of these programs (Bailey, 2009; Levin & Calcagno, 2008; Perin, Keselman, & Monopoli, 2003; Wang, 2009). However, there are a large number of researchers who examine the degree completion, academic choices and academic performance of remedial/developmental students. The following section provides an overview of this research.

Degree Completion of Remedial/Developmental Students

There is alarming evidence of high attrition rates among students who start college in remedial/developmental classes (Kreysa, 2006). While underprepared students are given access to college as well as the chance to get prepared, there are no guarantees they will persist and attain a degree (Spence, 2007). Even after successful completion of remedial/developmental programs, students are often unable to move upwardly on the educational ladder (Hagedorn, Siadat, Fogel, Nora, & Pascarella, 1999; Wellman, 2002).

Adelman (1999) reported the more remedial/developmental classes students take, the less likely they are to graduate. In his study, he found among students who took two remedial courses, 31% persisted and graduated with degrees. Graduation rates were lower among students who took four or more remedial classes (Adelman, 1999). Successful completion of remedial/developmental programs does not always ensure adequate preparation for college level course work (Long & Kurlaender, 2009; Robbins, Porchea,

Allen, & Phelps, 2010; Roksa & Calcagno, 2008; Wang, 2009). The end result can be high attrition rates among academically underprepared students who represent a high percentage of degree aspirants in higher education (Bailey., Calcagno, Jenkins, Kienzl, & Leinbach, 2008).

Bailey (2009) attributes attrition to factors related to students themselves. He reports students who need developmental/remedial classes may not see the benefits of college education because costs are higher. In theory, the perceived benefit for students of going to college determines whether or not they persist (Brewer et al., 2002). If the cost of attending college is higher than the benefit, students might choose other venues in life rather than college education. Best-case scenario, “students will choose to attend the institution that provides him/her with the most value added.” (Brewer et al., 2002, p. 54). Students may invest in higher learning for reasons like “increased future earning potentials, economic advancement, intellectual development, social skills development, physical development, specific knowledge, status recognition, and credential” (Brewer et al., 2002, p. 55). However, when students are placed in developmental programs, their debt increases, they spend more time and more money, and sometimes might waste their financial aid eligibility on courses that do not count toward a degree (Bailey, 2009). The end result is often drop-out.

For students who start academically underprepared and obtain a degree, they appear to make easy academic choices that may not pay off after graduation. They often enroll in majors perceived by some as “easier”, such as business and education (Clark., 1980; Martorell & McFarlin, 2010). In other words, even though some underprepared students obtain a degree, their long-term career choices remain limited.

In addition, there is an indirect negative consequence for starting college underprepared, completing remedial/developmental education at a community college and then transferring to a four-year institution among degree aspirants (Parker, 2007; Shaw, 1997). In this process, students face two challenges, the challenge of going through remediation and the challenge of transfer from one institution to another (Bastedo & Gumport, 2003; Grubb, 1991; Knapp et al., 2009; Martorell & McFarlin, 2010). Many researchers have addressed these challenges and the next section will review this research.

Developmental/Remedial Programs and the Community College

Community colleges were founded to serve as transfer institutions, as a result of the increased enrollment in the 1960's (Bragg, 2001). The term transfer in this context is defined as "initial enrollment at a community college followed by subsequent enrollment at any four-year institution within the 5 years study period" (Bradburn, Hurst, & Peng, 2001, p. iv). Community colleges can serve as a gateway to four-year institutions by offering open access at low tuition rates (Bragg, 2001; K. Dougherty & Kienzl, 2006; Mazzeo, 2002).

Offering remedial or developmental programs has been one of the major functions associated with the transfer mission (Wang, 2009). Today, 58% of students in 83 community colleges in the U.S. were found to be academically underprepared and enrolled in at least one developmental class (Bailey et al., 2008). This population of students was on track to complete developmental programs and either completed an Associate Degree or transferred to a four-year institution to obtain a baccalaureate degree. The pool of students who aspire to obtain a degree and transfer to a four-year institution

often need special academic support since remediation is not always effective (Bailey et al., 2008; Roksa & Calcagno, 2008).

Transfer students with initial remedial/developmental needs can face academic challenges and/or fail to gain academic acceptability at degree granting institutions (Grubb, 1991, 2001). Some studies have shown a bachelor's degree attainment gap between students who start at a two-year institution underprepared and students who start at four-year institutions both prepared and underprepared (Alfonso, 2006; Long & Kurlaender, 2009; Roksa & Calcagno, 2008).

While students continue to face academic challenges after completing remedial/developmental programs after transfer, a number four-year institutions have eliminated remedial programs, instead relying on the community college system to provide remediation (Arendale, 2005; Merisotis & Phipps, 2000; Parker, 2007). City University of New York (CUNY) was among the first degree granting institutions to eliminate remedial/developmental programs, and to date 22 states have delegated remedial education to community colleges (Parker, 2007).

In light of elimination policies and findings that document persistent post-remediation academic challenges, four-year institutions still have a responsibility toward degree aspirants who transfer after completing remedial programs. Considering Astin's Input-Environment-Output model (Alexander Astin, 1977), institutional academic and social climate contribute to student persistence and degree completion.

Alexander Astin (1991) suggests students come to college with varying potential (Input) that does not completely predict learning outcomes (Output). Rather, there are institutional conditions (Environment) available to cultivate student potentials. "Simply

having input and outcome data of a group of students over a period of time is of limited value if you do not know what forces were acting on these students during the same period of time” (Astin, 1991, p. 22). There is a level of compatibility between student characteristics and institutional characteristics that play a significant role in determining the probability of persisting and completing a degree (Tinto, 2005). Also, there are institutional practices that can identify students’ needs and consequently prescribe intervention and support services to keep students on track (Seidman, 2005).

Institutional Support Services and Programmatic Interventions:

Academic support services and programs available on campus are said to ease the sense of alienation students might develop when they face academic challenges (Gravenberg & Rivers, 1987). The primary function of these services and programs is to increase chances for degree completion (Kulik, Kulik, & Shwalb, 1983; Robbins et al., 2010). Intervention programs and support services may include instruction in academic skills, advising and counseling and comprehensive support (Kulik et al, 1983). Robbins et al., (2010) identified three major categories of intervention programs: 1) programs that target academic skills, such as study skills, learning strategies, note taking, and time management; 2) programs that target self-management, e.g., anxiety reduction, desensitization, and stress management, self-control; and 3) programs that target socialization skills, such as orientations and first year experiences. W. R. Habley and McClanahan (2004) identified freshman seminar or university 101 courses, tutoring programs, advising interventions with selected student populations, mandated course placement testing programs and comprehensive learning assistance centers or labs among the most successful retention practices.

The following section reviews literature that describes some successful support services and programmatic interventions including: early alert system, first year seminars, supplemental instruction, peer tutoring, learning communities, learning assistance labs/centers, and Trio programs.

Early Alert System. Student background information, SAT/ACT scores and Grade Point Average (GPA) are some indicators post-secondary institutions use to issue early academic alerts to stakeholders, such as academic advisors and students (V.A. Lotkowski, S.B. Robbins, & R.J. Noeth, 2004; Pérez, 1998). Academic alerts help academic advisors and faculty identify students with academic needs in order to direct them to special programs or academic resources provided by the institution. Early alerts help institutions sort students who are at risk of failing academically (Pérez, 1998) and several studies (Rudmann, 1992) showed the positive influence they have on retention rates.

First year seminar. Research (Porter & Swing, 2006; Schnell & Doetkott, 2003) reports significant increases in retention rates among students who enroll in first year seminars. First year seminars are also known as academic skills seminars, for they are designed to facilitate transition to higher education. They cover areas such as campus resources, study techniques, time management, note-taking strategies, wellness, stress management and other basic skills (Schnell & Doetkott, 2003). First year seminars can improve academic performance and retention, increase persistence to graduation, enhance student satisfaction with the college or university experience, instill greater feelings of academic and social integration and increase feeling of academic competence (Barefoot, 2004).

Supplemental Instruction. Hurley, Jacobs, and Gilbert (2006) described supplemental instruction as “an academic support program that provides regularly scheduled, out-of-

class, peer facilitated sessions that are open to students in the course” (p. 11). Lotkowski (2004) defined supplementary instruction as an academically focused program designed especially to help students who enroll in difficult classes until they develop the learning and study skills they need to be independent learners.

Supplementary instruction is designed to help students develop critical thinking skills and the ability to think through ill-defined complex ambiguous content (Lipskey, 2006). Typically, supplementary instruction “sessions are structured to maximize active student involvement with the course materials: learning and study strategies, such as note-taking, graphic organization, questioning techniques, vocabulary acquisition, and test prediction and preparation are integrated into the course content” (Lotkowski et al., 2004, p. 14)

Harding (2012) showed students who enrolled in supplemental instruction programs demonstrated a significant increase in critical thinking skills. Ning and Downing (2010) indicated that supplemental instruction enhanced student motivation, academic performance and learning competence. Arendale (1998) showed that supplemental instruction programs serve as a catalyst for an improved and effective learning environment.

Peer Tutoring. (Bruffee, 1993) asserted there is hardly a college or university that can do without peer tutoring. Peer tutoring is an interactive teaching and learning method widely used in higher education (Topping, 1996). Even though the quality of peer tutoring is embedded within the culture of the institution where it takes place (Topping, 1996), there is a considerable amount of research that theoretically and empirically proves it effective (Colvin, 2007; Elmborg & Hook, 2005; Miller, Topping, & Thurston, 2010). Peer tutoring

is effective because it allows students to have conversations with their peers who see the academic environment in a way different from the way faculty or employees see it (Elmborg & Hook, 2005). Student tutors understand tutees because they live and see the institutional and the academic responsibilities from the same perspectives (Elmborg & Hook, 2005). Peer tutoring has been shown to have a positive influence on academic performance, social integration, and self-esteem (Colvin, 2007; Terrion & Leonard, 2007).

Learning Communities. Learning communities are designed to bring students together with faculty members to gain academic and social support (Tinto & Riemer, 2001). The main purpose behind enrolling in learning communities is to create a linkage and academic connection among students, faculty and staff. Students interact with other students who share the same characteristics and goals within a supportive environment and beyond the borders of their classrooms (Tinto, 2005).

Learning Assistance Labs/Centers. Student learning centers, academic success centers, learning skill centers or academic success centers are among the many names learning assistance labs/centers are given. Learning labs or learning centers are designed to help remedial or developmental students or students with academic needs succeed. However, most of the universities that have learning labs include all students regardless of their academic needs (S. Stern & Colelges, 2001).

Based on a review of literature, Maxwell (1997) identifies various functions of learning centers. These centers diagnose what students with academic challenges might need and offer them services such as workshops, counseling, courses in study skills and learning strategies. In addition, learning assistance centers offer peer tutoring,

supplemental instruction and computer assisted instruction. Studies have shown an increase in GPA among students who utilize learning assistance (Maxwell, 1997).

Writing labs provide individualized instruction to students with writing challenges (Scott., 1991). They are designed to provide individual tutoring on any student assignment students (Lotto, 1993). Usually writing centers hire graduate students or undergraduate students with outstanding skills to provide individualized assistance to students of need (Clark, 1993). The main services writing centers provide generally include one-on-one conference, workshops on academic writing or any additional resources basic writers need (Simon, 1993).

Trio Programs. Trio (three) programs are federally funded initiatives designed to close educational achievement and opportunity gaps in the U.S. starting from high school until graduation (Blake, 1998; Colton, Connor Jr, Shultz, & Easter, 1999; McElroy & Armesto, 1998). TRIO student support services are provided to first generation students, those from low socio-economic status or those from any racial backgrounds that might cause educational disadvantage (McElroy & Armesto, 1998). TRIO programs enhance student satisfaction with their academic and social environment and increase their chances for degree completion.

Students with low academic credentials – Selected Definitions from 70 Years of Research

Research on student with low academic credentials or underprepared students goes back to 1950's when increasing attention was given to college readiness (Cole, 2009, p. 53). Building on the study by (Iffert, 1958; Noel & Levitz, 1982), the history of studies on support services that target students with low academic credentials in US colleges and

universities was tracked using Google Scholar customized date search engine. The term “underprepared college students” was used in the search with a customized date starting from 1950. The results were reviewed for possible definitions. *Inadequate Readers* was linked to college readiness, specifically with a focus on critical reading skills (Halfter & Douglass, 1958). *The Underprepared Students at the University of Illinois* (Roberts, 1957) was a letter written by the Chairperson of freshman rhetoric in which he declares failing students at DePaul University as those who fail to handle college level work. *The High School Graduate’s Preparedness for College Chemistry* (Burkhalter, 1956) discusses the characteristics of underprepared students in Chemistry classes. Underpreparedness for college Chemistry denotes that *Johnny* has not mastered the fundamental principles or thinking skills required to succeed generally in college. Therefore, *Johnny* cannot think, cannot calculate, gets lost in numbers, cannot read, does not understand two syllable words, and cannot comprehend passages without pictures.

Over the years, the definition of underprepared students or students with low academic credentials began to include a wide array of characteristics not limited to academic skill deficits. Demographic characteristics have been in the frontline of the definition of students with low academic credentials, such as socio-economic status and cultural capital (Bourdieu, 1977); race (Fischer, 2007), psychological (D’Augelli & Hershberger, 1993; Davis, 1991; Gosman, Dandridge, Nettles, & Thoeny, 1983; Middleton, 1963), sex (Alexander Astin, 1964; Bailey., Leinbach, & Jenkins, 2006); age (Thomas, Alexander, & Eckland, 1979), and pre-college academic records (Murtaugh, Burns, & Schuster, 1999).

A large body of research examines these characteristics combined, and interestingly *first generation college students* appear to have all or most of the attributes studied (Alexander Astin, 1964; Alexander Astin & Oseguera, 2005). (London, 1989) found first generation students face potential learning problems upon enrolling in college. First generation students are more likely to come from disadvantaged low-income families and/or ethnic minority group and are more likely to have weaker mathematics, reading and critical thinking skills. First generation students are also more likely to come to college with lower degree aspirations.

Terenzini, Springer, Yaeger, Pascarella, and Nora (1996) propose first generation college students get less support for college education than second generation students. This minimized support influences their understanding of how college works which consequently negatively influences their ability to navigate the college system.

York-Anderson and Bowman (1991) study first generation students in terms of their demographic characteristics, secondary school preparations, academic and career choices, and transition to college. They found first generation students are less likely to enter selective colleges because their family background is an indicator of lack of academic preparedness. The level of parental post-secondary education significantly influences students' college selection, academic and nonacademic experiences they get exposed to during college, and might have an influence on the cognitive and non-cognitive outcome of college.

Pascarella, Pierson, Wolniak and Terenzini (2004) found first generation students are at higher risk of dropping out because their pre-college and high school attributes have a direct impact on success in college. The study validates the findings that first generation

students' high school attributes have a significant impact on persistence in college and graduation with a degree. Last but not least, Ishitani (2006) indicate first generation students have to overcome social, academic, and financial obstacles and it takes great effort to persist in college until graduation.

NCES Definition of Underprepared Students

According to NCES, the minimum admission requirements at selective colleges and universities are: High school GPA of 3.5 and above, students should come from the top quartile of his/her high school graduating class, SAT score of 1100 or above, 18 to 19 Carnegie units or high school core course requirements (4 English Carnegie units, 3/4 mathematics Carnegie units, 3 natural science Carnegie units, 3 social science Carnegie units, and 1 foreign language Carnegie units, and 2 units of academic electives), good teacher recommendations and participation in 2 or more school-related extra-curricular activities.

A NCES report showed students who meet the 5 selective criteria make 5.9% of all college bound students; 8.5% meet a less restrictive criteria (SAT score of 950 and a HSGPA of 3.5 or above or SAT score of 110 and a HSGPA of 3.00); while only 1.5% meets a more restrictive criteria (SAT score of 1250 and a HSGPA of 3.5 and 0.5 computer Carnegie unit). Benchmark ACT composite score is 22, English score of 18, Mathematics score of 22, and reading score of 21).

Another report released by NCES in 1992 showed students who were minimally qualified for college admission were students who submitted scores whose highest value on any of the five criteria would put them among the top 75 percent (i.e., in the third quartile). These students submitted minimum high school GPA of 2.7, class rank

percentile of 54, and combined SAT score of 820, or a composite ACT of 19. In addition to these values, students successfully completed at least 4 years of English, 3 years each of science, mathematics, and social studies, and 2 years of a foreign language. The same study identified students who were classified as marginally or not qualified for four-year college work had an average class rank and NELS aptitude test scores which put them in the bottom third of their senior class, an average GPA of 2.1, and an average combined SAT score of 700 (Department of Education, National Center for Education Statistics, National Education Longitudinal study: 1988-1994 (NELS:88), Data Analysis system).

NCES defines additional measures colleges and universities consider when making admission decisions, which include dual enrollment, Advanced Placement (AP) Exams, and advanced course taking. Usually, students who show records of these measures are given priority consideration for admission. Students who take advanced placement courses (calculus, English language and composition, chemistry, and US history) in high school and therefore take advanced placement exams may earn college-level course credits. Students enrolled in dual enrollment programs are participants in college level courses and earn credits that count toward their degree in college.

ACT or SAT scores cannot be considered in isolation of high school GPA, or high school rank or any other measure. The most common combination that institutions consider is the SAT/ACT scores and high school GPA. College Board requires that when admission officers take SAT score into consideration when making admission decisions, they need to use them in conjunction with other indicators of academic performance, such as high school records, recommendations, personal statements and others (from guidelines on uses of college board test scores and data, 2011). College board recommends tests

scores be used as contemporary and approximate indicators of college success and not fixed or exact measures of academic readiness.

Institutional Definitions

The following section presents sample definitions from 14 selective institutions that do not offer open admission. These definitions are included for illustrative purposes only to provide a general idea of how institutions define students with low academic credentials, or students who start academically underprepared.

Institution 1 refers to students with low academic credentials as *at-risk students*. This institution refers to at risk students as low income high school graduates, low-income minority student, low in-come single parent students, and students with a high school GPA of 2.3 or less.

Institution 2 defines students who are not college ready as those who have academic deficiencies during high school and graduate with a GPA of 2.2, students who qualify for skill development programs upon matriculation, and those who submit SAT score of less than 700 on both Mathematics and Verbal and less than 14 ACT composite score.

Institution 3 defines students who are not academically ready as those who are not prepared for certain Core Curriculum Courses and those who need to strengthen their English, Mathematics and/or reading skills. Students who score below 830 on SAT/17 on ACT and do not pass COMPASS test and consequently enroll on learning support courses are also academically underprepared.

Institution 4 defines students with low academic credentials as those who did not take the total college preparatory courses in high school and are not expected to do well on college math, chemistry, and/or English composition. Students who come from low-income

families, are first generation college goers and have any form of disability are also expected to be academically underprepared.

Institution 5 counts students whose predicted first year GPA is 2.25 based on high school rank, SAT verbal (below 480) and SAT math (below 470) are students with low academic credentials and qualify for placement tests prior to matriculation.

Institution 6 does not have an explicit definition of students with low academic credentials. Students who submit a high school GPA between 2.3 and 2.75 and SAT combined score between 750 and 820 are eligible for summer enriching program.

Therefore, students with these scores count as students with low academic credentials.

Their admission requirements suggest that any scores lower than verbal SAT scores of 530 or reading ACT of 20 and a math score of 480 or math ACT of 22 require placement testing.

Institution 7 Students who submit ACT English score of 18 and an ACT math score of 19 or an SAT verbal score of 450 and an SAT math score of 460 are required to enroll in subject-specific developmental courses. Therefore, these students are considered to have low academic credentials.

Institution 8 Students with a high school GPA of 2.78 or less and an SAT combined score of 900 and a composite ACT score of 19 are considered to be academically underprepared.

Institution 9: Students with a verbal SAT score of 415 and math SAT of 409 are eligible to Summer Developmental Programs and Academic Developmental Programs. Therefore these students are considered to be academically at risk.

Institution 10 Students who submit an English ACT score of less than 18 and math ACT score of less than 22 or SAT math score less than 500 and SAT verbal score less than 440

are considered to be academically underprepared. High school GPA of 2.99 on high school academic units is also an indicator of lack of academic preparation.

Institution 11: Students who qualify for conditional admission based on SAT and ACT scores that are as low as 440 on both math and verbal and 18, respectively. This population of students is placed in reading, writing and mathematics courses and attends weekly at the learning center in addition to their regular classes until they complete the program and pass the College Prep Exit Exam.

Institution 12: Students submitting Reading and Math SAT score of less than 510 and ACT score of less than 22 do not meet admission criteria, and therefore are academically underprepared. Cumulative high school GPA of less than 2.8 and graduating with a high school rank less than 40% are two indicators of academic needs.

Institution 13 Students who are eligible for support services are the ones who are admitted with a high school GPA of less than 2.5, ACT score of 18 or less, and SAT score of 900 or less. Students who enroll undecided and with no clear career goals are also considered at risk students.

Institution 14: Students enrolled with a high school GPA of less than 2.0, an ACT composite score below 18 and are placed in developmental math and English classes are considered at risk.

Summary

In this chapter, a review of the literature was presented. The review began with a history of higher education followed by a brief description of the higher education landscape today. The review also presented literature that looked at how open access to higher education started and the major ramification and influence of open access on

quality of education. The chapter continued with a review of major studies that looked at academic skills and preparedness for college-level course work, and how high school prepares students for college. Subsequently, literature on developmental education and how institutions remedy lack of academic preparedness was presented. Finally, literature that offers definitions of students with low academic credentials since 1950's was reviewed followed by a review of how a select of higher education institutions define this population of students.

The next chapter will outline the methods to be used to conduct the study. This includes the research questions and the methods used to answer them. The chapter will also include description of the data collection, context of the study, units of analysis and research concept map.

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CHAPTER 3

Methodology

This study aims to explore and examine the influence of support services and programmatic interventions four-year institutions have in place to retain and support students with low academic credentials in graduating within six years of enrollment. A study of student pre-college characteristics can help the field understand how the services and programs affect student performance and upward academic mobility. Student performance also can serve as an indicator of institutional success or failure. Examining how student academic status changes from enrollment to graduation and even post-

graduation can provide a means to assess institutional effectiveness. The purpose of the study is to understand the linkage between institutional characteristics, academic services and interventions and student pre-college characteristics with student graduation. Three research questions guide this study:

1. How do colleges and universities in the United States define “students with low academic credentials”?
2. What institutional and students characteristics estimate graduation rates?
3. How do institution-specific support services and programmatic interventions influence academic performance and graduation of students with low academic credentials?

Mixed Methods Research Design: Philosophical Assumptions

The research design for this study is Mixed Methods *eclecticism* (Schulenberg, 2007). Methodological *eclecticism* in Mixed Methods research is used to examine the topic from any possible angle using a variety of paradigms (Greene, Kreider, & Mayer, 2011; Robson, 2011; Schulenberg, 2007; Teddlie & Tashakkori, 2011). Mixed Methods research involves a cycle of “moving from grounded results (facts, observations) through inductive logic to general inferences or theory through deductive logic to tentative hypothesis or predictions of particular events/outcomes” (Greene et al., 2011, p. 288). The use of quantitative methods allow for gathering and representing human phenomena with numbers, while qualitative methods allow for gathering and representing human phenomena with words (Greene et al., 2011). Caracelli and Greene (1993) identify five purposes for using Mixed Methods research: *Triangulation, complementarity,*

development, initiation and expansion. Specifically, this study uses Mixed Methods design for *complementarity* and *development* purposes.

Complementarity: The two research paradigms are combined in a complementary fashion to capture more than one aspect of the same phenomenon. The quantitative component, allows for employing and managing a larger sample size and predicting relationships between variables, but does not fully answer all questions surrounding the phenomenon (Sale, Lohfeld, & Brazil, 2002; Smith, 1983). The qualitative paradigm allows researchers to examine multiple realities or multiple truths quantitative methods alone may fail to explain (Madey, 1982; Reid, 1996; Sale et al., 2002). In this study, statistical analysis is used to predict the relationships between student and institutional characteristics and graduation rates, while the qualitative analysis probes in depth into practices that contribute to student academic performance.

Development: The two research paradigms are also combined for *developmental* purposes (Caracelli & Greene, 1993; Greene et al., 2011). Integrating the two paradigms opens up essential venues for advancement in the three phases of the study from design to data collection to data analysis (Madey, 1982; Sieber, 1973). “Development is broadly constructed to include sampling and implementation as well as measurement decisions” (Caracelli & Greene, 1993, p. 196). Qualitative exploratory methods were used to determine the sampling framework and overall design (Madey, 1982). The definitions collected in the initial stage determined the variables used in the quantitative analysis, and the results of quantitative analysis determined survey and interview informants.

Deductive and Inductive Inquiry

The study combines hypothetical deductive quantitative inquiry and qualitative naturalistic inductive inquiry (Patton, 2002) in order to understand the practices that retain and assist students with low academic credentials from matriculation to graduation as presented in Figure 1. The qualitative inquiry in the first stage was inductive in nature. Inductive inquiry was oriented towards exploration and discovery and was followed by a quantitative inquiry that was deductive in nature. Deductive inquiry was oriented towards measuring outcomes using specific variables and observations (Hatch, 2002; Patton, 2002). The investigation progressed from an inductive approach to determine the characteristics of students with low academic credentials to deductive outcome measurement to identify the highest estimator of graduation rates, back to inductive analysis to unravel immeasurable factors (Greene et al., 2011; Patton, 2002).

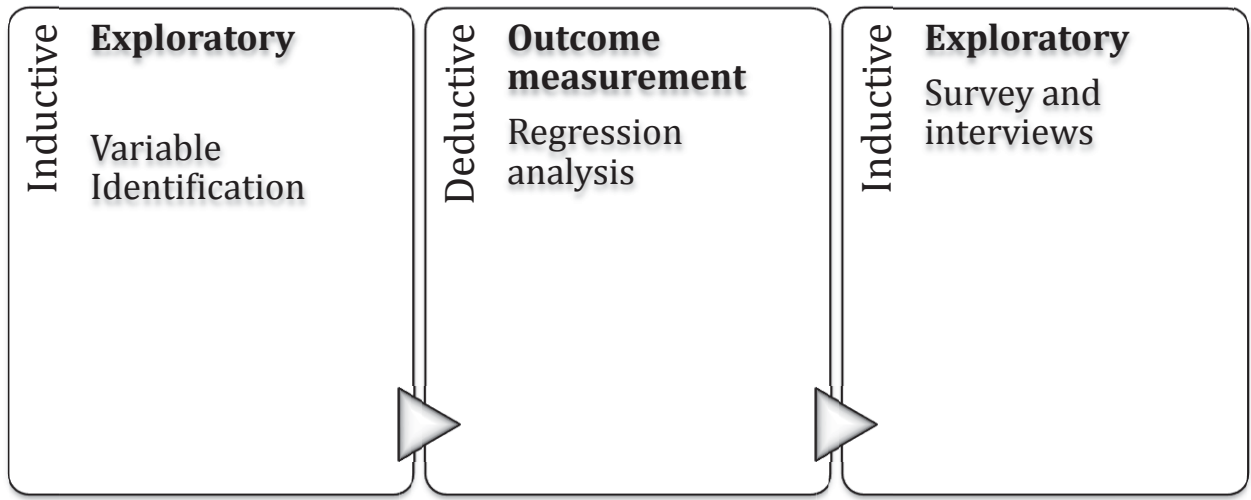


Figure 1: Study Design

Study Design and Research Questions

Study design and methodological decisions are best made within an overall strategic framework (Patton, 2002). The study was launched with a qualitative naturalistic inquiry using exploratory method. The purpose was to unfold the phenomenon of interest with openness to whatever emerges (Patton, 2002), through four distinct study stages. In stage 1, an extensive review of literature and institutions' webpages was completed to openly unfold the definition of students with low academic credentials. The definition helped identify the units of analysis for the quantitative analysis. In stage 2, quantitative analysis was used to estimate the influence of student and institutional characteristics on graduation rates. Results from quantitative analysis guided the sample selection in the qualitative stages of the study. Stage 3 included the use of open-ended surveys, while stage 4 included interviews, both of which delved deeper into the services and practices institutions employ to assist students with low academic credentials. Table-4 summarizes

the approaches used across the study phases, which are aligned with the research questions.

Table 4

Overall Study Design

Stage	Method	Approach	Sample	Focus	Research Question
1	Exploratory Content and Web- Document Analysis	Website and Literature Review	N = 230 institutions Journal Articles	Definition of students with low academic credentials	How do colleges and universities in the United States define “students with low academic credentials”?
2	Regression Analysis	Institutional Aggregate student data	N=173 Institutions 38 Variables	Student and institutional characteristics	What institutional and students characteristics estimate graduation rates?
3	Survey	Descriptive Analysis	N=45 Staff in Academic Affairs	Support Services and Programs (Learning Support Centers)	How do institution- specific support services and programmatic interventions influence academic performance and graduation of students with low academic credentials?
4	Interview	Exploratory	N=10 Staff in Academic Affairs	Support Services and Programs	How do institution- specific support services and programmatic interventions influence academic performance and graduation of students with low academic credentials?

Overall Study Sampling Procedure

The target population for the study included four-year (level) public (control) institutions as classified by Carnegie Classification. Under this category of institution, Carnegie identifies a total of 691 institutions. For this study, the target sample was 30% of these institutions (N=230). Random selection was used in order to ensure that the sample is representative (P. C. Stern, 1979). To draw a random sample, the 691 institutions were assigned random numbers using STATA. These numbers were sorted from highest to lowest and the first 230 institutions were selected.

Final criteria for institutional participation in the study included access to Common Data Sets (CDS) for 2004 through 2007 on the institutions website. The websites of the randomly selected 230 institutions were examined to obtain CDS. Of those selected, 178 met these criteria. Those who met the criteria were kept in the sample, while those who did not were replaced with another randomly drawn sample of institutions from the remaining population. This process was completed 6 times until a final sample of 230 institutions was identified.

Stage 1: Exploratory Research Design – Document Analysis

The first stage of the study involved an exploratory research design in order to seek new insights and assess graduation rates from different perspectives (Adams & Schvaneveldt, 1991). The major purpose in the initial stage was to build methodology in a more structured fashion to inform later stages of the study (Adams & Schvaneveldt, 1991; Ritchie & Lewis, 2003). This design allowed flexibility in exploring and asking questions about students who start college underprepared through extensive literature and institution website review (Adams & Schvaneveldt, 1991; Denzin & Lincoln, 2000). Flexibility was

also translated in the fact the study started with a broad focus and progressively and systematically became more focused through quantitative data collection (Adams & Schvaneveldt, 1991). This was the most critical stage in this study as the findings informed the subsequent study design and data collection stages. In this study, university webpages and source-or site specific search engines were used to collect data and to design research methods used in subsequent stages in this dissertation (Bradley, 1999).

Document analysis is relevant as it fits the conceptual framework (Corbin & Strauss, 2008). The use of institutional and organizational documents has become widely used in qualitative research in recent years (Bowen, 2009). “Document analysis is a systematic procedure for reviewing or evaluating document – both printed and electronic (computer-based and Internet based) materials. Documents contain text (words) and images that have been recoded without a researcher’s intervention” (Bowen, 2009, p. 27). For this study, three sub-stages of document analysis were conducted: (1) relevant literature related to defining students with high academic needs; (2) institutions websites from the 230 randomly selected institutions; and (3) Common Data Sets (CDS) in the form of organizational and institutional reports from the sample institutions. Specifically, CDS archives made available by the Office of Institutional Research (OIR) at each of the 230 institutions were examined and two sets (2004 and 2010) obtained.

Institutions’ Website Analysis

The first stage of the study was designed to address the question of how colleges and universities define students with low academic credentials. The webpages of the 230 institutions that do not offer open admission and that have a certain degree of selectivity were examined to collect qualitative data on the characteristics of students with low

academic credentials. This population of students is often referred to as *at risk students*, *students with academic needs*, or *remedial students*. The institution's search engine was used to obtain information on admission criteria and students with low academic credentials. Key words like at-risk students, academically underprepared, student with low SAT/ACT scores, students with low high school GPA, and low academic credentials were used. Since not all institutions had explicit definitions, information about admission requirements was collected. Scores and criteria lower than the admission requirements are considered low academic credentials in this study. All scores and criteria included in this definition apply to pre-college characteristics.

These data were collected and compiled in a word document. An inventory of definitions of students with low academic credentials was compiled. However, not all institutions had clearly stated definitions of students with low academic credentials. Therefore, minimum admission scores were used as criteria for academic preparedness under the assumption that students who do not meet the admission criteria are academically underprepared.

Definitions from a number of studies and the National Center for Educational Statistics were also added to the inventory. Literature since 1950's was used to obtain definitions. The selection of 1950's as a starting date was based on a study by Iffert (1958) on retention and withdrawal that indicated support services and programs began to appear in colleges and universities in the 1950's. Literature was used in this inventory as previous studies can serve as a data source even if they provide interpretations and descriptions rather than raw data (Bowen, 2009).

Common Data Sets (CDS) Analysis

The Common Data Set (CDS) Initiative is an effort put forth in the higher education community that brings together an advisory board of multiple organizations including: American Association of Community Colleges (AACCC), American Council on Education (ACE), Association for Institutional Research (AIR), The College Board, National Association for College Admission Counseling (NACAC), National Association of College and University Business Officers (NACUBO), National Association of Independent Colleges and Universities (NAICU), and National Association of Student Financial Aid Administration (NASFAA). This initiative aims at improving and standardizing data about student's transition into higher education, each cohort in a separate document (Common Data Set Initiative, 2013).

The fact this community of organizations and associations is the establisher of CDS initiative and these documents are published by Offices of Institutional Research give these documents a dimension of *authenticity*. "The motive or the "why" along with "who" wrote it or created it constitutes major step in the elaborate process of external criticism" about the authenticity and validity of the documents (Adams & Schvaneveldt, 1991, p. 298). This proof of authenticity is declared in this section as these documents are being used for the first time in an empirical study. The only mention of CDS, to the time of this study, was in a magazine article How U.S. News Collects Its College Rankings Data: Common Data Set (Morse, 2012).

The CDS documents reviewed contained data on student and institutional characteristics. Both student and institutional characteristics combined serve as the main study output. The use of institutional and organizational documents has become widely

used in qualitative research in recent years (Bowen, 2009). “Document analysis is a systematic procedure for reviewing or evaluating document – both printed and electronic (computer-based and Internet based) materials. Documents contain text (words) and images that have been recoded without a researcher’s intervention” (Bowen, 2009, p. 27). Documents or written texts serve as “mute evidence” separated across time and space from its author, procedure or user (Hodder, 2003) and are a major source for secondary data used in the event primary data sources are not available (Adams & Schvaneveldt, 1991). They serve as supplementary research data that provide valuable additions to knowledge base (Adams & Schvaneveldt, 1991; Bowen, 2009). “Documents provide background and context, additional questions to be asked, supplementary data, a means of tracking changes and development, and verification of finding from other data sources” (Bowen, 2009, p. 31). Using documents as a source of data is advantageous because they are cost effective, publically available, stable, exact, and above all they can be unobtrusive and independent from the researcher’s bias (Bowen, 2009). Web document analysis is the process of extracting symbolic and structured information from documents available in electronic forms (Antonacopoulos & Hu, 2003). Currently, there are a large number of documents made readily available online in various formats, and the proliferation of web-based resources has created a new form of interaction between researchers and data (Antonacopoulos & Hu, 2003).

Stage 2: Regression Analysis

The second stage in this study involved regression analysis of institutional and student characteristics to estimate their influence on graduation rates. This stage of the study serves three main purposes: (1) presenting a ground finding that supports the

assumption that graduation rates are influenced by student academic credentials; (2) provide sampling criteria to support selection of a purposive sample of institutions that have higher percentages of students with low academic credentials.

Stage 2: Sample

The sample used in this stage consisted of 173 observations after omitting missing values in graduation rates. All institutions that did not have 2004 graduate rates were omitted from the sample and the regression models were run using the remaining observations.

Study Variables

Dependent Variable: The outcome or dependent variable used at this stage was 6-year graduation rates. Graduation rates by NCES definition is the total number of students who completed their degree within 6 years or 150% of the normal time to degree attainment divided by the number of students in the revised cohort (Aud et al., 2012). Graduation rates are based on students who enrolled in public four-year institutions for the first time, full time and for the sake of obtaining a degree. The 6-year graduation rates were used instead of 4-year graduation rates as it has become the average time college students complete their degrees in the US based on the National Center for Educational Statistics. The graduation rates variable was obtained from 2010 Common Data Sets posted by the office of Institutional research the institutions that have 2004 common datasets (N=173).

Independent Variables: Independent variables were collected from multiple resources. Demographic characteristics of students at each university were collected from institutions' CDS section B -Enrollment and Persistence and section C - First-time, First-year (Freshman) Admission, and they are: total number of women admitted and enrolled

in 2004, total number of men admitted and enrolled in 2004, total number of Alien students, total number of Black students, total number of Indian students, total number of Asian students, total number of Hispanic students, total number of White students and total number of students whose ethnicity is unknown. These variables were transformed into percentages for data analysis.

Another set of variables about students' academic characteristics at each institution were collected from CDS. Common Data Sets provide student aggregate level data. Section C - First-time, First-year (Freshman) Admission was used to obtain data on student academic characteristics. This section contains information on percentage of students who submitted SAT scores, percentage of students who submitted ACT composite scores, percentage of students who submitted High School Rank, percentage of students who submitted High School GPA. Also, this section contains percentage of students who submitted SAT scores (both Verbal and Math) of 499 or less, percentage of students who submitted ACT composite scores of 17 or less, percentage of students who graduated from the bottom half of high school graduating class, and percentage of students who graduated with a High School GPA of 2.99 or less. All these variables were collected for each institution and compiled in an Excel sheet.

The College Navigator search engine powered by the NCES was used to obtain institutional region variable, whether or not the institution offers remedial programs and percentage of students who transferred out of the university in 2010. Region is captured by six categories: New England, Mid-Atlantic, Midwest, Southwest, West and South. However, Mid-Atlantic and Southwest had small numbers of observations. Therefore, New England and Mid-Atlantic were combined, and West and Southwest were combined.

Region was then coded into a series of four dichotomous indicators representing Northeast, Midwest, West, and South. The remedial variable is a dichotomous variable coded as 1= Offers Remediation and 0=Does not Offer Remediation. Transfer variable is a continuous variable represent percentage of students who transferred in from another institution.

The College Board website was used to obtain percentages of students eligible for Pell Grants at each institution. This variable is continuous and was obtained in order to better understand the socio-economic status of the student body at each institution.

Finally, institutional size was obtained from Carnegie Classification website. Carnegie reports size of institution as large, medium, small and very small. Small and very small were combined such that 1=large, 2=medium, 3=small. Three dichotomous variables were used to capture size categories in regression models. Table 5 contains variable names, description of variables, how they were transformed and where they were obtained.

Table 5

Variable Description

Variable Name	Description	Transformation	Source
graduation	Six-year Graduation rates of the 2004 cohort	None	Common Data Set
women	Percent women admitted and enrolled in 2004	None	Common Data Set
men	Percent men admitted and enrolled in 2004	None	Common Data Set
alien	Percent Alien admitted and enrolled in 2004	None	Common Data Set
black	Percent Black admitted and enrolled in 2004	None	Common Data Set
indian	Percent Indian admitted and enrolled in 2004	None	Common Data Set
asian	Percent Asian admitted and enrolled in 2004	None	Common Data Set
hispanic	Percent Hispanic admitted and enrolled in 2004	None	Common Data Set
white	Percent White admitted and enrolled in 2004	None	Common Data Set
unknown	Percent unknown race admitted	None	Common Data

Table 5 Continued

Variable Name	Description	Transformation	Source
	and enrolled in 2004		Set
satv_low	Percent students who submitted an SAT verbal score of 499 or less in 2004	None	Common Data Set
satm_low	Percent students who submitted an SAT math score of 499 or less in 2004	None	Common Data Set
act_low	Percent students who submitted an ACT composite score of 17 or less in 2004	None	Common Data Set
hsgpa_low	Percent students who submitted High School GPA of 2.99 or less in 2004	None	Common Data Set
62hrank_low	Percent students who submitted a High School rank below bottom half in 2004	None	Common Data Set
Region	Region of the institution	Dummy Coded (1=Northeast) (2=Midwest)	

Table 5 Continued

Variable Name	Description	Transformation	Source
		(3=West)	

		(4=South)	
remedial	Whether an institution offers remedial courses or not	Dummy Coded (0=no offering) (1=offering)	IPEDs
Pell	Percent students who are eligible for Pell Grant	None	College Board
Size	Size of the institution	Dummy Coded (1=Large) (2=Medium) (3=Small)	Carnegie Classification

Ordinary Least Square

Ordinary Least Squares is one of the most common techniques used in multivariate analysis (Amemiya, 1994; Dismuke & Lindrooth, 2006; Kennedy, 1992; Wooldridge, 2003). In this study OLS is used to estimate and predict the extent to which variation in graduation rates as an outcome variable is explained by a set of independent variables, both institutional and student-related. OLS regression is an ideal method for this purpose because it allows the researcher to estimate and directly compare the effects of one or more variables while simultaneously controlling for potential confounding variables. OLS regression is used to identify the strongest independent predictor of graduation rates for the subsequent phase of the study.

A series of stepwise models is estimated to assess the incremental effects of related sets of variables that are likely correlated to one another. The following model is

used to estimate variation in graduation rates as explained by socio-demographic composition of institutions:

$$y_{\text{graduationrates}} = \beta_0 + \beta_1 x_{\text{pell}} + \beta_2 x_{\text{women_pct}} + \beta_3 x_{\text{black_pct}} + \beta_4 x_{\text{hispanic_pct}} + \beta_5 x_{\text{asian_pct}} + \beta_6 x_{\text{other_pct}} + u$$

In this baseline model, y is the predicted value of graduation rate, B_0 is the y-intercept, B_1 is the effect of a one-unit increase in x on y , and x_1 is the actual value of x for each institution. On average, each institution's predicted graduation rate is a function of a y-intercept (i.e. the graduation rate when all covariates are zero) plus the incremental effects of explanatory variables: percent of students who are women, percent of students who are black, percent of students who are Hispanic, percent of students who are Asian, and percent of students who receive Pell Grants. Subsequent models use this same baseline regression function, but add related sets of covariates to the model.

Variable Imputation

Because 2004 Common Data Sets were not found at all institutions and because not all institutions fully reported their data, the database contained a large number of missing values. The presence of missing values on one critical independent variable – high school GPA – required missing value imputation (Cleophas & Zwinderman, 2012; Jing, 2012). Therefore, this variable was imputed to restore the maximum amount of information while keeping the data unbiased (Jing, 2012). The imputation was conducted by coding the percent low high school GPA equal to percent low high school rank if data on GPA were missing. Imputation of HSGPA using high school rank was chosen following a bivariate correlation test suggesting that the two variables are highly

correlated ($r=0.7$; $p<0.001$). This strategy is justified on the basis that both are proxies for academic preparation for higher education.

Stage 3: Survey

The survey instrument used in the third stage of the study is Support Services and Programs Dissertation Survey constructed for this study. The survey instrument contained 19 questions that were primarily multiple choice and open-ended response format.

The survey was sent electronically using the online software *Qualtrics* provided by the University of Kentucky. The instrument was constructed and administered on December 10th. In keeping with procedures recommended by (Dillman, 2007) two reminders were sent in two-week intervals.

The first three items on the survey required consent to continue and information about the respondent and the institution. Question-4 was multiple choice about services provided at the institution followed by a question that inquired about how long the services and programs have been in place. Questions 8 through 16 addressed data collection, tracking procedures, special programs, evaluation, and feedback based on student success rates after utilizing services. Questions 17 and 18 addressed institution memberships in support services organizations and associations. And the final question solicited remarks and questions from the respondents.

Internal and External Validity

Face validity: threats to face validity were addressed by having committee members who are experts in education and the research community review the survey instrument and provide feedback during the development phases.

Content Validity: threats to content validity were addressed by deriving the content of the surveys from peer-reviewed research and institutional websites. The services and programs addressed in the survey are grounded in research and currently are implemented by institutions of higher education in the US.

External Validity: threats to external validity were addressed by using a random sample of institutions to participate in the survey.

Sampling Procedure

The survey was constructed based on an inventory of services and practices listed on the 230 institutions' websites and in the literature. The survey was sent to a sample of 171 institutions to poll them on services they provide to assist students with academic needs and whether there are special services that specifically target students who start college underprepared. These institutions represented the remaining institutions from the full sample of 230 after 59 institutions were purposefully selected for participation in stage 4 of the study. More information on this selection process is provided in the following section.

The purpose of this general survey was to poll institutions on services and programs they have in place to assist and retain FFSLAC. Questions were qualitative, open ended, in nature in order to obtain as much information as possible about what services assist this population of students and how these services are provided. Survey participants represented both institutions with high and low percentages of FFSLAC and high and low graduation rates.

Recipients of the survey included directors, coordinators, deans of undergraduate studies or any top figure in the offices that provide support services and programs at each

institution. The names, email addresses and phone numbers were obtained from the university website and compiled in an excel sheet.

Data Analysis

Content analysis was conducted to interpret survey data. Content analysis is defined as “an *empirically grounded method*, exploratory in process, and predictive or inferential in intent” (Krippendorff, 2012, p. xvii). By content analysis, researchers can “examine data, printed matters, images, or sounds – texts – in order to understand what they mean to people, what they enable to prevent, and what the information conveyed by them does” (Krippendorff, 2012, p. xviii). Content can be *contained, inherent or a property of text* or it could simply *emerge* in the process of analysis (Altheide, 1987; Berelson, 1952; Krippendorff, 2012). In this study, content is not *contained, inherent or a property* of the text analyzed, but rather it *emerged in the process of text analysis*. In other words, the approach to content analysis followed in this study is *emic* as it was built on emerging or indigenous conceptions (Altheide, 1987; Creswell, 2007; Krippendorff, 2012) and was holistically built on the participant’s views and experiences (Creswell, 2007). Themes and categories emerged during the process of data reading, and findings will be reported in clusters that fall under the emerging themes and categories (Creswell, 2007, 2008; Krathwohl, 2004).

Stage-4 Interview

Interview questions evolved around 4 main areas. The first group of questions solicited basic information about the role of the participant in his/her office and the mission statement of the office. The second set of questions addressed the services the institution provides, what populations of students are served, whether or not they have

any special services for students with low academic credentials, how they monitor and track students, what referral strategies they use to make themselves visible to students, and how the services and programs have contributed to the success and graduation of students at their institution. The third section investigated the institutional atmosphere and leadership support and how offices of academic affairs benefit from the institutional characteristics and connections. The fourth section addressed unique services the institutions may have that are not offered at other institutions and what lessons the informants can share about these services.

Interviews were conducted over a landline phone in an office at the University of Kentucky. The interviews were conducted over speakerphone and a tape recorder was used to record the interviews. The interviewer informed the participants beforehand the interview was taking place over speakerphone and was being recorded. All interviews were conducted over a period of two months. After all interviews were completed they were transcribed verbatim. Tapes are kept in a secure locker and interview transcripts saved on a password protected computer device.

Sampling Procedure

Information gathered through Stage 2 of the study was used to select the sample for this stage of the study. Specifically, using the dataset built for statistical analysis, institutions were sorted by High School GPA and two subgroups were created for participation: (1) Institutions that had relatively higher graduation rates and higher percentages of students with low HSGPA, and (2) institutions with relatively lower graduation rates and higher percentages of students with low HSGPS. Criteria for selection was based on regression analysis conducted in the previous stage which

indicated High School GPA was the highest estimator of graduation rates. These two subgroups received customized surveys and request for an in-depth follow-up interview.

The interview sample was selected using *purposeful sampling* by which *information-rich samples* are identified for qualitative inquiry (Coyne, 1997; Patton, 2002). This sampling process allowed for the selection of 59 institutions with high percentages of students with low academic credentials. Each of these 59 institutions received a customized survey and a request for an in-depth phone interview.

Purposeful sampling of these 59 institutions was used to identify both *extreme or deviant cases sampling* and *intensity cases* (Flyvbjerg, 2011; Patton, 2002). Extreme or deviant cases are institutions with high percentages of students with low HSGPA and low graduation rates. These institutions were selected as they are *unusual or special* in this way (Flyvbjerg, 2011; Patton, 2002). The characteristic that makes them deviant is the fact that they are schools *not doing well* as far as graduation rates are concerned. Even though graduation rates are expectedly low due to the high percentage of students with low HSGPA, they still set examples of institutions that are *not doing well*. Therefore, examining what is happening at these samples can help improve their practices. “The logic of extreme case sampling is that lessons may be learned about unusual conditions or extreme outcomes that are relevant to improving more typical programs” (Patton, 2002, p. 232).

Institutions that admit higher percentages of student with low HSGPA and yet manage to graduate more students are *intensity cases*. *Intensity cases* are similar to *deviant cases* but they are less extreme. Institutions in the category do graduation rates that are below the national graduation rates, but they are still *doing better* than the *deviant*

cases described above. Therefore, the interviews aimed to identify any unique services or practices these institutions might have that might as well be behind the higher graduation rates. This sampling criteria helps identify information-rich cases that intensely, not extremely, describe the phenomenon (Patton, 2002).

The purpose behind the interview component is to generate practical and useful knowledge as reflected by people who are experienced in the area of support services and programs (Schön, 1983). To achieve this goal, interview participants were selected purposefully to contribute to the construction of knowledge about the reality the study aspires to present. This approach is *constructivist* in nature for it allows for the study of multiple realities as constructed by people in particular settings. These people report their perceptions, explanations, and beliefs of their *truths* and *relative* realities. They report the consequences of the constructions of their behavior for themselves and the people with whom they interact. In different words, the directors, coordinators and deans interviewed for this study presented different views of how FFSLAC can be academically assisted through the lens of their own practices. All institutions have common services and programs; however the practices and approaches they use make those services and programs more or less effective.

Interview Sample

Eleven program directors agreed to participate in the interview. The interviews, semi-structured in nature, were conducted via phone as institutions are scattered throughout the United States and in person interviews were not feasible due to financial and time constraints. One interview will not be included in the analysis as it was eliminated due to technical difficulties while transcribing the data. Therefore the final

sample size was 10 participants. The names of the informants and their institutions will not be disclosed in this study for confidentiality purposes. Each institution will be pseudo-labeled by a letter and the informant will be labeled by his/her institution pseudo-label.

Institution-A: Located in the Midwest, it is a medium residential public four-year institution that currently serves 10,214 undergraduate students. This institution falls within the *intensity sample*, i.e., has high percentages of students with low academic credentials but relatively higher graduation rates than the *deviant sample* institutions. In the year of 2004, 34% of its incoming first time full time freshmen submitted a High School GPA of 2.99 or less. In 2010, this institution graduated 56% of the 2004 cohort from the same institution.

Institution-A Participant is the Vice Chancellor of Multicultural Affairs and Student Success. The center he works for has federally-funded TRiO program and institutionally funded programs. He oversees the tutorial center and developmental education programs.

Institution-B: Located in the South, it is a medium residential public four-year institution that currently serves 10,029 undergraduate students. This institution falls within the *deviant sample*. In 2004, 52% of its incoming first-time full-time freshmen submitted a high school GPA of 2.99 or less. And in 2010, only 34% of its 2004 cohort graduated with a degree from the same institution.

Institution-B Participant is the director of the academic support department that offers tutoring, Supplemental Instruction, academic advising and a variety of academic support programs.

Institution-C: Located in the West, it is a non-residential large public four-year institution that serves 20,620 undergraduate students. This institution falls within the *intensity sample*. In 2004, 34% of its incoming first-time full-time freshmen submitted a high school GPA of 2.99 or less. In 2010, 60% of the 2004 cohort graduated with a degree from the same institution.

Institution-C Participant is the Assistant Director of the Academic Success Center and is in charge of the writing center and technology for the Academic Success Center.

Institution-D: Located in the Northeast, it is a medium residential public four-year institution that serves 5,098 undergraduate students. This institution falls within the *intensity sample*. In 2004, 48% of its incoming first-time full-time freshmen submitted a high school GPA of 2.99 or less. In 2010, 58% of the 2004 cohort graduated with a degree from the same institution.

Institution-D Participant is an Associated Director. She directs student services and coordinates summer week program, which is a summer bridge program for high school students who want to come to college. She is in charge of day-to-day operations in the program. She also teaches first year seminars.

Institution-E: Located in the South, it is a large non-residential public four-year institution that serves 14,016 undergraduate students. This institution falls within the *deviant sample*. In 2004, 54% of its incoming first-time full-time freshmen submitted a high school GPA of 2.99 or less. In 2010, only 30% of the 2004 cohort graduated with a degree from the same institution.

Institution-E Participant is the director of Center for Student Excellence, which is an advising center operating by an *in-take model*. It means, every freshman entering the university is going to be advised for their first year in this center.

Institution-F: Located in the Midwest, it is a large non-residential public four-year institution that serves 11,522 undergraduate students. This institution falls within the *deviant sample*. In 2004, 62% of its incoming first-time full-time freshmen submitted a high school GPA of 2.99 or less. In 2010, only 30% of the 2004 cohort graduated with a degree from the same institution.

Institution-F Participant is the coordinator of the tutoring center, and was the first one to be hired in this position at her institution.

Institution-G: Located in the Midwest, it is a large nonresidential public four-year institution that serves 13,608 undergraduate students. This institution falls within the *deviant sample*. In 2004, 52% of its incoming first-time full-time freshmen submitted a high school GPA of 2.99 or less. In 2010, only 25% of the 2004 cohort graduated with a degree from the same institution.

Institution-G Participant is the Associate Vice Chancellor for Academic Success and supervises first year programming - an academic support unit that provides advising resources for students who are in high-risk category.

Institution-H: Located in the West, it is a large nonresidential public four-year institution that serves 23,279 undergraduate students. This institution falls within the *intensity sample*. In 2004, 37% of its incoming first-time full-time freshmen submitted a high school GPA of 2.99 or less. In 2010, 53% of its 2004 cohort graduated with a degree from the same institution.

Institution-H Participant is the director of Academic Resource Center and the Learning Assistance Center at his institution.

Institution-I: Located in the Midwest, it is a small residential public four-year institution that serves 2,653 undergraduate students. This institution falls under *intensity sample*. In 2004, 47% of its incoming first-time full-time freshmen submitted a high school GPA of 2.99 or less. In 2010, 47% of its 2004 cohort graduated with a degree from the same institution.

Institution-I Participant is the Director of the Academic Assistance Center that provides all the tutoring, alternate site testing, the writing center, and that cares for at-risk students – both online and onsite.

Institution-J: Located in the West, it is a large residential public four-year institution that serves 7,792 undergraduate students. This institution falls under the *intensity sample*. In 2004, 36% of its incoming first-time full-time freshmen submitted a high school GPA of 2.99 or less. In 2010, 55% of its 2004 cohort graduated with a degree from the same institution.

Institution-J Participant foresees four programs that are located and administered out of the Learning Center. Three programs are federally funded and one institutionally funded.

Table 6 provides a summary of participants and institutional characteristics.

Table 6

Participant and Institutional Characteristics of Interview Sample

Institution	Title of Participant	Region	Size - Setting	Sample	Percentage	Graduation
					FFSLAC	Rates 2010
Institution A	Vice Chancellor of Multicultural Affairs and Student Success	Midwest	Medium – Residential	Intensity Sample	34%	56%
Institution B	Director of the Academic Support Department	South	Medium – Residential	Deviant Sample	52%	34%
Institution C	Assistant Director of the Academic Success Center	West	Large – nonresidential	Intensity Sample	34%	60%
Institution D	Associate Director of Academic Support Center	Northeast	Medium- Residential	Intensity Sample	48%	58%
Institution E	Director of Center for Student Excellence	South	Large – nonresidential	Deviant Sample	54%	30%

Table 6 Continued

Institution	Title of Participant	Region	Size - Setting	Sample	Percentage	Graduation
					FFSLAC	Rates 2010
Institution F	Coordinator of the Tutoring Center0	Midwest	Large- nonresidential	Deviant Sample	62%	30%
Institution G	Associate Vice Chancellor for Academic Success	Midwest	Large – nonresidential	Deviant Sample	52%	25%
Institution H	Academic Resource Center and the Learning Assistance Center	West	Large- nonresidential	Intensity Sample	37%	53%
Institution I	Director of the Academic Assistance Center	Midwest	Small – Residential	Intensity Sample	47%	47%
Institution J	Director of Learning Center	West	Large – Residential	Intensity Sample	36%	55%

Themes and Codes Reduction

Transcripts were carefully read multiple times; meanwhile, each sentence, statement or story was categorized under a relevant code or theme using online computer-assisted program *Dedoose*. During the process, additional codes and themes emerged, resulting in a total of 38 codes and 354 excerpts. The interviewees discussed a wide array of topics at length and expectedly some interviews contained information not relevant to the research questions. The codes with their related excerpts were printed, reviewed and consolidated resulting in 5 major themes that addressed the research question This process is summarized by Creswell (2007) as “moving from the reading and memoing loop into the spiral to the describing, classifying, and interpreting loop” (p. 151).

Inter-rater Reliability

After identifying the final set of themes that emerged during the content review of the interviews, a naïve reviewer was asked to code the 10 interviews separately. The investigator randomly selected 5 of the interviews to be coded with a result of 88% agreement.

Ethical Considerations

IRB approvals were obtained from the University of Kentucky. The identity of institutions surveyed and interview participants are protected. The institutions and interviewees are given pseudonyms in the data analysis section. Participants were informed about the confidentiality considerations in the consent letter they received when the request to participate in the study was sent to them. Participant’s consent to record the interviews was taken again before starting the interview. The recordings are stored in a

locked drawer in a desk at the investigator's home, and the transcripts are saved in a password protected file on the investigator's laptop that is also password protected. Interview data was analyzed using online software that uses high confidentiality and security measures. The investigator's account is password protected.

Summary

This chapter presented a detailed description of methodologies of data collection and data analysis used in this study. Four stages of data collection and analysis were outlined and detailed. Stage 1 presented a description of document content analysis to obtain the definition of students with low academic credentials, followed by another sub-phase of document review to collect quantitative data. Stage 2 used quantitative data collected in the previous stage to estimate the influence of confounding student and institutional characteristics on graduation rates. Stage 3 presented detailed description of survey instrument that was sent to a sample of institutions to investigate about their academic support services and interventions. Finally stage 4 describes in details the interview method used in this study to further probe how institutional services and practices contribute to retention and graduation of students with low academic credentials. The next chapter presents major findings from the data collected during this phase of the study. The definition of FFSLAC will be introduced, followed by regression results and finally results from the qualitative content analysis.

CHAPTER 4

Data Collection and Analysis

This chapter presents detailed analysis of the collected data. The first section will present the definition found in the initial exploratory phase of the study followed by regression analysis results. This is followed by a presentation of findings from the qualitative content analysis of the surveys and interviews.

Stage 1: Definition of FFSLAC

The purpose of stage 1 of the study was to determine how selective colleges and universities in the United States define “students with low academic credentials”? Academic preparedness encompasses a myriad of characteristics, and oftentimes students can be prepared in one area and underprepared in another. Student demographic characteristics have long been used as indicators and predictors of college preparedness. In this study, a new definition of students with low academic credentials will be introduced. This definition will certainly have limitations. However, this attempt is designed to inform future research related to retention and graduation of college students with low academic credentials.

Findings from this study indicate colleges and universities take six measurable pre-college academic indicators into consideration when admitting students: high school GPA, high school rank, SAT or ACT placement test scores, Carnegie units or high school core course requirements, letters of recommendation, and records that show participation in extra-curricular activities.

Based on the inventory of admission standards at selective institutions, i.e. institutions that do not have open admission, the following measures were found to be characteristic of FFSLAC:

1. A combined Math SAT score of 820 or less
2. An ACT composite score of 19 or less
3. High School GPA between 2.00 and 2.99
4. High school class rank less than 54th percentile
5. Taking less than 16 Carnegie/high school academic units
6. Having record of at least one remedial/developmental class

In the Common Data Sets (CDS), these components were reported in separate sections but with a slight difference in cut off scores. SAT math and SAT verbal are reported separately, with a cut off score of 499. Therefore, the percentage of students admitted with SAT verbal of 499 or less and SAT math of 499 or less were obtained. The ACT composite cut off score for FFSLAC in CDS is 17. Therefore, the percentages of students with ACT composite cut off score of 17 or less were obtained. HSGPA and High School Rank were kept the same. Carnegie/High school academic units were eliminated from the criteria because there are no records of them. The remedial/developmental class history was eliminated as it could be explained by the pre-college scores.

Stage 2: Quantitative Analysis

The purpose of stage 2 was to identify institutional characteristics that have the strongest relationship to 6-year graduation rates. Aggregate level data was compiled in a spreadsheet and analyzed using the statistical software program STATA[®]. Descriptive

statistics from the dataset are presented in Table 7 followed by regression analysis and results from the four models.

Table 7

Descriptive Statistics

		Proportion	Mean	SD	Range
	Graduation	—	52.57	17.08	15-92.7
	High School GPA Low	—	29.75	20.26	0-89
	High School Rank Low	—	26.17	19.52	0-93
	Pell	—	29.60	8.97	10.1-59.6
Remedial	Offers	0.73	—	—	—
	Does not	0.26	—	—	—
Region	Northeast	0.26	—	—	—
	Midwest	0.23	—	—	—
	West	0.27	—	—	—
Size	South	0.23	—	—	—
	Large	0.52	—	—	—
	Medium	0.32	—	—	—
Demographics	Small	0.15	—	—	—
	White	—	71.63	19.11	3.27-98.23
	Black	—	9.47	12.11	0.31-88.42
	Hispanic	—	6.53	8.61	0.21-63.36
	Asian	—	5.99	8.05	0-43.84
Gender	Other	—	5.66	4.88	0.17-31.84
	Women	—	49.88	11.35	6-51-83.49
	Men	—	45.25	11.67	12.55-93.49

Variable Imputation

Because 2004 Common Data Sets were not found at all institutions and not all institutions fully reported their data, the database contained a large number of missing values. The presence of missing values in critical independent variables like high school GPA and High School rank required missing value imputation (Cleophas & Zwinderman, 2012; Jing, 2012). Therefore, these variables were imputed to in order to restore the maximum amount of information while keeping the data unbiased (Jing, 2012).

The model estimation proceeds in four steps to reduce the impact of multicollinearity on the estimation of coefficients. Large variance is usually attributed to

Multicollinearity (Kennedy, 1992). Therefore, correlational analysis was conducted in order find out which variables are multicollinear and strong correlations were found between SAT verbal and high school GPA (0.8); SAT verbal and HSGPA (0.8); HSGPA and ACT (0.6); and, HSGPA and HS Rank (0.7).

In cases of Multicollinearity, it is suggested that researchers “do nothing” (Kennedy, 1992, p. 181). “The existence of Multicollinearity in data does not necessarily mean that the coefficient estimates in which researcher is interested have unacceptably high variance” (Kennedy, 1992, p. 181). However, one of the ways researchers can remedy Multicollinearity is by omitting one or more variables that are collinear (Kennedy, 1992). Therefore, high school rank, SAT verbal, SAT math and ACT variables were dropped because they all predicted graduation rates the same as high school GPA. High School GPA was the only variable about student academic characteristics kept in the final model given a large body of research that demonstrates it as the highest estimator of graduation among other variables, i.e., SAT and ACT scores and High school rank (Alexander Astin, 1987; Alexander Astin, 1997; Murtaugh et al., 1999; Reason, 2003; Tross, Harper, Osher, & Kneidinger, 2000).

Regression Diagnostics

To detect and remedy potential violations of OLS assumptions (Kennedy, 1992) two regression diagnostics were run (a) the square root of the variance inflation factor (VIF) for multicollinearity, and (b) a scatterplot of the standardized residuals and predicted values of the dependent variable heteroskedasticity. Variance Inflation Factor was very high for models that included all academic variables due to the high correlation between these variables. Likewise, multicollinearity was also found due to the high

correlation between the explanatory academic variables. Therefore, SAT and ACT variables were excluded from the models.

Regression Results

Model I examines the effects of student socio-demographic characteristics on graduation rates. Model II investigates the impact of measures of academic performance on graduation rates, while Model III focuses on institutional characteristics. Finally, Model IV includes all independent variables simultaneously. Standardized coefficients are examined to compare effect size across covariates.

Model 1: Socio-demographics

This model estimates how variation in graduation rates is explained by socio-demographic characteristics. On average, it is estimated that a one percent increase in students who receive Pell grants is associated with a significant decrease in graduation rates ($b=-1.04$ $p<0.001$), holding all other variables constant. Higher percentage of women among the student body is associated with an increase in graduation rates ($b=0.22$, $p<0.05$), holding all other variables constant. Additionally, this model shows that while holding all variables to their means, the presence of Asian students is associated with an increase in graduation rates ($b=0.80$; $p<0.001$). Higher percentages of black, Hispanic and any other non-white students are associated with a decrease in graduation rates, but these results are not statistically significant.

Model 2: Academic Performance

The second model estimates the influence of student academic characteristics on graduation rates. The variables included in this model are: percentage of students with

low High School GPA, percentage of students with low High School Rank and whether or not the institution provides remedial courses. On average, a one percent increase in students with low HSGPA is associated with a significant decrease in graduation rates ($b = -0.26$, $p < 0.001$), all else constant. On average, a higher percent of students with low high school rank is also associated with a decrease in graduation rates ($b = -0.41$, $p < 0.001$), holding other variables constant. On average, institutions that offer remedial courses have lower graduation rates ($b = -4.53$, $p < 0.05$), holding all other variables constant.

Model 3: Institutional Characteristics

The effect of institution's size and region is estimated in this model. On average, compared to institutions in the Northeast (New England and Mid-Atlantic), institutions in the Midwest have lower graduation rates ($b = -16.2$, $p < 0.001$), holding all else constant. Similarly, institutions in the West and Southwest are estimated to have lower graduation rates in reference to Northeastern institutions ($b = -13.84$, $p < 0.001$), holding all other variables constant. Institutions located in the South are also estimated to have lower graduation rates in reference to institutions in the Northeast ($b = -10.95$, $p < 0.001$). Size of the institution appears to have influence on graduation rates. In reference to small institutions, on average, large institutions ($b = 22.9$, $p < 0.001$) and medium institutions ($b = 7.71$; $p < 0.05$) are estimated to have higher graduation rates, all else constant.

Model 4: Full Model

The final model combines both student and institutional characteristics and estimates their influence on graduation rates. This model shows that 78% of the variation in graduation rates is explained by the independent variables included. One variable,

percentage of women, lost statistical significance in this model, suggesting that gender does not explain unique variance in graduation rates after controlling for other covariates. However, racial and socioeconomic composition, student academic performance in high school, region, and size of the institution remain significant in the full model, indicating that these variables all have independent significant effects on institutions' graduation rates.

Table 8

Results of the 4 Regression Models

	Model 1	Model 2	Model 3	Model 4
Percentage with Pell Grant	-1.04(0.15)***	—	—	-0.33(0.12)**
Remedial				-6.22(1.88)***
Percentage Women	0.22(0.11)**	—	—	0.06(0.07)
Percentage Black	-0.1(0.11)	—	—	-0.03(0.08)
Percentage Hispanic	-0.05(0.14)	—	—	-0.18(0.13)
Percentage Asian		—	—	0.31(0.11)**
	0.78(0.15)***			
Percentage Other	-0.38(0.22)	—	—	-0.19(0.16)
Percentage with low HSGPA		-0.27(0.07)***	—	-0.56(0.05)***
Percentage with low HS Rank		-0.42(0.08)***	—	—
Midwest ¹	—	—	-16.16(3.24)***	-5.66(1.69)***
Southwest	—	—	-13.84(3.17)***	-8.84(2.18)***
South	—	—	-10.95(3.26)***	-9.01(2.39)***
Large ²	—	—	22.39(3.42)***	10.99(3.18)***
Medium	—	—	7.71(3.52)**	10.49(3.10)***
<i>R</i> ²	0.46	0.61	0.30	0.78
<i>F</i>	19.91***	79.06***	14.40***	35.04***
¹ Omitted Category is “Northeast”; ² Omitted Category is “Small”				
=p<0.05; *=p<0.001 (Two-tailed tests)				
<i>Note:</i> Unstandardized coefficients are presented, standard errors are in parentheses.				

In order to identify the strongest predictor of graduation rates, the magnitude of effects for each significant covariate in the full model are compared. Regression

coefficients are fully standardized to compare how a one standard deviation increase in each independent variable is associated with standard deviation increases in graduation rates. The magnitude of the continuous variables: Pell, percentage women, percentage black, percentage Hispanic, percentage Asian, percentage other, and percentage low HSGPA are compared in one set; and the magnitude of the dichotomous variables: remedial, west, southwest, south, large and medium are compared in another.

It was found that, on average, a one standard deviation increase in percentage of students with Pell Grant is associated with a 0.14 standard deviation decrease in graduation rates ($P < 0.05$). On average, a one standard deviation increase in Asian students is associated with 0.19 standard deviation increase in graduation rates ($p < 0.05$). Finally, on average, a one standard deviation increase in the percentage of students with low HSGPA is associated with a 0.63 standard deviation decrease in graduation rates ($p < 0.001$). Therefore, HSGPA appears to have the highest effect on graduation rates among the continuous variables.

The magnitude of the effects of dummy variables are also compared. Among the six variables, size of the institution appears to have the highest influence on graduation rates, particularly for medium institutions. Offering remedial courses is associated with 0.17 standard deviation decrease in graduation rates ($p < 0.001$). Being an institution in the Midwest is associated with 0.17 standard deviation decrease in graduation rates ($p < 0.05$), being in the West is associated with 0.27 decrease ($p < 0.001$), and being in the South is associated with 0.22 decrease ($p < 0.05$). As for the size of the institution, being a large institution is associated with a 0.28 standard deviation increase in graduation rates ($p < 0.05$) and being a medium institution is associated with 0.29 unit increase ($p < 0.05$).

In summary, the results from the quantitative phase of this dissertation research suggest that student pre-college and institutional characteristics have significant influence on graduation rates. High School GPA is the highest estimator and therefore this result guided the subsequent stages in this study. The next section will present the qualitative stages of the study that are stages 3 and 4.

Stages 3 and 4: Qualitative Content Analysis

The statistical analysis was followed by two qualitative stages, that involved the use of a survey and in-depth interviews to further investigate the variation in graduation rates. While graduation rates were explained in general terms through the regression analysis, qualitative analysis further investigates how institutional practices and support might explain performance and graduation of FFSLAC only. Content analysis is conducted to report findings from a general survey taken by 45 respondents, and 10 customized surveys completed via interview by directors, coordinators and deans in charge of the offices of support centers at institutions that have high percentages of FFSLAC. The purpose of the qualitative analysis is to thoroughly understand factors that influenced graduation rates at the selected institutions. Specifically, this stage of the research seeks to identify links between institutional support services and interventions and degree completion.

Stage 3: General Survey Results

The survey was completed by 45 respondents from different regions in the United States: 12 respondents from the Northeast (New England and Mid-Atlantic), 8 respondents from the West (West and Southwest), 8 respondents from the South and 7 respondents from the Midwest. Ten respondents did not provide answers beyond the first

question that asked for confirmation to proceed. Therefore, 35 valid responses were used in the analysis. Each respondent provided his/her title and the name of the institution where he/she is employed. Respondents were Directors of Academic Success Centers or Learning Centers, Executive Directors of Learning Centers, Managers of Learning Assistance Centers, and Learning Center Coordinators.

The first question was multiple-choice, which required respondents to select all services and programs offered at their institution. Table 9 presents the list of services/programs provided and number of institutions indicating they provide the service. Overall, the most commonly provided service was tutoring (N = 35), followed by academic skills workshops, Math and Science labs, academic learning services (each with N = 33). The least common program/service was courses in college reading (N = 19).

Table 9

List of services and programs and how many institutions provide them

Service or Program	Institutions that Provide (N)
1. Tutoring	35
2. Supplemental Instruction	27
3. Learning communities	22
4. Academic skills workshops / student success workshops / skill development workshops / learning skills workshops	33
5. Academic skills courses / learning strategies courses	20
6. Early alert system	23
7. College reading skills program and services	19
8. College writing skills programs and services	30
9. Mathematics and science labs	33
10. Computer resources	31
11. Academic learning services (such as study skills, time managements, test preparations and others).	33
12. Online resources for students (printable resources)	27

Respondents were offered the opportunity to list additional services and programs offered by their office but not included in the list. Seventeen respondents provided 33

additional services. Analysis of these services indicated the majority was similar to the services listed, but respondents gave them different labels/names. For example, respondents included services such as developmental courses in mathematics and English language, courses in speaking, foreign language labs all of which could be classified under *Support with Basic Skills* (language, mathematics and computer). Services such as academic coaching and peer mentoring programs could be classified as *tutoring or mentoring programs*. When duplicative services and programs were removed, two classifications were identified, as presented in Table 10 below: *advising and counseling* and *First Year Programs*

Table 10

List of Services and Programs Provided by Respondents

Category of Services and Programs	Institutional Examples
Basic Skills Courses and Services	<p>Grammar Blob</p> <p>College reading, writing, speaking and listening courses for ESL students</p> <p>Foreign language lab</p> <p>Conversation Partner Program</p> <p>Language conversation groups</p> <p>Developmental courses in reading, composition, mathematics and science</p> <p>Individual appointments: math, sciences, writing, languages, study strategies</p>
Tutoring and Mentoring programs	<p>Academic coaching: one-on-one assistance</p> <p>Embedded online tutor</p> <p>Embedded online tutor</p> <p>Virtual tutoring labs</p> <p>Study groups</p> <p>Peer mentoring for students with disabilities</p> <p>Faculty mentoring program</p>

Table 10 Continued

Category of Services and Programs	Institutional Examples
Supplemental Instruction	Linked courses: Students enroll in the primary course and then eligible to enroll in the link that provides (primary course specific support)
First Year Programs	A gateway program (Onward program) Summer bridge program “First Year” course
Coaching and Advising	Career center, diversity, and multicultural centers Advising for one of the at risk student population Academic advising Peer and staff support and counseling

Recognizing the difference between services that target the general population of students regardless of their academic credentials and services that target FFSLAC, respondents were asked to identify services that target this particular population of students. Twenty-one respondents indicated they offer special programs for this population of students, and listed 31 programs that can be clustered under three main categories. The first category is *Special programs for conditional admits*. These programs are offered either during the summer or during the first semester. Students are offered full admission after successfully completing these programs. Such programs include Summer Bridge Programs, First Year Foundation programs, Summer Proof of Ability programs and Educational Opportunity Program. The other two categories included *Tutoring* and

Basic Skills Courses and Services, consistent with the programs listed and described previously as presented in Table-11.

Table 11

Services and Programs that Target FFSLAC

Category of Service or Program	Institutional Example
Basic Skills Courses and Services	Academic development program Developmental math courses
Tutoring and Mentoring	One-on-one writing and study skills workshops Saturday tutoring
Special Programs for Conditional Admits	Admission by alternate criteria Educational Opportunity Program Foundations program (within the explorations program) Freshman studies program (it requires they take set of classes in the summer and must successfully complete them in order to continue in the fall) Golden Scholars Bridge Program (it requires students to participate in tutoring and workshops as part of conditional

Table 11 Continued

Category of Service or Program	Institutional Example
	<p>admission)</p> <p>First Year Foundations program (it offers summer intensive workshops and online refresher modules in math and reading for students who did place into college level courses but were close to the cutoff scores. At the end of the session they retest and can be exempted from Basic Skills courses)</p> <p>Summer boot camp</p> <p>Summer pre-freshman academic preparation program for 6 weeks</p> <p>STEP/CAP (Summer Transition at Eastern Program/Contract Admission Program)</p> <p>Summer Proof of Ability Program (it requires students take a minimal course load in their first semester, enroll in a first-year seminar, and have frequent meetings with an Advisor</p>

An open-response question investigated how services/programs offered have contributed to the success and graduation of students who need academic support. Thirty-

two respondents indicated their services contributed to student success. Responses varied from anecdotal to data supported. A total of 14 respondents provided anecdotal data. For example, respondents provided examples of information provided by students, such as:

Unprepared utilize our services extensively and tell us directly of just how much of an impact our services have made on their academic career.

We provide individualized one-on-one assistance, and students tell us the difference that makes in their academic success and progression. Also, the vast majority of students pass the classes in which they received tutoring.

Responses also were based on practices they follow in their centers:

The Academic Center reaches out to students who are placed in developmental or refresher coursework visiting their courses, speaking with students when they take placement exam(s), and also via e-mail to inform students of our services.

Finally, responses reflected data and tracking by the institution:

We have assessed the success of students (GPA and retention rates) who have received services through our office. We compare their success with similar students (same HS ranking and ACT scores) who have not received our services.

Our graduation rate is at/higher than the university's regularly admitted students' rates. Our persistence/grade class progression rate is higher than the university's regularly admitted student.

The general survey polled institutions on what services and programs are in place and attempted to find out about any unique services and programs that

target students with low academic credentials. The next section reports main findings from interviews conducted with 10 institutions around the United States.

Stage 4: Interview

The following findings were generated through survey sent to individual respondents with a request for an in-depth phone interview. Customized surveys (or institutional profiles) were constructed after review of websites of 59 target institutions. Each institution offers a different set of services and programs, and each institution received a customized survey to obtain general information about these services and programs for two main purposes. First, the survey solicited basic information to reduce interview time. Second, the investigator used the survey to obtain contact information and schedule time for phone interview. This stage of the research study was designed to address the third research question related to how institutions approach support services and programs, and what programs are perceived as more successful than others.

The focus of the interviews was on what institutions do to assist students with low academic credentials in order to succeed and graduate with a degree. An additional goal was to determine whether graduation rates at institutions with high percentages of students with low HSGPA can be explained by the types of programs and services they offer. The assumption was institutions in the intensity sample (e.g., graduation rates that are below the national graduation rates, but above the deviate group sample) would have services and programs that contribute to graduation rates that differ from those in the deviant sample.

Data from the customized profile (survey) and in-depth interviews did not support this assumption, as there were not significant discrepancies in programs offered between

the two subgroups of institutions. Other major findings did emerge related to practices and approaches respondents described as effective in helping students with low academic credentials persist and succeed. The next section presents the major themes that emerged from this analysis.

Themes

This section presents major themes that can be used to answer the third research question in this study, specifically respondents perceptions on : (1) how FFSLAC are defined and identified; (2) services/programs provided; (3) effectiveness of these services; (4) referral strategies and connections; and (5) lessons they would share with other institutions.

Definition and identification of FFSLAC

Informants were asked to provide a definition of students with low academic credentials. At the beginning of the interview, they were reminded the study is primarily focused on this population of students. Two kinds of definitions emerged, either through direct statements or were inferred.

Stated Definition: Respondents were asked directly how their institution defines students with low academic credentials and how this population of students is identified. The majority of respondents indicated *Test scores* were used for identification (N = 8). This included both ACT or SAT scores. *High School GPA* is also used along with the *test scores* to determine student college readiness. Some respondents identified *High School GPA* was taken with consideration to the geographic context of the High School. Students who go to high schools in rural areas are treated differently from those who attend high

schools in urban or sub-urban areas. Students who come from rural areas were identified as most likely to be *first generation* college students, another characteristic of FFSLAC.

The second category of responses was related to *demographic characteristics*. Respondents indicated that *Nonwhite* students were typically more at-risk especially at pre-dominantly white institutions. Students from *low socio-economic status* are also considered to be at-risk As well as *students with diagnosed physical and learning disability* who were reported given special attention at these institutions. Another population of students mentioned by multiple respondents was *student athletes*. Finally one institution reported *military students* among the high-risk population served. While institutions reported offering provisional or conditional admission to these populations of students using a combination of characteristics, the primary means of identification was test scores and HSGPA.

Inferred: Though not directly tied to the interview questions, a number of student characteristics were mentioned and referenced throughout the interviews. For example,, *students on probation* were mentioned several times as students who get institutional attention. This population of students does not necessarily start with low credentials, but reported did not do well after matriculation. *Undeclared students* are also among those who reportedly received academic support as they were considered to be at risk of dropping out after their first year if not provided with counseling and support.

Support Services/programs offered

The interviews sought to discover unique or special programs that can help explain why there are discrepancies in graduation rates among the institutions despite the fact they all have high percentage of students with low academic credentials. The premise

was there are certain unique services and programs at the institutions that fall within the intensity sample and/or they implement their services in a more successful or unique way than institutions in the deviant sample. Again, this assumption was not supported by the data. The majority of the institutions, across the two samples, reportedly provide similar services. For example, all 10 institutions offer tutoring, Supplemental Instruction, coaching/advising and some form of assistance with academic/learning skills through first year seminars/courses or workshops. The majority also offer summer bridge programs (6 institutions). Interviewees reported they do not offer unique services and programs not provided in other institutions around the country; however, they indicated their practices and the way they approach their services might be unique to their institutions. For example, Institution-I Participant (from the intensity sample) reported the approach they follow when new underprepared students are admitted. He said:

We find that students are often arriving at school unprepared for college. We draw students ACT quartile 2 and 3, so students arriving with less preparation and less structure, so they come in, it is a very intrusive style of intervention. They receive a letter that they are admitted but they are on probation. And then it outlines the conditions of students on probation, then when they get here they come for special orientation and this gets students aware of the conditions in order to maintain enrollment, and then at this orientation they set an academic action plan to identify what their weaknesses are. For example, students check off a checklist, I didn't study enough, I didn't study more. But we discovered that we make them articulate why they had low ACT scores or why their HSGPA is below 2.0

has been more beneficial. Then when that happens students get their academic action plan, they have to go over that with someone up here and their academic advisor. The student then agrees to come up here to the Academic Assistance Center at least two hours every week, I would say they do more than that when they start getting used to it.

Institution-E Participant (from the deviant sample) reported:

A lot of people have Success Courses. Our Success Courses are tightly managed and we get people from all over the university campus to teach the course, and not only the staff advisor. The course is mandated and required for graduation [...] we have tightened the control so that we have increase in our retention and progression.

Institution-B Participant (from the deviant sample) reported a new *faculty reporting* program that they have started fairly recently:

Within the first month, faculty have to report if the student has attended class or never attended class. And they have added another one which is student is engaged or not engaged. And this reporting is for federal financial reasons, but we have piggy backed on this program. That can include a variety of possibilities such as students are not coming to class, sleeping not sleeping, failing a test or not. So we get reports of students who are not engaged. And from there we have a variety of interventions. We have different departmental services, we have mentors who get in touch with the students, we have residence life support as well, RAs knock

on their doors and ask why they're having issues and refer them to resources on campus.

Institution-F Participant (from the deviant sample) talked about a Summer Bridge program that is not unique to their institution, but the way they implement it make it more successful. She illustrated:

A lot of universities have summer bridge programs for unprepared students, but our boot camp program is interesting because many student commuter take math or math and English or English. They take course for 7 weeks Monday through Friday, and an SLA leader is invited to their class for an hour and a half a day or an hour SLA peer lead study session. And they are committed to attendance for one hundred dollars. For students who are from lower income to afford it is much cheaper to pay 100 than pay 2000 dollars for no credit in the general term. We have 80 students from 50. That is growing. That's an excellent program.

Effectiveness

When asked about how effective their support services and programs have been, all participants indicated they have contributed to student success in many different ways. In this section, informants showed high knowledge of their institutional data and tracking procedures. Some work with the offices of Institutional Research and retention offices and some have their own tracking system.

Institution-A Participant (from the intensity sample) gave an example on how one of their programs improves student grades:

We know that students who participate in SI have a half letter grade higher. Students who participate in sessions of SI where a tutor is an in class assistant, their performance is about 0.8 letter grade higher.

Institution-B Participant (from the deviant sample) talked about how they monitor and track attendance of this population of students because they have found an association between attendance and academic success. By making sure students are accessing their services first, the mission is halfway accomplished. Therefore, at this institution some of the records they keep are related to how many students participate and how frequently:

The best record keeping we have is not for the non-engaged because that's a new one, but for those who have been on academic probation or involved with tutors and SI. We check whether their GPA improved or whether they are enrolled in classes for the next semester, and we also get students satisfaction evaluation of those program. This is a tough population, because many of the factors can be outside of the realm of academic support unit. Of course we'd love to see a high level of participation because this is a population that most likely wont participate in any program the college university offer, so we put a lot into participation numbers and we saw those going up. And then we've been seeing our success rates going up as participation goes up.

Institution-C Participant (from the intensity sample) talked about one of the most effective ways to evaluate performance, which is comparing student performance before and after attending a certain program or using a certain service:

Academic success class: we compare their GPA before and after attending the class. We see significant differences in their growth. The term prior they take the class, their GPA is half what their GPA becomes after taking the class.

Institution-G Participant also referred to the same point:

Roughly 70% of our students who graduate record using a combination of multiple services, we know there is a high correlation between the use of these resources and success rates.

Institution-I Participant (from the intensity sample) compared performance of students on probation after using their services to regular students:

Recently about 3 years ago, I hired a specialist for at risk students and our students now who are admitted on probation are succeeding at a slightly higher rate than our regular students, it is not statistically significant, we are talking about a portion of our a point. But the point is that our retention has gone up specifically in relation to programs implemented originally for students admitted on probation and recently extended it to all students on probation.

Institution-F Participant (from the deviant sample) compared last year's numbers and this year's numbers and they show improvement:

Things are really improving, last year the fall '11 cohort 26 of them were on probation, this year we have a largest cohort with 22 on probation, so percentages are going down.

Referral Strategies and Connections

Informants reported a wide variety of referral strategies in use at their institution to inform students about their services and programs. Since they are dealing with a *difficult population* of students, according to some, there is a need to think of ways to recruit these students. Strategies like *socials, advertisements, information/orientation sessions, connecting via social networks, friends and peers, and flyers* were among the strategies the informants listed.

Recognizing the difficulty of attracting this population of students, informants discussed the effectiveness of working with faculty members. The most effective and recurrent strategy most of the informants highlighted throughout the interview is *working with faculty*.

Institution-A (from the intensity sample) Participant was very strong about working with faculty, saying: “*Typically we don’t do much of that stuff [such as orientations, ice cream socials], we work with faculty, because that stuff doesn’t work well*”. Institution-G Participant (from the deviant sample) also stated:

Although we do many things, email communication, we do presentations, we have open fairs where we literally go on the sidewalk and share our resources, we find the most important communication that generates student interaction is recommendation from faculty members in the classroom.

Participant-D (from the intensity sample) confirmed:

Faculty hold power. Many put us on their syllabus. We go to faculty orientations every year whenever new a faculty is hired, we’re in faculty

handbook and we go to classes. Faculty invite us to do sessions on time management, reading strategies, how to handle reading load and get the most out of it.

Another effective practice was the use of academic advisors. *Direct referrals from academic advisors* was highlighted by a large majority of respondents. Institution-E (from the deviant sample) has in place a *Total In-take Model* that illustrates one of the successful ways of working with academic advisors:

The nature of the total in-take model is that every student is required to meet with an advisor at the Center of Excellence, they don't have that as an option. When student come in, they have his profile in front of them, so they begin advising students based on where they are, so the referrals are in place. If the student has high score, the meeting has a different nature from when students have low scores. And the advisor is the person who refers student if there's a need for counseling, a need for tutoring, a need for enrolling in supplemental instruction class. They're the ones who handle that.

The informants acknowledged the increasing attention institutions give to retention efforts, which was discussed in context of how their offices are supported by top-tier leaders at their institutions. Leadership teams at these institutions have played a crucial role in sustaining and financing the offices of support services. In addition, offices of provosts, chancellors, vice chancellors and presidents have been mandating retention initiatives start in the offices of support services.

Institution-E (from the deviant sample) Participant illustrated:

The provost is very supportive, and this particular program was started at the university in 2005, so for that period of time [University]101 was actually where they took measures of student effectiveness and monitor that course against student progression and retention, because in that course itself the students were required to complete certain milestones and a portfolio, and the provost met on regular basis with the university community that was subcommittee to report the outcomes and they're very aware and supportive of what going on here. Anything that has to be changed has to take the provost approval.

Institution-D (from the intensity sample) Participants also denoted:

One of the ways we transformed ourselves is former president held a great push for academic excellence so we totally revamped our general education program we now have an integrated studies program and it has been recognized as being a real model general education program and we also increased our rigor in our programs.

Institution-I (from the intensity sample) Participant said:

Because we are small and we have the support of the university administration we are able to operate well and get funded. The very good about helping us implement new and experimental programming. And example is our writing center we have some data that local business hiring students with skills extremely high but their raking in written oral communication not really high so I went to see the chair of the department that we'd like to start a writing center to work on this, so he was like "this

is a 10 thousand dollars to start working on this". So I went with just permission and came back with money. So that's what you can do at a small institution that you cannot do at bigger institution very easily.

Another dimension that facilitates the job of offices of support services and programs is collaboration with other offices on campus. Several informants indicated they cannot succeed alone, and they cannot reach students if they do not collaborate with other offices like *residence life, counseling, disability services, student government, and financial aid*. Collaborating with these offices helps them become more visible and reachable for students who need academic support.

Lessons

At the conclusion of the interviews, participants were offered the opportunity to talk about what other institutions could learn from what they considered their own best service or practices. Some respondents indicated successful services they offered might not be unique to their institution but they approached or delivered the services in unique ways. Others offered information they felt would be helpful to other institutions. For example, Institution-A Participant (from the intensity sample) said:

You need to bring together practitioners and faculty to where they have communication. Some of our initiatives we were able to do that. The more we've done than the better we've gone. First time you do it you mess it up. Sometimes things you don't anticipate happen. Then you have to do it again and then you get more things right. But there are other things you mess up, and then you do it for the third time. Then you start to become better about it. It has to be several times. You have to have people

communicating, and you have to work to develop the resources. We did not get there all of a sudden. We have done a lot of experimentation over time, and we are still trying. People have to be patient.

Another lesson Institution-H Participant (from the intensity sample) talked about:

The biggest thing is our willingness to work with other offices I have worked with other institutions that have a high load approach, there were multiple organizations on campus doing their own initiatives and not engaging with other institutions so the message is have the conversation because we are a team and students who work with us work are engaging with dozen different offices on campus, we just need to have connections between the offices. It certainly makes things easier.

Once again, respondents brought up the importance of being visible and connecting with other resources on campus. Working with faculty and getting support from the leadership team and collaborating with other offices that provide other kinds of services were seen as important.

Summary

This chapter presented findings from regression analysis, survey and interviews. Regression results showed HSGPA as the highest estimator of graduation rates; this finding allowed for sample selection of interview participants. Content analysis from the general survey showed most institutions rely on summer programs to prepare FFSLAC for college. Content analysis of interview data revealed institutions do not focus on implementing new services as much as improving practices and approaches to service students with academic needs. In the next chapter, a summary of findings and

conclusions will be provided followed by recommendations for institutions and future research.

CHAPTER 5
SUMMARY AND DISCUSSION OF RESULTS, CONCLUSIONS,
AND RECOMMENDATIONS

This study applies a mixed methodological approach to investigate and examine the effectiveness of support services and programs implemented and practiced at public four-year institutions that admit larger percentages of students with low academic credentials. This concluding chapter presents the study summary, discussion of results, main conclusions and recommendations for practice and future research.

The research questions guiding this study included:

4. How do colleges and universities in the United States define “students with low academic credentials”?
5. What institutional and students characteristics estimate graduation rates?
6. How do institution-specific support services and programmatic interventions influence academic performance and graduation of students with low academic credentials?

The findings presented in this chapter are twofold. First, findings from this study are consistent with earlier research that found student and institutional characteristics influence graduation rates (W. Habley, Bloom, & Robbins, 2012; Moore. & Shulock, 2009; Tinto, 2010). Second, the study will add to the understanding of what and how academic support helps students with low academic credentials persist to graduation (Engle & O'Brien, 2007; Engle, Theokas, & Education, 2010; Nguyen, Bibo, & Engle, 2010).

Summary of the Study

Data used in this study were drawn from multiple resources to examine and understand how support services and programs contribute to graduation rates at institutions with high percentages of students with low academic credentials. The purpose of this study was to define and identify measurable characteristics of full-time first-time students with low academic credentials, then collect quantitative data based on this definition. Quantitative data were collected and analyzed using regression analysis in order to identify the highest estimator of graduation rates. Based on the findings from regression analysis that showed HSGPA to be the highest estimator of graduation rates among variables used in the study, a sample of 59 institutions that had high percentages of students with low HSGPA were selected for survey and interview. Simultaneously a general survey was sent to a sample of institutions with varying graduations rates to poll them on what services and programs they implement at their institutions. Findings from data analysis of all sets of data will be presented to answer the three research questions that guided this study.

Astin's (1991) input-environment-output (IEO) theory was used as a guiding theoretical framework for this study. The results showed student characteristics, *input*, mainly HSGPA and race, are predictive of graduation rates. It was also shows institutional *environment*, mainly size and region of the institution are predictive of graduation rates. The regression model that combined student and institutional variables explained variation in graduation rates to a large degree. These findings show student input and institutional *environment* influence graduation rates, *output*. The study did not use institutional practices to predict graduation rates. Therefore, institutional

characteristics were the only predictors used along with student characteristics, which provides limited information about institutional effectiveness related to performance and practices.

Discussion of Findings by Research Question

The first research question addressed how colleges and universities in the United States define “students with low academic credentials”. Findings from this study indicate colleges and universities primarily identify students with low academic credentials as those with (a) combined Math SAT score of 820 or less; (b) ACT composite score of 19 or less; (c) High School GPA between 2.00 and 2.99; (d) High school class rank less than 54th percentile; (e) taking less than 16 Carnegie/high school academic units and (f) record of at least one remedial/developmental class.

Several variables appeared to have a significant influence on graduation rates, the most significant of which was high school grade point average (HSGPA). There is a large body of literature that supports HSGPA as the most predictive variable of college performance (Alexander Astin, 1987; Alexander Astin, 1997; Murtaugh et al., 1999; Reason, 2003; Tross et al., 2000). It is worth noting, however, that high school performance is influenced by the high school from which students graduate (Carey, 2004). Specifically, there is disparity between high schools depending on their funding levels, staffing, and other resources (Carey, 2004).

This study shows that graduation rates were significantly influenced by the demographic characteristics of the student body. Socio-economic status has a significant influence on graduation rates. Specifically, institutions that admit larger numbers of students who are Pell Grant eligible are more likely to have lower graduation rates. These

findings may indicate that students from lower socio-economic status environments are less prepared, which may be due to the type of social and academic experiences they have prior to coming to college (Haycock, Lynch, & Engle, 2010).

Research has found Pell Grant recipients are usually less academically prepared, typically as a result of taking less rigorous high school curriculum; and they have lower SAT/ACT scores (Engle & O'Brien, 2007). Further, demographically, Pell Grant eligibles are more likely to be older, non-white, and first generation students, as well as married or single parent (Engle & O'Brien, 2007). These conditions may make a college education less of a priority or a burden potentially due to the student's inability to see the benefits of delayed gratification (e.g., finding a job) when earning a college degree. The end result is drop out. This finding is consistent with a study conducted by Jones-White, Radcliffe, Huesman Jr, and Kellogg (2010) that shows despite financial aid, i.e. Pell Grant received by lower SES students to overcome the financial obstacles, their probability of graduating is 10 points less than wealthier students.

Findings in this study indicate institutions that have higher percentages of Asian students more likely to have higher graduation rates. This finding is consistent with a study conducted by McCarron and Inkelas (2006) that examines educational aspirations and educational attainment of first generation students and how that interacts with race. The study found that among first generation students, Asian students had the highest educational attainment rates (41%). Asian educational attainment is explained by their high socioeconomic status and educational advancement among the Asian communities that reside in the US. (Hirschman & Morrison, 1986). Asian communities, particularly Japanese and Chinese, have not grown dramatically which has allowed them to use

marginal resources to educate their children and advance their communities (Hirschman & Morrison, 1986). These cultural and socio-economic factors may enhance Asian student aspiration and make their educational attainment highly achievable.

Findings in this study support existing research that found women have higher graduation rates than men (Ewert, 2010; Lee, 2012). A study conducted by Wohlgemuth et al. (2007) showed females usually have higher grade point average and higher graduation rates, and students with higher ACT scores tend to have higher education rates. Female graduates outnumber male graduates, 3-to-2, due to differences in returns from college, especially in health, marriage and earnings. Women and men do pay the same for college education, but men's advantage from the total cost of attending college is less than that of women (Becker, Hubbard, & Murphy, 2010).

The academic characteristics model examined how high percentages of students with low high school grade point average (2.99 or less) and high percentages of students with low high school rank (from the bottom half of the graduating class) influence graduation rates. Findings suggest institutions that admit large numbers of students with high school GPA of 2.99 or less, and those who admit large percentages of students who graduate from the bottom half of their high school are more likely to have lower graduation rates. Use of HSGPA and high school rank as a proxy for student academic capacity by researchers is common (T. Bailey & Xu, 2011; Goenner & Snaith, 2004) as it is highly predictive of degree attainment. The findings from this study confirm existing research that pre-college academic performance influences student's ability to successfully complete college level course work (Engle et al., 2010; J. L. Hoffman & Lowitzki, 2005; Horn & Kojaku, 2001; Moore. et al., 2010; Noble & Sawyer, 2004).

Influence of institutional size and region was estimated in the third regression model. Institutions located in the Northeast appear to graduate more students than institutions in the Midwest, West and South. Unfortunately, there are no studies that confirm this finding or provide any empirical evidence on the influence of institutional region on graduation rates. However, it is known that Northeastern states, such as New York, Pennsylvania and Massachusetts are among the states with strongest economics in the nation (Kaplan, 1998). Such economic conditions imply that wealthier taxpayers, and upper and middle class people reside in that region, which may reflect on the resources of the academic institutions in the region.

Size of the institution was found to have a significant influence on graduation rates; large institutions appear to have higher graduation rates than medium or small institutions. This finding is confirmed in previous studies (Kamens, 1971; Scott, Bailey, & Kienzl, 2006). Ryan (2004) found institutional size had a positive effect on graduation rates. He asserts larger institutions may provide better funded and a larger variety of support and academic services that help students throughout their college years. In addition, a study by Engle et al. (2010), showed size of the institution has influence on graduation rates; higher graduation rates at larger research institutions could be attributed to more resources to support students and more selective admissions. This finding is also confirmed by Haycock et al. (2010) who found research and flagship institutions have higher graduation rates for a variety of reasons, including resource allocation and selectivity.

The final question in this study aimed to identify what and how support services and programmatic interventions influence academic performance and graduation of

students with low academic credentials. More specifically, the question aimed to identify the factors that influence graduation rates from those who work in academic support offices.

The general survey was designed to verify services and programs identified as available, as well as identify unique services and programs offered through the institutions participating in the study. Based on the survey results, respondents indicated their institutions implement a variety of services and programs to help students graduate. Some institutions have special programs and services they report have a positive influence on graduation rates; these programs are mainly summer bridge programs that have been shown to increase persistence among students who start academically underprepared (Ackermann, 1991; Cabrera, Miner, & Milem, 2013).

Findings from this survey indicate institutions do implement services and programs that aim to enhance graduation rates. It was also found that most of the institutions that responded to the survey rely on summer programs, in addition to tutoring and Supplemental Instruction to assist at risk populations. The interviews went deeper into how services and programs influence graduation rates differently at different institutions. This study was based on the assumption that some institutions are experiencing higher graduation rates than others because of their academic support system. However, the interviews did not verify this assumption as each of the 10 academic affairs staff talked about the influence of support services in a very positive way.

The interviews with the institutions with very low graduation rates did not show significant gaps in the services and programs they provide. On the contrary, institutions

categorized as deviant sample have well-implemented services and programs and their data shows significant improvement in academic performance among students who use their services, according to the informants. These institutions implement programs, such as summer bridge programs, intrusive advising, learning communities, tutoring, Supplemental Instructions and other programs and services successfully like the institutions in the intensity sample.

Even though the assumption that institutions with higher graduation rates are doing something different was not verified, the informants do collectively provide evidence that support services and programmatic interventions have a positive influence on graduation rates when implanted well. In other words, the recurring theme and major finding in the interviews is that services are available, and though they are *not unique*, they can be implemented in *a unique way*. The interviewees reported the *practices* and *approaches* that frame the services and programs matter the most.

The majority of the informants indicated in order for them to provide the appropriate support and serve students with low academic credentials they identify or *detect* students with academic needs using institutional data early on before students experience failure. After detecting or identifying students who need academic support, students can be *referred* to the appropriate services that meet their specific needs. *Referring* students can be done within a network that combines various departments and offices on campus. *Connecting* with faculty, residence halls, academic advisors, deans and other offices on campus is one effective way the offices of support services can reach out to students and meet their needs. Finally, a key element the interviewees emphasized was the importance of receiving *support* from the institution's top-tier administration for

them to sustain continuity and effectiveness. Offices of support and interventions need resources that are provided and sustained by the institution at large. These resources can vary from space, to funding, to policymaking, to strategic planning from the top-tier administration. Finally, the respondents emphasized the importance of using data to *evaluate* their own performance and monitor student success before and after using services. Figure-2 summarizes the four major steps that may ensure effectiveness: detect, refer, support and evaluate. To detect, data is needed; to refer, connection is needed; to support, resources are needed; and to evaluate, data is needed.

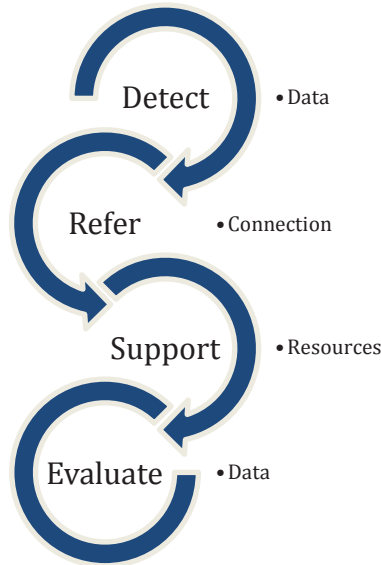


Figure 2 - Four-Step Model for Academic Support

The major finding in this study is that practices and approaches matter more than the services themselves. Some services and programs are unique and effective for some institutions, but overall the way institutions practice and approach the services is what makes them more or less successful. For example, tutoring can be either successful or unsuccessful depending on the way it is approached. Some institutions might have tutoring available for students on “a stop-in” basis, or when students decide for

themselves to see a tutor. On the other hand, other institutions make tutoring mandatory for students who are identified and referred before or early on in the semester or before they experience failure. When students are required to see a tutor, tutoring can be more effective. Therefore, institutions can be more successful if they approach support services and interventions in a systematic way. The next section provides a detailed description of how institutions can do that using the four-step approach detect, refer, support and evaluate from the perspective of the Academic Affairs Staff who were interviewed.

Detect: Proactive and intrusive support is necessary. Early detection or what institutions call *Early Alert system* is one way to assist students before they experience failure. Students who come in to the institution with low credentials can be identified using admission data and reporting strategies from faculty members, academic advisors, department heads and undergraduate deans. Once students start showing early signs of incompetence, like not coming to class, failing a quiz/test, not submitting work on time and the such, they can be reported by faculty or class instructor and academic advisors for proactive or intrusive intervention.

Research on Early Alert or early academic analytics (J. P. Campbell, DeBlois, & Oblinger, 2007) is rich and provides evidence on how it improves performance among students with academic needs. Veronica A Lotkowski, Steven B Robbins, and Richard J Noeth (2004) suggest that Early Alert system is one of the most effective retention strategies that institutions can implement based on pre-college academic factors as well as indicators of college performance, such as attendance and engagement. An example of institutions that have been using successful alert model is University of Alabama (J. P. Campbell et al., 2007). Students in Data Mining courses at this university were given

access to student data and were asked to develop a predictive model of at risk students using academic pre-college and demographic characteristics. Using this model thousands of at-risk students are identified annually and referred to the appropriate services needed. This model has been effective in increasing retention among at risk populations (J. P. Campbell et al., 2007).

Refer: Building networks and working with other offices is another area of importance. Once detected, students should be referred to the appropriate support services and interventions. *Connection* among different offices that work on campus is one way to accomplish this. Offices of Academic Support can work with other offices, like offices of disability, offices of residence life, counseling and above all with academic departments to which faculty report. Detection that starts in class, advising sessions and residence halls can help identify students who need support and get them connected with the academic support unit for remedy and assistance.

Research on referrals and connections between various offices on campus is related to research on early detection or alert systems. Early detections are implemented to connect students with service providers through faculty and advisors who are directly involved with the students (Barefoot, 2004; J. P. Campbell et al., 2007). A study by Jenkins (2007) that used student level data to evaluate institutional effectiveness in retaining minority students in 28 community colleges in Florida showed high performing colleges were the ones that coordinated their programs and services to support students. Also, the study found high impact colleges were the ones that provided students with academic services tailored to their special needs.

Support: Offices of Academic Support need support in order to support. Institutional support, particularly support that comes from the top-tier leaders and administrators appears to be a key player in facilitating and sustaining the continuity and effectiveness of the academic support offices. Support of Presidents, Vice Presidents, Provosts and Vice Provosts is important. Initiatives to increase graduation rates that offices of presidents and provosts lead today in higher education can be successful if done in coordination with academic support units.

An example of how top tier institutional administration can support academic support units is *Access to Success Initiative* (Engle & Lynch, 2009). *Access to Success (A2S)* is an initiative that brings together 24 public higher education systems that represent 378 higher education institutions that serve over three million students. A2S system serves 27% of all low-income students and 44% of all African American, Latino and American Indian students in the US higher education system. Presidents and Chancellors of A2S initiative took the lead on increasing the graduation rates among minority students significantly by 2015. Some of the institutions that are part of A2S, such as Tennessee Board of Regents (TBR), have demonstrated exemplary work towards achieving this goal (Engle, 2009). TBR are six higher learning institutions that serve 67% minority students without having gaps in success. These institutions used to experience high first year drop-out rates that made them develop a project to redesign their elementary and intermediate algebra developmental math courses. This project aims at increasing success through dedicated services to all students, particularly students who start academically underprepared, rather than increasing their selectivity (Engle & Lynch, 2009).

Evaluate: Last but not least, data-informed practice is important for academic support units to maintain effectiveness and success. In order to gain and maintain institutional support, academic support units can provide enough evidence that their presence on campus makes a difference in student academic performance. Keeping track of students who receive support and conducting data analysis continuously is an important record-keeper and effectiveness-checker.

The literature provides examples on program evaluations and how data can improve practice. An example is presented in the work of T. A. Campbell and Campbell (1997) that looks at faculty-student mentor programs at a large metropolitan university in the West Coast. The researchers emphasize the importance of commitment to evaluation research to understand the programmatic efforts.

In summary, from the interviews, it appears the *availability* of services and programs that target students with low academic credentials is not a major focus of the institutions that participated. Rather, they reported the practices and approaches rather than availability of services are of greater importance to student success. All institutions that participated offer tutoring, SI, seminars and workshops and several other services, but the fact that some institutions are more successful than others is attributed to a host of other factors than availability of services and programs themselves. There is a large body of research that reports a wide array of factors that influence graduation rates. These factors do not necessarily reflect institutional performance as much as they are characteristics of the institution and student body. Astin, (1997) suggested student major fields can influence retention rates; institutions with more students in fields like business and social sciences tend to graduate more students. Astin also indicated that residential

institutions appear to graduate more students. Titus (2004) attributed retention and graduation to institutional selectivity; the higher the selectivity, the higher the retention rates due to what he considered positive peer climate. In a different study, Titus (2006) found institutions that rely on tuition as a main resource of revenues tend to graduate more students because they focus more on retention strategies. On the other hand, Titus showed that students chances for persistence decrease as expenditure on administrative functions increase because the focus shifts from students to administration (Titus, 2006). Additionally, Ryan (2004) found graduation can be influenced by instructional and academic expenditure; the more institutions spend on instruction and academic support, the more likely students persist and graduate. Such studies show graduation and persistence can be influenced by a host of factors. These factors can interact with the institutional academic support services and can make them more effective at institutions than others.

Recommendation for Practice and Future Research

The findings from this study have resulted in the development of a four-step model (Figure-2) that could be used to support the implementation of successful practices in Academic affairs to target students with low academic credentials. This model is based on experiences and practices of directors in the offices of academic support who agreed to participate in the study. Each step in the model is grounded in research, and combining the four steps may provide a more effective framework for service planning and implementation. The study does not provide empirical evidence on the effectiveness of this model. Specifically, future studies can look at these four practices combined at

institutions of higher education and evaluate their effectiveness in assisting students with low academic credentials.

Additionally, more research on institutions that admit high percentages of students with low academic credentials can help institutions inform their practices. This study does not look at practices of selective institutions, because the body of students is already academically capable and may not reflect much of institutional effectiveness or uniqueness. More research, e.g., case studies and comparative studies, on institutions with high percentages of students with low academic credentials is recommended.

Assessing and evaluating the effectiveness of academic support services requires use of student level data and tracking methods to compare student performance before and after using the services. This study did not use student-level data or any records of students who used the services. Aggregate level data and general graduation rates that do not distinguish between students who are academically prepared and those who are underprepared were used. Therefore future research that uses student level data and tests to show how student performance is influenced after using the services would yield valuable information for the field.

Limitations of the Study

One major limitation of the study is the inability to generalizability of findings given since conclusions are based on the graduation rates of one year. The study is cross-sectional and examines one graduating class, thus impacting generalizability. Studies may yield more valid results using longitudinal data. In addition, the qualitative stages of this study, inherently affect the ability to generalize findings beyond the sample participating in the surveys and interviews. As with all qualitative methods, the measures used provide

indirect information filtered through the participants' viewpoints. Researcher's bias in interpretation of the data must be considered.

Additionally, the exploratory nature of this study presents a big limitation. The quantitative data showed relationship between variables and graduation rates, and the qualitative data deeply explored institutional practices that might have influenced these graduation rates. However, the interview sample was very small and no student-level data was used to empirically prove the influence the use of services and programs has on graduation rates. The major assumption that institutions with higher graduations rates are doing something different from the institutions with lower graduation rates was not validated. There are many factors that interact within the institutional setting and influence graduation rates and that could be examined, but the study studied support services and programs only.

A related limitation is the use of aggregate level data. The study was built on graduation rates reported in a Common Data Sets, and these data sets do not dichotomize graduation rates by academic characteristics. Aggregate level data was used because the scope of this dissertation study was limited and obtaining student-level data from a large number of institutions was beyond the limit of this dissertation.

Another limitation in this study is the small number of Academic Support Staff who agreed to participate in the study. One of the reasons could be the timing of the interviews. The request for the interviews was sent at the end of the fall semester while universities were getting ready for Christmas break. Reminders were sent at the beginning of the spring semester but the timing was also difficult for the academic

support staff. Better timing to send request for interviews might result in more participation.

Conclusion: New Ways of Researching Educational Attainment

Student and institution characteristics are critical and are highly predictive of academic performance. However, these findings only confirm an existing body of research that is both rigorous and massive. The attention that the community of scholars in higher education has given to demographic characteristics, pre-college academic characteristics, and some institutional characteristics is vast. Nevertheless, this attention has not solved the problems of high attrition rates that institutions of higher education are facing. Graduation rates in the public higher education system are still less than 60% and student academic preparedness for college is still in decline. In addition, higher education is burdened by political and fiscal challenges due to shrinking state appropriations for colleges and universities.

If student characteristics are the strongest predictors of graduation rates, institutions might need to consider admitting students who are affluent, academically prepared, with high academic aspirations and high parental expectations and involvement. This is a win-win situation for institutions and students. However, this is not what higher education is all about, and such student body is not reflective of the society at large. Increasing selectivity can definitely raise academic standards and increase graduation rates but it contradicts the social agenda of public four year institutions and does not provide enough evidence on institutional effectiveness (Schroeder, 2013).

Graduation is not the product of student characteristics or *input* only; it is “a metric by which institutional performance could be judged” (Schroeder, 2013, p. 39). If graduation rates will continuously be predicted by SAT, ACT, or other student pre-college characteristics, what role do institutions play in the academic process? (Kalsbeek, 2013). Offenstein, Moore, and Shulock (2010) argue:

Two things institutional leaders should never do as they learn more about the students who don't succeed. They shouldn't lower standards, and they shouldn't excuse low graduation rates for some groups of students because “students like these” supposedly cannot be expected to graduate at higher rates. (Offenstein et al., 2010, p. 1)

For the past 50 years, institutions of higher learning have maintained an equilibrium between student capacities and institutional expectations (Boden, 2011). Institutional performance and practices are the measures by which institutions should be evaluated and this cannot happen without looking at both student *input* and *environment* together. Institutions, though they have some control over the *input*, they have tremendous control over the *environment*, which can shape the *output* in many different ways.

Rhetoric about student persistence and graduation that has long been framed by student academic preparedness has been taking place for decades (W. Habley et al., 2012). The fact that nearly one third of college students who come to college are expected to drop out due to academic underpreparedness has not changed for decades and it is traced back in the early work on retention of Astin, Tinto and Pascarella (Alexander Astin, 1987; E.T. Pascarella, Smart, & Ethington, 1986; Tinto, 1975). If studies since

1970 still yield consistently similar findings about the influence of academic preparedness on graduation rates, then there is a need to reframe the way we look at retention of students with low academic credentials to include the institutional practices not only physical environment to the equation.

Recent Initiatives to Increase Graduation Rates

Interestingly, in the recent years, new research on retention and student achievement has provided new models for evaluating institutional effectiveness. *Education Trust* in coordination with *Institute of Higher Education Leadership and Policy (IHELP)* funded by Bill and Melinda Gates Foundation and Lumina Foundation Education have been leading initiatives to increase retention and graduation rates among underrepresented groups since 2005. Their goal is to close the achievement and opportunity gaps among all students, particularly students of color and students from low-income families. *Top Gainers*, *High Performers* and *Gap Closers* are some of the terms given to institutions that have closed the achievement gap among different groups of students and increased graduation rates especially among populations of students that traditionally do not make it through the academic pipeline.

Top Gainers increased graduating minority students between 2002 and 2007 by 8% (Engle et al., 2010). For example, Florida State University was able to close the achievement gap between minority students and their peers through the *Center for Academic Retention and Enhancement*. This center supports minority students from high school to college and supports them financially and academically through advising, orientation and tutoring. Ohio State increased graduation rates among minority students by 10% since 2002 through the University's Todd Anthony Bell National Resource

Center. This center provides services that target African American males and has been considered to be an important institutional strategy to increase graduation among minority students on campus. Some of the services this center provides are intrusive advising, freshman orientation, faculty and peer mentoring programs. Graduation rates among African American males rose from 69% in 2001 to 91% in 2008.

Stony Brook University and Texas Tech are two examples of *The Top Gap Closers*, specifically for the advancement of Hispanic students (Engle, 2012). Over one third of the student population who go to these two university systems are Pell Grant Recipients and over 15% are underrepresented students; however they managed to succeed in closing the gap between the different groups of students through practices that engage and empower students and involve faculty. This institution implements supports services that include *summer boot camp program, mandatory study skill workshops for students who are falling behind* and other interventions that have contributed to closing achievement gaps. Leaders of *Top Gap Closers* suggest that implementing programs and services is necessary, but not sufficient. These institutions suggest coupling services and programs with policies and practices that make them more effective is what matters.

College Results Online, which is an online tool that provides information about institutions records, practices, and graduation rates, show why and how certain institutions are able to graduate a more diverse body of students more than others. In their recent reports about retention of low-income students, Engle and O'Brien (2007) examine the practices and policies that influence persistence and retention rates at large institutions that matriculate larger numbers of low-income students or Pell Grant recipients. Their study revealed that through successful practices, like *intrusive academic*

advising and courses and services that improve students' basic skills during the first year of college, institutions could increase retention and graduation of low-income students.

While these initiatives show promising gains and advancements in retention among populations of students known to be underprepared, more research that focuses on institutional practices is required. Student characteristics have long held power in predicting graduation rates, and it is time for institutional practices to hold the same predictive power.

APPENDICES

Internal Review Board



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EXEMPTION CERTIFICATION

MEMO: Nada El Majzoub, EdD
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PI phone #: (859)806-4709

FROM: Institutional Review Board
c/o Office of Research Integrity

SUBJECT: Exemption Certification for Protocol No. 12-0910-X4B

DATE: November 29, 2012

On November 28, 2012, it was determined that your project entitled, *Support Services and Programmatic Interventions Four Year Colleges and Universities Have in Place to Increase Degree Attainment Among Students with Academic Needs: A Mixed Methods Research*, meets federal criteria to qualify as an exempt study.

Because the study has been certified as exempt, you will not be required to complete continuation or final review reports. However, it is your responsibility to notify the IRB prior to making any changes to the study. Please note that changes made to an exempt protocol may disqualify it from exempt status and may require an expedited or full review.

The Office of Research Integrity will hold your exemption application for six years. Before the end of the sixth year, you will be notified that your file will be closed and the application destroyed. If your project is still ongoing, you will need to contact the Office of Research Integrity upon receipt of that letter and follow the instructions for completing a new exemption application. It is, therefore, important that you keep your address current with the Office of Research Integrity.

For information describing investigator responsibilities after obtaining IRB approval, download and read the document "PI Guidance to Responsibilities, Qualifications, Records and Documentation of Human Subjects Research" from the Office of Research Integrity's Guidance and Policy Documents web page [<http://www.research.uky.edu/ori/human/guidance/htm#PIresp>]. Additional information regarding IRB review, federal regulations, and institutional policies may be found through ORI's web site [<http://www.research.uky.edu/ori/>]. If you have questions, need additional information, or would like a paper copy of the above mentioned document, contact the Office of Research Integrity at (859) 257-9428.

General Survey

You are about to take Support Services and Programs Dissertation Survey. You have clicked on the link to this survey upon reading the consent letter in the email you received. Therefore, you have read, understood, and printed a copy of, the consent form and desire of your own free will to participate in this study.

What is your title?

- 1- Select all the services and programs that your institution offers
 - Tutoring
 - Supplemental Instruction
 - Learning communities
 - Academic skills workshops / student success workshops / skill development workshops / learning skills workshops
 - Academic skills courses / learning strategies courses
 - Early alert system
 - College reading skills program and services
 - College writing skills programs and services
 - Mathematics and science labs
 - Computer resources
 - Academic learning services (such as study skills, time managements, test preparations and others).
 - Online resources for students (printable resources)
- 2- Does your institution offer services or programs not mentioned in this list?
 - Yes

- No

If yes/please list.

- 3- Which of the services you selected were offered after 2004?
- 4- First time freshman students with low academic credentials students admitted with SAT/ACT scores, high school GPA and high school rank below the minimum admission requirements at an institution. Do you have any special programs not listed above that target students with low academic credentials ONLY?
- 5- Does your office keep longitudinal data or records of students who start academically underprepared until they graduate/transfer out/drop out?
- 6- Do you keep record of all students who seek academic assistance?
 - Yes
 - No
- 7- Do you believe your services and programs have contributed to the success and graduation of students with low academic credentials at your institution?
 - Yes
 - No
- 8- Are you a member of any of the following associations? (Check all what applies)
 - College Reading and Learning Association
 - Council for the Advancement of Standards (CAS) in Higher Education
 - Council of Learning Assistance and Developmental Education Associations
 - Other
- 9- Do you have questions or remarks?

Customized Survey

1- I have reviewed your institution's website and have a list of the services and programs you indicate you offer. For each one, I would like to ask you a few questions?

The first service/program listed is **tutoring**. For this service/program:

- a. Is it still being offered? If not, why? If yes...
- b. How long has it been provided?
- c. Has it been modified or changed? If yes, why?
- d. Would you consider it research-based?
- e. Did you adopt it from another universities?

The second service/program listed is **Supplemental Instruction (SI)**. For this service/program:

- a. Is it still being offered? If not, why? If yes...
- b. How long has it been provided?
- c. Has it been modified or changed? If yes, why?
- d. Would you consider it research-based?
- e. Did you adopt it from another universities?

The third service/program listed is **study skills workshops**. For this service/program:

- a. Is it still being offered? If not, why? If yes...
- b. How long has it been provided?
- c. Has it been modified or changed? If yes, why?

- d. Would you consider it research-based?
- e. Did you adopt it from another universities?

2- Are there other programs or services that you can list?

3- Students with low academic credentials are first year first time students who are admitted with SAT/ACT scores, high school GPA and high school rank below the minimum admission requirements at an institution. Do you offer special support service and programmatic interventions that are targeted only to students with low academic credentials?

- a. If yes, what are they?

4- Does your office keep longitudinal data or records of students who start academically underprepared until they graduate/transfer out/drop out?

5- Do you keep record of all students who seek academic assistance?

Interview Protocol

Background Information

- 1- Could you please provide a general overview of your role in the office of support services and programs?
- 2- Can you please provide a brief overview of the mission of your office?
- 3- Are there any additional services/programs provided at your institution that were not listed on the website? If yes, are you willing to share some information about them? If no, can you tell me why. If yes, can you tell me:
 - a. Why do you not have it listed on your website?

Support Services and Students with low academic credentials

- 4- What population of students do your support services and programs target?
- 5- How do you define students with low academic credentials or students who need academic support?
- 6- Are there students who use your services regularly (daily, weekly, monthly...)?
What population of students are they from?
- 7- How are students with low academic credentials at your institution referred to support services and programmatic interventions? In other words, what referral strategies does your institution use?
- 8- To date, to what extent do you think your institutional support services and programmatic interventions have contributed to the persistence and success of students with low academic credentials?

- a. Do you have any official records or evidence on how performance of students with low academic credentials has changed upon receiving assistance from the institutional support services? Can you give me examples or numbers?

The institution and academic support services

- 9- What institutional characteristics do you think influence your ability to provide academic assistance to students who seek help at your institution? (Prompt - demographic composition of students, fiscal conditions of the institution, geographic characteristics and others)
- 10- What support services or programmatic interventions do you think are provided uniquely by your institution?
 - a. If none, are you currently or working on unique services or supports to increase degree attainment?

Future

- 11- Are you anticipating similar outcomes for the more recent cohorts?
- 12- What lessons can other institutions, with both high and low percentages of students with low academic credentials, learn from your institution?

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