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Persistence and academic attainment of community college student service members/veterans earning career and technical education credits

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PERSISTENCE AND ACADEMIC ATTAINMENT OF COMMUNITY COLLEGE STUDENT

SERVICE MEMBERS/VETERANS EARNING CAREER AND TECHNICAL EDUCATION

CREDITS

A dissertation submitted in partial satisfaction

of the requirements for the degree of

Doctor of Education in Organizational Leadership

by

Brennan Jeremy Carr

October, 2020

Leo Mallette, Ed.D. – Dissertation Chairperson

This dissertation, written by

Brennan Jeremy Carr

under the guidance of a Faculty Committee and approved by its members, has been submitted to and accepted by the Graduate Faculty in partial fulfillment of the requirements for the degree of

DOCTOR OF EDUCATION

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DEDICATION

This dissertation is dedicated, first and foremost, to my family for all of the love and support they provided me over the many years it took to complete this journey. To my beautiful wife, Rebecca, no words could ever express my love and gratitude for your unwavering support and encouragement. I could not have done this without you, nor would I have wanted to. You are and always will be an inspiration to me in the way you handle life with integrity, beauty, and grace. I love you with all my heart.

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Finally, to all the student service members/veterans who are working hard to complete their education, never ever give up on this worthwhile endeavor. There are a lot of people in postsecondary education rooting for your success. Thank you for your service to, and sacrifices for, our great nation.

SERO SED SERIO

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ABSTRACT

This study examined the impact of Career & Technical Education (CTE) credit accumulation on the persistence and academic attainment of student service members/veterans (SSM/V) within the 2-year public postsecondary education segment. SSM/V are a small but significant population of underrepresented non-traditional students within postsecondary education. This study sought to explore the effect of CTE credit accumulation on SSM/V performance in five key dichotomous outcome areas: (a) persistence, (b) degree attainment, (c) certificate attainment, (d) any award attainment, and (e) vertical transfer. Data from the Beginning Postsecondary Students Longitudinal Study (BPS), which are maintained by the National Center for Education Statistics within the U.S. Department of Education, were analyzed using linear probability modeling.

The results of this study found no association between CTE credits earned and SSM/V status on four of the five dichotomous outcomes examined: persistence, degree attainment, certificate attainment, and any award attainment. The fifth outcome, vertical transfer, showed a statistically significant and positive relationship to CTE credits earned and SSM/V status. As SSM/V accumulated CTE credits, the probability of vertical transfer increased. Results in each of the first four outcomes also showed a significant and positive relationship with CTE credit accumulation. As students' CTE credit accumulation increased, the probability of persistence, degree, certificate, and any award attainment also increased. With the vertical transfer outcome, the results showed a significant but negative association to CTE credits earned. In this case, increased CTE credit accumulation resulted in decreased vertical transfer probability.

The implications from this study are likely to be of interest to CTE and SSM/V researchers, as well as 2-year postsecondary policy and decision makers. Researchers, for

example, may want to replicate this study using datasets containing larger SSM/V participants, which may produce results with stronger statistical power. CTE and community college policy and decision makers may want to consider the results of this study as they focus on serving the needs of the SSM/V community on their campuses, and as they strive to create CTE learning opportunities that improve overall student success.

Chapter 1. Introduction to the Study

Introduction

The focus of this dissertation is the persistence and attainment of student service members/veterans (SSM/V) earning community college Career and Technical Education (CTE) credits. SSM/V are an under-represented population of nontraditional postsecondary students in the research literature. This chapter includes a discussion on the background of the problem as it relates to economic conditions, the role of community colleges, the significance of CTE programs and credits, SSM/V as a unique population of students, and the importance of persistence and attainment in postsecondary education. Further, this chapter includes a discussion of the problem in the current research, the purpose of this dissertation, the research question that was examined in this study, and the hypotheses. The chapter concludes with a discussion of the conceptual framework of the study, the significance of the topic examined, the key definitions used within this research, and the limitations of the study.

Background

Some sectors of the U.S. economy continue to grow at a fairly healthy pace, despite the challenges of turbulent conditions related to the global pandemic. While it is understood that the economic prosperity of recent years would not continue for the long term, and periods of recessionary economics will manifest, business, political, and education leaders should continue to focus, as long as possible, on creating and implementing systems, structures, processes, and policies that will allow workers and organizations to take advantage of whatever positive economic conditions exist in as many industries as possible and for as long as possible.

Industries such as communications, energy, critical manufacturing, information technology, and healthcare have shown decreasing or already low unemployment rates (Bureau

of Labor Statistics, 2020), and many of these areas continue to be strong contributors to the U.S. gross domestic product (Bureau of Economic Analysis, 2020). According to the Bureau of Labor Statistics (2019a), employers continue to be challenged to find qualified applicants to fill the positions available, especially in areas of skilled labor and trades. Many of the open jobs in the United States are in industries such as trade, transportation, and utilities; professional and business services; and health services (Bureau of Labor Statistics, 2019b).

Postsecondary educational institutions such as community colleges are being tasked with helping to attract and train workers who can close the labor gap. Community colleges are uniquely qualified to bridge the gap between workers and job placement. With their open enrollment policies; easy access; low cost; shorter timeframes for course, certificate, credential, or degree completion; and a focus on skilled labor, trades, technical, and vocational education, as well as liberal arts, community colleges provide a valuable resource for students, employers, communities, and the economy as a whole (Wheeler, 2013).

A major focus for many community colleges today is the area of CTE. CTE programs are concentrated in areas such as business administration and management, health sciences, information technology, and skilled trades. Advance CTE (2019) has categorized CTE disciplines into 16 career clusters, which is discussed in more detail in Chapter 2. CTE courses, certificates, credentials, degrees, or degree transfer plans may have varying requirements among community colleges; however, many community colleges that offer CTE programs are singular in their pursuit of advancing the knowledge, skills, and abilities of students in an effort to fill job vacancies and create employment mobility now and well into the future.

Career and Technical Education programs within community colleges have received a lot of attention and resources for continued development. For example, in California, the Strong

Workforce Program allocates $248 million annually to spur career and technical education in the nation's largest workforce development system of 113 colleges (California Community Colleges-Chancellor's Office, 2019; Rosen et al., 2018). Additionally, the Carl D. Perkins Act passed in 1984 (referred to as "Perkins"), and subsequently again in 1990 ("Perkins II"), 1998 ("Perkins III"), 2006 ("Perkins IV"), and 2018 ("Perkins V"), has added tremendous financial resources in support of CTE programs across the U.S. On July 13, 2018, the Strengthening Career and Technical Education for the 21st Century Act ("Perkins V") was passed, which amended the earlier Carl D. Perkins Career and Technical Education Act ("Perkins IV") of 2006. This new amendment, which took effect on July 1, 2019, allocates $1.26 billion toward CTE programs in the United States (Perkins Collaborative Resource Network, 2019). It is beyond the scope of this paper to detail all of the legislation passed in support of CTE and related educational programs; however, as stated earlier, a significant amount of attention and resources have been dedicated to this endeavor.

Career and Technical Education programs have been identified as having a profound and positive affect on American competitiveness in the global economy (Association for Career and Technical Education, 2013). According to the ACTE Issue Sheet on American Competitiveness (2013):

> CTE plays a vital role in developing a well-educated workforce that supports American productivity and innovation through its emphasis on college and career readiness, including academic, technical and employability skills; its partnerships with industry; and its focus on meaningful postsecondary attainment that leads to careers that drive the global economy. (p. 2)

As companies continue to seek qualified workers to fill open positions, one population of people who represent a very important segment of our country are our student service members and veterans who transition from the military into the private workforce. These men and women possess valuable life and job skills, both technical and transferable, that almost any employer would consider an asset to the organization.

More SSM/V are becoming college students today in part because of the benefits offered from the Post-9/11 Veterans Education Assistance Act of 2008 (Vacchi & Berger, 2014), which is more commonly known as the Post-9/11 GI Bill (Dortch, 2018). Zoli et al. (2015) report that one of the top reasons why people join the military is because of the educational benefits offered to those who serve. The U.S. Department of Veterans Affairs reports that, in 2018, over 700,000 veterans had received educational benefits through the use of the Post-9/11 GI Bill, at all degree levels, at a cost of nearly $11 billion (U.S. Department of Veterans Affairs, 2018). The American Council on Education (ACE) estimates that "over 5 million Post-9/11 service members are expected to transition out of the military by 2020" (Molina, 2014, p. 1). According to the American Association of Community Colleges, student veterans in particular make up 5% of the college student population in the United States (Phillippe & Tekle, 2019a), which is an increase from 3.5% in the 2011-2012 academic year. Quarles (2018) states that when accounting for active duty service members and reservists, military-affiliated students make up nearly 6.5% of the community college population. Molina (2014) further states that the majority (54%) of student veterans were enrolled in certificate programs or associate degree programs, both of which are offered at the community college level.

One of the most researched areas in postsecondary education is that of student retention (Tinto, 1993; 2006; Berger et al., 2012). Although this study does not focus primarily on

postsecondary student retention, it is worth discussing briefly since some of the literature on the topic of retention and persistence can be confusing. An important issue surrounding student retention is how the concept should be defined. There is no single definition of retention that is universally applied and able to fit all situations (Pascarella et al., 1986). Berger et al. (2012) provide a general definition of student retention as "the ability of a particular college or university to successfully graduate the students that initially enroll at that institution" (p. 8); however, this definition seems more aligned with student persistence than retention. The National Center for Education Statistics (NCES) defines retention rate as "A measure of the rate at which students persist in their educational endeavors at an institution, expressed as a percentage" (McFarland et al., 2019, p. 353). Again, there appears to be some crossover between retention and persistence in this definition.

Hagedorn (2012) admits that there is some confusion between the terms "retention" and "persistence." In her view, referencing data from the National Center for Education Statistics, retention is a measurement used by institutions, and persistence is an individual student measure. In other words, Hagedorn states, "institutions retain and students persist" (p. 85). Tinto (2017) reiterates the point that retention and persistence are not the same. He rightfully states that the goal of college students is to persist until reaching their desired educational goals. Accordingly, it seems plausible that student retention is related to attainment at the postsecondary institutional level, for attainment cannot happen without retention.

Hagedorn (2012) posits that there are inconsistencies and a lack of agreement on a standard definition of student retention. She further argues that there are issues regarding the measurement of student retention in community colleges because of the lack of continuous enrollment or because some students do not necessarily have the goal of graduating from such

institutions. Continuous enrollment may be an issue for some military students, such as active duty and reserves students, who must temporarily postpone their postsecondary education in order to fulfill their military obligations. For some students, Hagedorn (2012), suggests that it may be enough just to take a course or two at a community college in order to achieve their postsecondary education goals.

Measuring student persistence and attainment is important for postsecondary education institutions today because of the continuing decrease in college enrollment rates. The National Student Clearinghouse Research Center (2019) reports that for the spring 2019 semester, total postsecondary student enrollments had decreased nationwide by 1.7%. For two-year public postsecondary institutions (community colleges), the decrease from the spring 2018 to spring 2019 semester was 3.4%. These decreases in enrollment represent a continuing trend among most postsecondary educational institutions. As far back as 2011, two-year public colleges experienced continued year-over-year student enrollment decreases (National Student Clearinghouse Research Center, 2013). The U.S. Department of Education, however, through the National Center for Education Statistics, predicts that postsecondary enrollments from 2015 through 2026 will increase 13% (Hussar & Bailey, 2018). Although difficult to predict the future, the alarming nature of the current enrollment trends should make evident the need to measure and monitor student persistence and attainment rates on a regular basis so that postsecondary institutions are not only aware of the ongoing problem, but can work toward effectively creating strategies and policies to negate the harmful effects of such trends.

There should be little doubt that long-term decreasing college enrollments can have a negative ripple effect not only on postsecondary educational institutions, but also on a nation's

economy as well. Working to improve student persistence and attainment must continue to be a priority for all colleges and universities. In speaking of increased student retention, Hagedorn (2012) suggests that "retention not only has an impact on the individual and his or her family but also produces a ripple effect on the postsecondary institutions, the workforce, and the economy" (p. 95). Seidman (2012) also suggests that the strength of a nation's economy is dependent on an educated workforce, and that national economic strength also affects the strength of the global economy. Furthermore, Hagedorn (2012) states quite clearly that "the power to retain students remains the most crucial outcome if students are to be successful in life" (p. 81).

What the author of the present study finds interesting, from his personal experience as a college professor, is the contrarian nature of postsecondary education, specifically at the community college level. When the economy is strong, the author has observed lower enrollments within community college courses, especially in courses that do not transfer directly to the four-year universities. However, when the economy is weak, enrollments tend to increase to the point where many classes are overflowing with students on the first day of class. One possible explanation is the rationale that students who are out-of-work or facing the threat of being out-of-work, are motivated to increase and improve their skill sets in order to make themselves more immediately marketable and employable. This viewpoint seems to be shared by Berger et al. (2012) who stated that economic downturns lead to larger college enrollments.

Statement of the Problem

The problem this study examines is how SSM/V, as a unique population of postsecondary students, perform though earning community college CTE credits from the perspective of persistence and attainment. While research on SSM/V does exist, there are gaps in the research

that this study proposed to fill by diving deeper into the specific areas mentioned above. Cate and Davis (2016a) stated that there have not been any large-scale or cross-sector studies conducted that focus on SSM/V academic performance. Because the proposed research for this study looks at SSM/V data on a national level, it works to satisfy Cate and Davis' (2016a) statement, as well as the criticism of Barry et al. (2014) who state that "investigations that are national in scope are underrepresented and needed" (p. 38).

The current economic conditions have produced a need for more skilled labor in the trades and other areas that are important for continued economic growth and global competitiveness. As stated above, there are many areas of our economy in which there is not enough labor to meet the current employment demand. Community college CTE programs are attempting to help close this gap by attracting and training students to take on work in the skilled labor and trades fields, as well as other areas such as business administration, healthcare, transportation/logistics, and information technology.

Encouraged by the Post-9/11 GI Bill, student veterans make up approximately five percent of the college student population at present (Phillippe & Tekle, 2019a). Much of the research that has been conducted on SSM/V thus far has focused mainly on two primary areas: (a) the transition of student veterans from military service to postsecondary education, including ensuring that the proper support structures are in place to guide the student veteran to successful transition (Ackerman et al., 2009; Elliott et al., 2011; Evans et al., 2015; Gregg et al., 2016; Jenner, 2017; Kirchner, 2015), and (b) the struggles that SSM/V face in terms of physical, mental, emotional, and social well-being (Albright et al., 2017; Medley et al., 2017; Shackelford, 2009; Thomas et al., 2018). Some research has been conducted on student veteran persistence and attainment (Alschuler & Yarab, 2018; Cate, 2014; Cate et al. , 2017); however, there is not a

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lot of research in these areas (Jenner, 2019; Kirchner, 2015), and the research does not specifically look at SSM/V performance through the earning of CTE credits, which this study does. Additionally, according to Barry, Whiteman, and Wadsworth (2014), while there is a great deal of "commentaries, editorials, and organizational reports" (p. 38) related to SSM/V, there are far fewer peer-reviewed research articles on the topic.

Many SSM/V bring qualities such as dedication, loyalty, discipline, integrity, teamwork, and leadership to the workforce; they are a reliable source of labor in the private sector (Aerotek, 2016). Organizations such as Aerotek, Inc., and many others, understand the value of employing SSM/V and the benefits that are garnered through the qualities and characteristics that military-affiliated students and veterans bring to the workforce.

Statement of the Purpose

The purpose of this study is to dive deeper into the research regarding postsecondary SSM/V to analyze their persistence and attainment through community college CTE credit accumulation. The major outcomes for this study are student persistence and attainment, which is further described as attainment of a degree, a certificate, any award, or whether the student completed a vertical transfer for a 4-year institution. The more that is learned about SSM/V, the better postsecondary leaders and decision makers are able to serve this unique population of underrepresented and nontraditional students, as well as taking what is learned from this population of students and applying that knowledge to other underrepresented and nontraditional student populations. The more that educational and non-educational leaders learn about CTE and community colleges in general, the better they are able to partner to create policies and make decisions that support students who are a part of these postsecondary areas of education.

As stated earlier, much of the research conducted so far on SSM/V has focused on the transition from military life to college life, as well as the struggles that SSM/V face in terms of physical, emotional, mental, and social barriers as they transition away from the military life. While these topics are certainly very important to college administrators and decision makers, there is much more to explore within this select group of important students. Vacchi and Berger (2014) state that empirical research on SSM/V has been lacking, and that there is clearly a need for "purposeful, thoughtful, and rigorous empirical study" (p. 94) of this important body of students within postsecondary education. Chan (2018) supports the notion that more studies are needed with regards to SSM/V success, particularly in two-year postsecondary institutions.

The decision to study SSM/V in community college CTE programs is important to this study's author because he is a military veteran who currently teaches within a community college CTE program. As educators work to serve our SSM/V on campus, this research attempts to better understand this important population of nontraditional students, and what community college administrators, policy makers, faculty, and other constituents can do to better serve their needs.

Research Question

The following research question was used for this study:

- RQ: What is the relationship between CTE credit accumulation among community college student service members/veterans and the following academic outcomes: (a) persistence, (b) certification completion, (c) degree completion, (d) any award completion, or (e) vertical transfer?

Hypotheses

Alternative Hypothesis:

- H_a: There is a statistically significant relationship between CTE credit accumulation among community student service members/veterans and the academic outcomes of (a) persistence, (b) certification completion, (c) degree completion, (d) any award completion, or (e) vertical transfer.

Null Hypothesis:

- H_0: There is no statistically significant relationship between CTE credit accumulation among community college student service members/veterans and the academic outcomes of (a) persistence, (b) certification completion, (c) degree completion, (d) any award completion, or (e) vertical transfer.

Conceptual Framework

The topics studied in this dissertation are interrelated. There is an immediate and tangible need to fill important jobs within the U.S. economy. Many, if not most, of these jobs require some sort of training; perhaps not necessarily a college degree, but certainly, at a minimum, a certificate, credential, license, or a foundation of knowledge and/or experience gained through college coursework that will allow workers to qualify for such jobs (Torpey, 2012). Many of the jobs that need to be filled are in academic areas that fall within the guise of CTE education. Community colleges fulfill a unique and necessary role in attracting and training workers in CTE areas of study and preparing them for in-demand careers.

The ability of postsecondary institutions, specifically community colleges, to retain their students and encourage their students to persist, may create an environment whereby student success is more likely to happen through the attainment of educational goals. When students are

successful in the classroom and in their educational pursuits as a whole, they gain not only the

necessary academic knowledge and skills important in the workforce, but also the confidence,

motivation, and desire to be productive contributors to their communities and society at large.

Zoli et al. (2015) found that military service improved SSM/V belief that education is an

important factor for transitioning into civilian life, as well as adding to their sense of post-

military success and confidence. They report that 71% of SSM/V believe their military service

helped them develop skills and attributes necessary for postsecondary education success (Zoli et

al., 2015).

This study looked at this conceptual framework through the lens of SSM/V, an important

segment of the population in our society. Many SSM/V come into the college environment as

older students with more life experience and responsibilities, who may be better prepared,

because of their military experiences, to manage the challenges of academic life, while also

balancing academic life with other non-academic personal endeavors. By the time they enter

college, SSM/V, as older, mature students, may be more focused on closing the gap between

their present career situation, and where they desire to take their career in the future. Because

SSM/V are more likely to choose a two-year community college to begin their academic pursuits

over a four-year university (Phillippe & Tekle, 2018c), and because two-year educational

institutions struggle more with persistence and attainment rates than do four-year universities,

the need to study these topics in more detail will hopefully be evident to the reader.

Significance of the Topic

There are several ways in which this study is significant and will add to the current

research on military students and student veterans, career and technical education, persistence

and attainment at the community college level:

- A better understanding of the challenges that SSM/V face in community college may significantly improve the success rate of this unique group of students. We owe it to our service members to understand their unique needs and challenges in postsecondary education, and to create programs, processes, policies, and strategies for helping SSM/V successfully transition from military life to college life to civilian life.

- As our SSM/V are retained by postsecondary educational institutions, and as SSM/V persist through their chosen academic pursuits, the likelihood of goal attainment, both academically and non-academically, increases. The academic success of SSM/V may also carry over into their personal lives, thus building stronger families, communities, and society.

- As previously stated, much more research is needed regarding SSM/V and the unique challenges and opportunities they face in postsecondary education (Zoli et al., 2015). This study adds to the extant literature on this important topic and continues to move the conversation forward.

- CTE is predicted to continue to be a significant area of focus, both at the local, state, and national levels, for students, colleges, businesses, and governmental institutions well into the future. This focus should continue to produce opportunities for SSM/V who are seeking educational avenues on which to build their career.

- As community colleges continue to be evaluated on various criteria, such as outcomes and completions, important organizational factors such as persistence and attainment will continue to be a part of the conversation. Berger et al. (2012) state quite emphatically that "As higher education becomes increasingly important for success in

a society that has become knowledge- and technology-oriented, retention and persistence are more important than ever" (p. 29).

Key Definitions

The following definitions will be used in this study:

- *Attainment*. In order for a student to reach a level of attainment, they would have also necessarily completed something important and achieved a level of success. Vacchi and Berger (2014) suggest that postsecondary success is defined as "simply earning a college degree" (p. 113) regardless of whether it was earning credits at one institution or across multiple institutions. These scholars suggest that it is less important to focus on the student retention aspect of postsecondary education, and instead focus efforts on persistence to goal completion. For the purposes of this study, however, the terms "student success," "completion," and "attainment" are synonymous, and are defined as successfully completing a postsecondary program of choice, whether a certificate, license, certification, or degree, or successfully transferring vertically to a 4-year university.

- *Career and Technical Education*. A singular and unified definition of CTE does not exist at this time; however, the definition from the Perkins Collaborative Resource Network (PCRN) seems appropriate for use in this study. The PCRN states that "CTE provides students with academic knowledge and technical and employability skills that prepare them for career fields and credentials" (Perkins Collaborative Resource Network, 2019).

- *Community College*. Community colleges are Sub-baccalaureate degree- and certificate-granting institutions.

- *Student Persistence*. Like other definitions in this study, the definition of student persistence is somewhat inconsistent among the scholars in this field. Hagedorn (2012) defines persistence as "a student who enrolls in a college and remains enrolled until degree completion" (p. 81). A similar but expanded definition of student persistence comes from the National Student Clearinghouse Research Center (2019), which sees persistence as "continuous enrollment (or degree completion) at any higher education institution – including one different from the institution of initial enrollment – in the fall terms of a student's first and second year" (p. 15). For this study, the term student persistence is most aligned with Hagedorn's (2012) definition of a student who remains enrolled in a postsecondary course of study until that student has reached their educational goal, culminating in a tangible outcome, whether a degree, certificate, certification, license, et cetera.

- *Student Veteran*. Although there are many labels for students who have prior military service experience and are now pursuing postsecondary education, and although the term "student veteran" is a commonly-used term in the scholarly literature (Vacchi, 2012), for the purposes of this study, the term "Student Service Member/Veteran" will be used. A SSM/V is any postsecondary education student who (a) served in the U.S. military, either full- or part-time, and, upon discharge from the military, enrolled in a postsecondary educational institution, either full- or part-time, (b) was enrolled in college classes while also continuing to serve as an active duty member of the military, and (c) includes those students who served as a reservist or member of the National Guard while also pursuing an education at a postsecondary institution. Barry et al., (2014) argue that using the term "student veteran" to collectively associate any

current or former military member who is pursuing postsecondary education is non-inclusive, inadequate, and confusing. These researchers recommend using the term SSM/V in scholarly writing in order to "provide greater consistency and accuracy to the literature base" (Barry et al., 2014, p. 32). Interestingly, Vacchi and Berger (2014) use a similar definition in their research; however, they prefer to use the term "student veteran" in their writing, which, in the opinion of this researcher, is not as accurate as the definition provided by Barry et al., (2014).

Limitations of the Study

There are several limitations of this study that need to be taken into consideration.

- This study focused on a very unique sub-population of non-traditional students earning a very specific set of academic credits within the community college system.

- This study was quantitative and not qualitative.

- This study was limited to data related to SSM/V within a very specific timeframe (2004-2009).

- This study had the potential of having a low sample size due to the possibility of data not collected on SSM/V in community college environments. Some members of the SSM/V population might not have identified themselves as a military student or student veteran when enrolling in postsecondary courses; therefore, data on those persons might not had been collected.

Organization of the Study

This dissertation is quantitatively based and is organized into five chapters. Chapter 1 presents an overview of the topic and an argument as to why this research should be undertaken in more detail, and it provides the basis for the connectedness among the variables to be studied.

A review of the relevant literature and research-to-date is provided in Chapter 2. This chapter provides details regarding the many variables researched for this study. Chapter 3 describes the specific research methodology and design to be implemented for this study, including the IRB process, data sources, data gathering procedures, and the proposed data analysis process. Chapter 4 discusses the findings of the research that was undertaken for this dissertation. And Chapter 5 presents the conclusions of the research, as well as provides suggestions for future research and practice.

Summary

The U.S. economy had been doing quite well in various industries over the past few years. While it is widely known that change is happening at present due to the COVID-19 pandemic, now may be the time to continue to build structures and processes that allow organizations and workers to thrive as best as possible under conditions of uncertainty. To keep the U.S. economy moving forward, an educated workforce is needed that is equipped with the right knowledge and determination, ready now to step into positions that need to be filled. Community colleges serve as an important conduit between people ready and eager to learn new skills, and organizations needing these skillsets in the immediate and distant future. Helping to bridge the gap are our military students and veterans, many of which are transitioning between military service and the workforce, both public and private. These men and women possess valuable skills and abilities that make them an asset to a wide variety of industries. As our student service members/veterans return to school, one of the major areas of interest is career and technical education programs within the nation's community college systems. These programs are important for training people to fill good paying, necessary jobs in our economy. Focusing on student persistence and attainment in these postsecondary programs of study not only helps

students prepare for the future, but also helps educational leaders, decision makers, and policy creators find the most expeditious and beneficial methods for closing the gaps and working toward sustaining economic progress.

Chapter 2. Literature Review

Introduction

This chapter examines the literature of several areas pertaining to the different facets of this study. The area of economics will be explored in a limited capacity as it relates to current and near future economic conditions that set forth the necessity to focus on skilled labor and trades areas, among others. The role of community colleges will be examined as a topic of great importance to current and future economic development and job training needs. Career and technical education will be reviewed in this chapter and highlighted as a critical factor of economic growth and stability. The role of veterans, student service members/veterans, and their relationship to the economy, community colleges, and career and technical education will be examined. Finally, the areas of student persistence and attainment will be explored in more detail.

Each of the above-named areas is interrelated to an extent. The macroeconomic forces at work in the U.S. have created a need to fill open positions in our economy in areas such as skilled labor, the trades, business, healthcare, technology, transportation, and others. Many of these positions do not require a four-year college degree, but may require some postsecondary education, including certificates, licenses, or associate degrees. Community colleges play an integral role in their ability to quickly teach and train people to be qualified for the current spate of available jobs. The major area within community colleges that is vocational and occupational focused is Career and Technical Education (CTE). The focus of CTE is in many of the areas in which jobs are currently available in our economy, with the outcome of CTE programs in the form of certificates, licenses, associate degrees, or other credentials and knowledge that qualify people to enter the workforce in high-demand positions sooner rather than later. The importance

of an educated populace who are able to work in these high-demand areas not only helps our national economy, but also plays a vital part in the United States' global competitiveness. An important population of people to whom we owe much are our military veterans who are transitioning from military service to civilian life. Within this transition, postsecondary education, specifically community colleges, plays a vital role in preparing veterans for good paying, sustainable jobs that allow them to be economically mobile. Some of the measures that community colleges focus on are the persistence and attainment of their students, which, when well-managed, leads to academic achievement and overall goal attainment.

Economic Conditions

According to a 2018 study conducted by The Manufacturing Institute and Deloitte, the lack of qualified workers to fill manufacturing jobs in the U.S. is rising to uncomfortable levels for many manufacturing companies (Giffi et al., 2018). Manufacturing accounted for $6.2 trillion in 2018, and the unemployment rate in this area was as low as 3.8% in July 2018 (Aerotek, 2018). As jobs are increasingly difficult to fill, manufacturers are concerned about the impact and ability to fulfill open orders for products, which can ultimately affect current and future consumer demand for those products. According to Giffi et al. (2018), based on the projected growth in U.S. manufacturing of 1.5% per year, there is a potential to leave between 2 and 2.4 million manufacturing jobs unfilled through 2028. If these projections come to fruition, by 2028, there is the potential to lose $2.5 trillion in economic output, according to Giffi et al. (2018). There is concern at present with the U.S. economy in a recession due to the COVID-19 pandemic, which may cause recent manufacturing projections, such as those stated above, to be revised. It may be too soon to make definitive long-term business and economic projections until more data become available over time.

Manufacturers are facing a challenge in finding qualified talent to hire because of increasing minimum wage levels in industries that compete with manufacturing (Aerotek, 2018). One way in which manufacturers have attempted to offset the current lack of skilled workers is through the introduction of automation and digital technologies, yet it is in these areas of automation and digital technologies that manufactures are having difficulty finding qualified labor with the right skill sets. Deloitte analysis points to five key skill areas that are expected to be in higher demand and necessary for success in manufacturing environments over the next few years, which are (a) technology and computer skills, (b) digital skills, (c) programming skills for robots and automation, (d) working with tools and techniques, and (e) critical thinking (Giffi et al., 2018). Many of these skill sets align with CTE courses taught in postsecondary institutions, which lead to certificates, licenses, or associate degrees. One potential positive side effect of these changes is that automation is driving wages up in manufacturing "as the traditional maintenance skill set evolves to a more diagnostic, computer-based, sophisticated skill set" (Aerotek, 2018, p.4).

The importance of an educated and skilled workforce to the U. S. economy cannot be overemphasized. Carnevale and Rose (2011) state quite clearly that "increasing our supply of skilled labor is central to the vitality of the U.S. economy" (p. 13). The data show that the United States has lost some of its global competitiveness due to the decreased expansion of postsecondary education, and lower college completion rates (Carnevale & Rose, 2011). Carnevale and Rose (2011) also argue for an increase in college-educated workers to the economy by 2025 in order to combat efficiency and equity problems they see as plaguing the U.S. for decades. In their analysis, adding 20 million more postsecondary-educated workers is the solution to not only lessening the wage gap between college educated workers and workers

who only have a high school education, but they maintain that adding these college educated workers will also give the U.S. economy "strength in an increasingly competitive world" (Carnevale & Rose, 2011, p. 10).

Although there is no full-proof defense against the economic downturns that all nations face, especially during the time of a worldwide pandemic, an educated workforce can be a powerful weapon to lessen the harmful effects of negative economic cycles. An educated workforce is a productive workforce (O'Lawrence, 2017). No longer is it the case that most of the jobs in the U.S. economy can be performed with only a high school education or less. Increasingly, today's jobs, and more importantly, the jobs of the future will require at least some postsecondary education (O'Lawrence, 2017). Higher education is also associated with higher wages and an increased ability to be competitive in the workforce, both of which are important elements to lift people out of poverty (O'Lawrence, 2017).

There are many ways that workers become qualified for certain jobs, which may include such things as apprenticeships or other on-the-job training (OJT) but may also include some form of postsecondary education. The link between education and individual and national economic prosperity has been well documented. There is a plethora of research related to the value of postsecondary education on earnings potential, even if the postsecondary education does not ultimately lead to a credential or degree, though attaining a tangible outcome such as a credential, or degree does improve earnings potential even more (Belfield & Bailey, 2011; 2017; Carnevale & Cheah, 2018; Carnevale et al., 2011; Chen, 2017; Marcotte et al., 2005). This latter point is particularly important in terms of student persistence to completion and attainment in postsecondary education. For those students who graduated high school and attended community college, but did not earn a credential or degree, according to Marcotte et al. (2005), earnings still

increased 5% to 10% for each year of college completed for everyone except men who were on an hourly wage schedule. In a later study, Belfield and Bailey (2011) reported that men who attended community college without obtaining a credential or degree saw an average increase in their earnings of 9%, while women saw an average increase in earnings of 10%. In terms of completing an associate degree, Belfield and Bailey (2011) reported that the average earnings of men increased 13%, while the average earnings of women increased 21%.

A study by Minaya and Scott-Clayton (2017) also looked at labor market returns for community college graduates in terms of those who completed an associate degree versus those who completed a long certificate (one that takes longer than a year to complete). One main difference in this study is that the researchers expanded the time frame of examination to 11 years post-entry, which is almost twice as long as the other studies. Their results were aligned with previous studies that showed positive economic returns for both associate degree and long certificate completers; however, they found that the value of the associate degree grew substantially over time, whereas the value of long certificates remained relatively flat. Both the associate degree and the long certificate are valuable; however, the value of the associate degree in the long term is higher than that of certificates (Minaya & Scott-Clayton, 2017).

Bailey and Belfield (2019), in considering the differences between associate degrees and certificates, agree with previous research that shows that associate degrees are of higher value in the labor market for the long term over certificates. They also suggest that the type of community college certificate matters and will produce different returns to the holder. Generally speaking, according to Bailey and Belfield (2019), certificate programs tend to take less time to achieve than degree programs; however, certificate programs that require more credits produce better labor market returns, but are not as good in the long run as having an associate degree. This

argument is likened to a race between two cars, where one car is faster off the starting line and produces better short-term returns more quickly (certificates), but ends up losing to the car that, while slower off the starting line, has more endurance to go a greater distance and therefore produces better long-term results (associate degree).

Carnevale et al. (2018) proposed three paths to good jobs in the United States, which are (1) the high school pathway, (2) the middle-skills pathway, and (3) the BA pathway. Good jobs are those that "pay a minimum of $35,000 for workers between the ages of 25 and 44, and at least $45,000 for workers between the ages of 45 and 64" (Carnevale et al., 2018, p. 1). Good jobs, sometimes referred as Middle-skills jobs, are those that require less than a Bachelor degree, but more than a high school diploma, which is where community colleges are well positioned (Bailey, 2008; Phillippe & Tekle, 2017a). Preparing students for middle-skills jobs includes among other things college career and technical education, certificates, credentials, and associate degrees (Carnevale et al., 2018). These researchers also state that "increasingly the competencies necessary to succeed in the modern labor market require at least some formal postsecondary education and training" (Carnevale et al., 2018, pp. 7-8). Lastly, Carnevale et al. (2018) remind us that "college offers individuals the opportunity to attain entry into the middle class" (p. 15).

The importance and power of education in the American economy and the ability to create valuable change cannot be overstated. In terms of the link between education, economics, and change, Carnevale et al. (2018) state that,

> Education is the preferred response in the United States to social and economic change, as opposed to expansion in other aspects of the welfare state. Education empowers individuals as responsible agents in dealing with change, and it minimizes government control. (p. 15)

According to Carnevale (2016), educators have a duel responsibility of not only educating people for the workforce, but to also ensure that these people are prepared to promote and defend the very ideas that our country is founded upon. "Ultimately, however, the economic role of postsecondary education and training, especially its role in preparing American youth for work and helping adults stay abreast of economic change, is central" (Carnevale, 2016, p. 3). If educators fail at one of these missions of postsecondary education, then they likely will fail at the other as well (Carnevale, 2016).

While technical (hard) skills in a particular discipline are beneficial to workers' economic mobility and earnings potential, they are only a part of the story. Carnevale et al. (2018) also suggest that the "new realities of work require new sets of soft skills, including teamwork and leadership, to facilitate collaboration" (p. 7). There are a variety of soft skills necessary for success in today's work world. On top of leadership and teamwork skills that Carnevale and his team mention, Robles (2012) identified other skills necessary and important for job success. These skills are "communication, courtesy, flexibility, integrity, interpersonal skills, positive attitude, professionalism, responsibility, and work ethic" (Robles, 2012, p. 455). Of these skills, Robles (2012) found that communication, courtesy, and integrity are the most important for success at work. The difficulty of soft skills is that they are often considered intangible and therefore harder to measure and evaluate than hard skills (Robles, 2012). Nevertheless, Robles (2012) argues that soft skills must be taught in postsecondary education to whatever extent possible, and that they must work in conjunction with the hard skills to create long-term employment success.

Chief among the topic of soft skills is that of Emotional Intelligence (EQ), which is broadly defined as the ability to perceive, understand, and manage one's own emotions, as well

as the emotions of others (Salovey & Mayer, 1990). Emotional Intelligence has at its core four essential elements according to Daniel Goleman: self-awareness, self-management, social awareness, and relationship management (Goleman, 2005). Goleman's model of EQ is one of three main models of emotional intelligence; however, it is the model that is most frequently taught in postsecondary management, leadership, and organizational behavior classes. While it is beyond the scope of this paper to discuss EQ in depth, it is no less important to mention this concept as a necessary attribute to learning and success, both personally and in the workplace. There may appear to be a disconnect between soft skills/emotional intelligence with career and technical education programs; however, Bronson (2007) makes an argument that CTE teachers can infuse technical courses with soft skills learning in a number of ways including stimulating student curiosity, encouraging reflection, and discussing real-world application of soft skills to workplace success.

According to Carnevale et al. (2018), we currently live in an economy where "over 60 percent of all jobs require at least some postsecondary education beyond high school, as do good jobs that support middle-class lifestyles" (p. 2). Carnevale et al. (2018) further point out that a high school education is no longer the standard for self-sufficiency and attaining a good job in today's economy. They argue that the new standard is becoming the two-year college degree, at minimum. Lastly, Carnevale et al. (2013) predict that by the year 2020, 65% of jobs in the U. S. economy will require at least some postsecondary education or training, thus, making it clear that the value of the community college appears to have a sustainable future. The next section of this literature review gives a better understanding of community colleges in America.

Community Colleges

Several places within this literature review references the importance of the Morrill Land-Grant Act of 1862 and its impact on the formation of higher education in America. Although the 1862 Morrill Act and the 1890 version of the Act did not necessary create the "junior" college, it did create the philosophical foundation of higher education from which the community college framework would come into existence (Vaughan, 1982).

Community colleges have a long and important history in the United States. The first public "junior" college was created in 1901 through the efforts of William Rainey Harper, president of the University of Chicago, and J. Stanley Brown, Superintendent of Joliet Township High School in Illinois who agreed to allow college-level courses in the high school's curriculum (Drury, 2003; Joliet Junior College, n.d.). In 1916, the name of the college-course program was officially changed to "Joliet Junior College," and the college is still in existence today.

The growth of community colleges in the United States began slowly in the early 1900s, but gained momentum throughout the decades as more debate and discussions were held as to the nature and role community colleges played in the American education system (Brint & Karabel, 1989; Cohen, 1990). There appear to be some disagreement on this topic, with some constituents at the time believing that the purpose of the community college was to satisfy the first two years of a university education, which would allow universities to better focus on the last two years of a baccalaureate degree, as well as be able to separate those students who are better prepared for a higher education from those who are not (Brint & Karabel, 1989; Cohen, 1990). Others, however, believed that the community college would be better served by emphasizing an education based on vocational and career studies rather than pre-baccalaureate

and academic endeavors exclusively (Ayers, 2017; Brint & Karabel, 1989; Cohen, 1990; Drury, 2003).

The creation of the American Association of Junior Colleges (AAJC) in 1920 was an indication as to the significance and importance of the junior college movement in America. The Association was formed out of both necessity and frustration (Brint & Karabel, 1989). Many of the junior college leaders at the time were concerned about the negative perceptions people seemed to hold about their institutions and of junior colleges in general (Brint & Karabel, 1989). Because the junior college industry lacked a common structure at that time, and because the leaders of these institutions felt "a need for mutual support" and "a sense of shared interests" (Brint & Karabel, 1989, p. 33), the Association was formed, which helped to shape industry policies moving forward. The Association is still in existence today, though the name was changed in 1972 to the American Association of Junior and Community Colleges, then again in 1992 to the American Association of Community Colleges.

A significant and influential report that shaped higher education policy in the U. S. was the "Higher Education for American Democracy" report that was produced by the President's Commission on Higher Education, which was created under the direction of President Harry Truman in 1946 (Brint & Karabel, 1989). One of the motivations for commissioning this report was the concern of returning veterans after World War II and the affect that the influx of veterans into higher education, through the opportunities afforded by the passage of the new GI Bill (Serviceman's Readjustment Act of 1944), would have on the higher education industry as a whole (Brint & Karabel, 1989). It was in this report, released in 1947, that the term "community college" was officially recognized and accepted as applying more meaningfully to the purpose

and mission of these two-year postsecondary educational institutions (Brint & Karabel, 1989; Gilbert & Heller, 2010). Additionally, the report recommended,

> …the establishment of a network of public community colleges that would charge little to no tuition, serve as cultural centers, be comprehensive in their program offerings with emphasis on civic responsibilities, and serve in the area in which they are located. (Rumann et al., 2011, p. 52)

While some of the report's recommendations regarding community colleges were implemented over time, such as greater expansion of, and access to, the public community college system, a focus on local communities with an emphasis on vocational education, and oversight at both the state and federal levels, other recommendations, such as free tuition were not implemented at that time (Gilbert & Heller, 2010).

Further growth of the community college system in America continued throughout the decades following World War II. During the 1960s, for example, the community college system outgrew all other segments of higher education, with new campuses opening up weekly during the last half of that decade (Brint & Karabel, 1989). Although the argument for the "vocationalization" of community colleges was well represented throughout the previous decades of its existence, it was not until the 1970s that community colleges experienced a significant rise in enrollments of vocational/occupational education programs, as well as support for such programs from organizations such as the Carnegie Commission, various foundations, businesses, and the federal government (Brint & Karabel, 1989). The rise in enrollment was due to factors such as the attention from the above constituencies, as well as a saturation in the market for graduates of four-year universities (Brint & Karabel, 1989).

During the course of the community college history, the mission seems to have shifted from the old paradigm of being a junior college to the university's senior college, to a newer paradigm of open enrollment, convenience, and low cost, which appeals to a great many people, many of which are first generation students who come from socioeconomically disadvantaged backgrounds and who may not be fully prepared for the academic rigors of postsecondary education. Additionally, community colleges have tended to focus on transferring students to four-year universities, creating opportunities for vocational and career learning, workforce and economic development for their local communities, and other programs and opportunities (Beach, 2010). Be this as it may, Carnevale (2016) reminds us that "The mission of American higher education is based on the widely shared conviction that, in a democratic society, education's primary mission is to allow people to live fully in their time" (p. 1).

In the United States today, there are 1,051 community colleges that serve approximately 12 million students who are taking both credit and non-credit courses (Phillippe & Tekle, 2019a). Of those students taking credit courses, approximately 37% are full-time students, and 63% are part-time students (Phillippe & Tekle, 2019a). Of the full-time students taking classes at community colleges, 62% are employed either full- or part-time, while 72% of part-time community college students are employed either full- or part-time (Phillippe & Tekle, 2019a). Women make up 56% of today's community college students (Phillippe & Tekle, 2019a).

In terms of persistence and attainment of sub-baccalaureate credentials after attending community college for three years, Phillippe and Tekle (2019b) show that in the 2011-2012 cohort, students seeking an occupational credential achieved a 59% persistence and attainment rate, which is slightly better than the 2003-2004 cohort, which had achieved a 57% persistence and attainment rate. These rates are slightly better than students who sought an academic

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credential for both cohorts. Further research by the American Association of Community

Colleges, using data from the National Center for Education Statistics, found that 58% of adult

workers in the U. S. have some form of postsecondary degree, certificate, occupational license,

or other credential (Phillippe & Tekle, 2018a).

The Strada Education Network, Gallup, and the Lumina Foundation, who have combined

resources to do research in the postsecondary education space, have found that students who

have earned a postsecondary certificate, but do not have a college degree, have higher

employment and personal income levels (Strada Education Network et al., 2019). Public

community colleges are, by a large margin, the preferred method of achieving a postsecondary

certificates in the United States (Phillippe & Tekle, 2018b). Additionally, the Strada Education

Network and Gallup suggest that the more relevant students find their college education to be to

both work and life, the higher the perceived value and quality of that education (Strada

Education Network & Gallup, 2018). Those who believe their education is relevant to both their

work life and personal life also reported having a higher sense of thriving and well-being (Strada

Education Network & Gallup, 2018). Community colleges attract a variety of students who come

from a wide range of backgrounds and experiences. These students are often first-generation

students who are older, have dependents, are from a minority background, attend college part

time, have limited proficiency in English, and come from lower socioeconomic status, (Bailey,

2008; Carnevale et al., 2018). Furthermore, Carnevale et al. (2018) state that "Nearly two-thirds

of students enter community college academically unprepared for college-level coursework.

These populations present a greater challenge for educators, and it takes more resources to help

these students attain outcomes that meet a standard of educational adequacy" (p. 25). Despite the

challenges that community colleges face, these institutions of higher learning provide

opportunities for students who might otherwise not be able to attend college due to constraints such as affordability and lack of preparedness for postsecondary education achievement (O'Lawrence, 2017). The attraction of a community college education to low-income or nontraditional students is well documented (Bailey, 2017).

Community college student outcomes historically are not very good. Bailey (2017) and Dougherty et al. (2017) state that the majority of students who begin a community college education do not complete their program by completing a degree or certificate. A report by the National Student Clearinghouse Research Center shows that for the students who began their postsecondary academic career at a 2-year college in 2012, only 27.9% completed their program of study within six years at their original starting institution, and another 11.5% completed their program at a different institution (Shapiro et al., 2018). This data is in alignment with previous cohorts whose average completion rate for academic years 2006 to 2012 was 38.45% (Shapiro et al., 2018). Additionally, in terms of earning a bachelor's degree, Dougherty et al. (2017) state that students who enter postsecondary education through a community college have a lower probability of earning a Bachelor's degree than students who enter through a four-year college/university; however, in some cases, community college certificate graduates earn higher incomes than bachelor degree graduates.

As stated previously, the less-than-desirable outcomes may, in part, be due to the myriad obligations and responsibilities that community college students have outside of their academic pursuits. It may also be that some students simply do not wish to complete a degree or certificate program, but rather take just enough classes to develop skill sets necessary for employment purposes. Whatever the outcomes, it is crucial for community college leaders, faculty, staff, and

other constituencies to remember the importance of creating a culture of persistence within their college environment.

One promising segment within the community college sector is Career and Technical Education, especially as it pertains to occupational certificates. In the 2014-2015 academic year, the overwhelming majority of certificates awarded in community colleges were in CTE-related areas, while just slightly over 47% of associate degrees awarded in 2014-2015 were in CTE-related areas (Phillippe & Tekle, 2017b). Much attention has been paid to this segment of postsecondary education and both the state and national levels.

Career and Technical Education

Vocational education in America has taken on various forms and names throughout its long history, from apprenticeships in the early colonial periods (Gordon, 2014; O'Banion, 2019) to the more formal and structured system of education present in the U.S. today. Career and Technical Education is the term currently used to represent "vocational" education in America. The term "Career and Technical Education" was first used in the Carl D. Perkins Career and Technical Education Improvement Act of 2006 (Gordon, 2014; Imperatore & Hyslop, 2017; Rosen et al., 2018; Scott, 2014), which is one of the five versions of the Perkins Act to be passed in Congress since 1984. Further details of this Act are discussed below. Although the names and structures have changed over time, the overall goal of career and technical education has not, which is to teach, train and prepare workers for jobs in the skilled trades and other important areas, as well as to make workers more mobile in their employability.

The first federal legislation to be passed regarding the support of vocational education in America was the Morrill Act of 1862 (Gordon, 2014; O'Banion, 2019). The official title of this act was "An Act Donating Public Lands to the Several States and Territories which may provide

Colleges for the Benefit of Agriculture and the Mechanic Arts" (Library of Congress, 2017);

however, it has simply become known as the Morrill Act. This Act provided 30,000 acres of

federal land to each of the states and territories, for which there was Congressional

representation, for the creation of public colleges and universities whose purpose was to educate

people primarily in the areas of agriculture and mechanical arts (engineering), understood at the

time to be vocational in nature (Gordon, 2014; Library of Congress, 2017).

Throughout history, several other forms of federal legislation have focused on vocational

education efforts, including the Smith-Hughes Vocational Education Act of 1917, the Vocational

Education Act of 1963, and the various forms of the Carl D. Perkins Vocational Education Act of

1984 among many others (Association for Career & Technical Education, 2019a; Imperatore &

Hyslop, 2017; O'Banion, 2019). The Smith-Hughes Act, which, according to Gordon (2014) was

"the first vocational education act" (p. 105), came into existence through the efforts of a coalition

of people and organizations not normally aligned with the same interests in mind (Hillison,

1995), and whose coalition quickly dissolved after the passage of the Act. Because these various

people and organizations were able to put their self-interests aside momentarily, a significant

piece of vocational education legislation was created that benefited a great number of people

(Hillison, 1995).

The Vocational Education Act of 1963 was also a significant piece of legislation that was

seen as a way to strengthen the already existing programs in place to support vocational

education in the U.S. (Gordon, 2014). This legislation was also the first to focus on the needs of

individual students in vocational education rather than just on industry needs (Gordon, 2014, p.

110). In 1968, the Vocational Education Act was amended to include language pertaining to

postsecondary schools, as well as to use more inclusive language of students from certain populations (Gordon, 2014; Association for Career & Technical Education, 2019b).

The Carl D. Perkins Vocational Education Act of 1984 is a significant piece of vocational education legislation that still exists today; however, it has gone through several iterations since the original 1984 Act was passed. The original Act was created to amend the Vocational Education Act of 1963 and replace the 1968 and 1976 amendments (DeFeo, 2015; Gordon, 2014). Today, the fifth version of this Act, known as the Strengthening Career and Technical Education for the 21st Century Act, was passed by Congress in 2018 and took effect July 1, 2019, allocating $1.26 billion toward secondary and postsecondary CTE programs in the United States (Perkins Collaborative Resource Network, 2019). The Perkins V Act continues the trend of governmental funding of CTE programs throughout the nation's secondary and postsecondary educational institutions and serves as a reminder of the importance of these educational opportunities for youth and adults. Figure 1 shows a timeline of selected CTE governmental legislation in the United States. A full list of CTE-related legislation can be found in Appendix A. DeFoe (2015) reminds us that although several important pieces of legislation have existed in various formats throughout several decades, the effectiveness of CTE initiatives have not gained the attention of researchers in the form of empirical or longitudinal studies.

More recently, several state governors across the country have espoused their commitment to increase workforce development efforts and career and technical education programs, especially within the community college system (Schwartz, 2020). There is little doubt that these efforts will be supported through increased legislation at the state level and will most likely be aligned with the federal legislation as well.

Figure 1

A Timeline of Selected Vocational and CTE Legislation
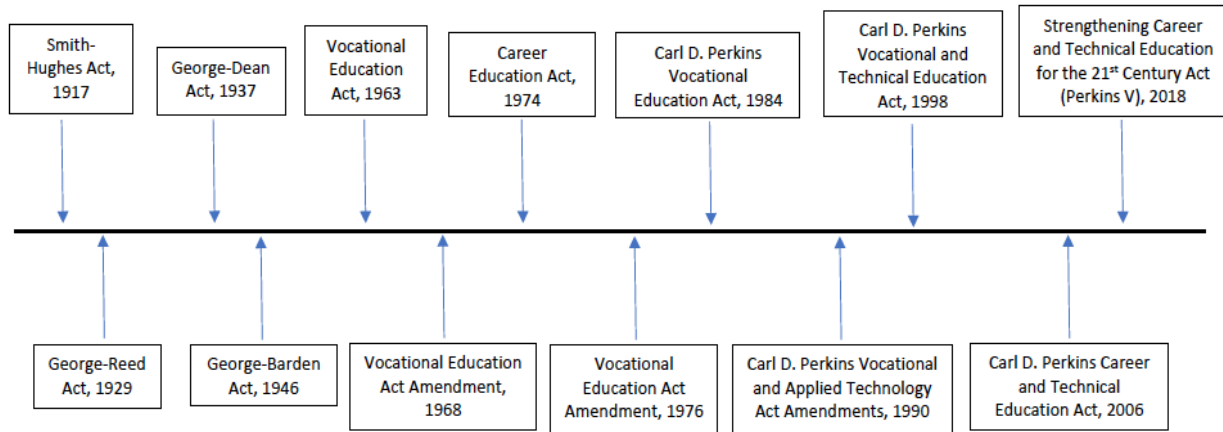
The number of students enrolled in postsecondary CTE programs varies significantly among sources. For example, the Perkins Collaborative Resource Network (PCRN) states that nearly 4 million students are currently enrolled in postsecondary CTE programs across the U.S. (Perkins Collaborative Resource Network, 2019b). The Association for Career and Technical Education (ACTE) reported that in January 2018, there were approximately 8.4 million students pursuing postsecondary certificates and degrees in CTE-related fields (Association for Career and Technical Education, 2018). Advance CTE and Higher Learning Advocates (2019) asserts that in the 2017-2018 academic year, approximately 2.6 million students were enrolled in postsecondary CTE programs.

Although there are differences in the number of students reportedly enrolled in postsecondary CTE programs across the U.S., these numbers indicate that CTE is an important and growing field of study. From 2002 through 2012, students earning CTE credentials below the baccalaureate level increased 71%, compared to 54% for all undergraduate awards during that same time frame, according to the National Assessment of Career and Technical Education

(U.S. Department of Education, 2014). The interesting dilemma is that even though CTE course and program demand remains strong, the number of public postsecondary institutions and private, nonprofit institutions offering CTE courses and programs declined between 2000 and 2014 (National Center for Education Statistics, n.d.c). Only for-profit institutions offering CTE courses and programs increased in number during this time frame (National Center for Education Statistics, n.d.c). This phenomenon may be more at the university level than at the community college level (Fletcher et al., 2015). And although CTE courses and programs have traditionally focused on vocational/career education for the main purpose of employability and mobility, today, many programs also include training in academic and soft skills development (Scott, 2014) necessary for creating well-rounded individuals to succeed not only in their chosen trade, but also in other facets of personal and professional life.

Gauthier (2018), in a qualitative study of twelve participants, found that students enroll in community college CTE programs for four primary reasons: employability; the influence of family and family educational background; having been rejected by a four-year university, thus deciding to enroll in community college to "repair their academic standing and to regain self-confidence" (p. 2); and for socioeconomic reasons such as cost of education, speed of completion, and employment prospects after graduation. There may be important findings from this research; however, further analysis of CTE students and alumni is needed to confirm these results. In a similarly structured study, Gauthier (2019) researched CTE students and alumni in order to gauge their satisfaction with, and value of, their CTE educational experience. Again, a limited number of CTE students and alumni were used in this study, which concluded that "economic independence, opportunity for a better lifestyle, and gaining self-confidence" (p. 2) were the major themes of this qualitative research study.

The U.S. Department of Education, with participation from the National Association of State Directors of Career and Technical Education Consortium (NASDCTEc), first developed a career clusters framework, which was created for the purpose of assisting various stakeholders to help students transition successfully from secondary to postsecondary education and then into the workforce (Gordon, 2014; Ruffing, n.d.). In 2016, the NASDCTEc changed its name to Advance CTE, but remains an important CTE advocacy organization. The below listed career clusters "are based on a common set of knowledge and skills that are needed for career success" (Maguire et al., 2012, p. 236):

- Agriculture, Food, and Natural Resources

- Architecture and Construction

- Arts, Audio/Visual, and Communications

- Business, Management, and Administration

- Education and Training

- Finance

- Government and Public Administration

- Health Science

- Hospitality and Tourism

- Human Services

- Information Technology

- Law, Public Safety, Corrections, and Security

- Manufacturing

- Marketing, Sales, and Service

- Science, Technology, Engineering, and Mathematics

- Transportation, Distribution, and Logistics

Additionally, within these sixteen career clusters are 79 associated career pathways (Association for Career & Technical Education, 2019b). Typically, these career pathways are also used to guide students from high school to college to career; however, the college portion does not necessarily mean a four-year degree, but does usually mean some postsecondary education (Rosen et al., 2017).

Hudson (2018) in a study of sub-baccalaureate occupational (i.e., CTE) awards between 2003 and 2015 showed that in 2015, health sciences, trades (manufacturing, construction, repair, and transportation), consumer services, and business management were the top fields of study, accounting for 75% of all credentials awarded. When split between occupational certificates and associate degrees during the same time period, these four fields of study remain in the same order (Hudson, 2018). During the 2003 to 2015 time frame, overall Subbaccalaureate credentials awarded increased 35%, with sub-baccalaureate occupational awards making up approximately 74% of overall credentials awarded (National Center for Education Statistics, n.d.a).

In the 2015-2016 academic year, of the students seeking a postsecondary certificate, 88.7% pursued an occupational education field of study, compared to only 9.6% of students who sought a certificate in an academic field of study during that same year, with the remainder as undeclared (National Center for Education Statistics, n.d.i, Table, p. 179). Of the associate degree seeking students in 2015-2016, those pursuing an occupational education were 64.7% of students, with 31.5% seeking an academic associate degree, and the remaining undeclared (National Center for Education Statistics, n.d.i, Table, p. 179).

Data points such as these confirm the popularity of postsecondary CTE-related courses and programs during the last decade. In comparison to the 2007-2008 academic year, these data

have held steady. For example, certificate-seeking students in occupational fields of study accounted for 87.6% of students in 2007-2008, with 3.8% of students pursuing an academic certificate during that time period, and 8.6% of students undeclared (National Center for Education Statistics, n.d.g, Table p. 115). With associate degree-seeking students during the 2007-2008 timeframe, 62.9% pursued occupational education, while 25.5% of students pursued academic degrees, and 11.5% were undeclared (National Center for Education Statistics, n.d.g, Table, p. 115).

Although data such as these point to the differences between pursuing academic degrees and certifications and CTE-related degrees and certifications, Bailey and Belfield (2019) argue that distinguishing between academic education and vocational, or career, education is not a productive way of framing the debate, nor that there should really be a debate at all. Skills developed in both academic and vocational programs are necessary for labor market success.

As stated throughout this study, the importance of an educated workforce, specifically in CTE-related fields is critical to our nation's current and future economic prosperity. The research by Anthony Carnevale and his associates at the Center on Education and the Workforce at Georgetown University has been instrumental in this cause. Lowry and Thomas-Anderson (2017) have stated that career and technical education programs and pathways "have the capacity to launch America's future global competitiveness by emphasizing increased student engagement and innovative integration of traditional academic courses, meeting the needs of both employers and the economy as a whole" (p. 46). O'Lawrence (2017) reminds us that "an investment in the nation's future means a solid commitment to career and technical education to achieve higher levels of educational attainment and high-tech workforce proficiency" (p. 23). The vocational and occupational courses and programs specifically within the community colleges have allowed

many to advance their economic status and social mobility when few other options were available to them (O'Lawrence, 2017).

Over the years, vocational, occupational, and CTE courses and programs, whether at the secondary or postsecondary level, have been viewed by some as an education for those who are otherwise academically-challenged or low-achieving individuals (Hull, 2003; Palmer & Gaunt, 2007). Over time, that viewpoint has shifted, and today CTE is seen in more positive terms as a viable route of educational endeavor that can lead to well-paying jobs, career opportunities, and economic and social mobility for anyone who pursues that particular area of study. Oftentimes, the pursuit of CTE education culminates with a certificate or certification within the student's field of study. One population of students for whom certificates and certifications are particularly popular is military veterans (Clayton & Torpey-Saboe, 2019).

Military Veterans

American military veterans are a unique population of people (DiRamio et al., 2008), particularly to the author of this study. In terms of simple demographics, today's military veterans tend to be older married white males with some college education and a median household income of just under $62,000/year (National Center for Veterans Analysis and Statistics, 2019). No matter which branch of the armed services a person has served, the men and women who have taken the oath to defend and protect the Constitution of the United States, past, present, or future, deserve our respect and recognition for their willingness to sacrifice. Although in recent years the plight of military veterans in the United States has received renewed and warranted attention on various fronts, there is still much work to be done to support and serve the people who have courageously served our country.

The educational achievement of veterans is somewhat mixed. Data from the National Center for Veterans Analysis and Statistics (NCVAS) of the U.S. Department of Veterans Affairs in 2017 show that in terms of postsecondary education, 37% of male veterans have completed some college, 16.4% have attained a Bachelor's degree, and 11.3% have an advanced degree (National Center for Veterans Analysis and Statistics, 2019). The "some college" and "advanced degree" figures of male veterans are both higher than the non-veteran counterparts in these categories, while the bachelor's degree figures are slightly lower than non-veterans. Women veterans fare better in these categories than men, with 42.4% of women veterans having completed some college, 21.3% having completed a bachelor's degree, and 15.4% of women veterans having earned an advanced degree (National Center for Veterans Analysis and Statistics, 2019, p. 9). The figures for women veterans all outweigh their non-veteran counterparts in every category.

Strada Education Network and Gallup found that among adults without a college degree, certificates and certifications are a popular choice among military veterans as opposed to non-veterans (Clayton & Torpey-Saboe, 2019). Among adults without a college degree, 57% of military veterans are more likely to have a certificate or certification than non-veteran adults at 35% (Clayton & Torpey-Saboe, 2019). Furthermore, the popularity of certificates and certifications is consistent among race and ethnicity between veterans and non-veterans. Addtionally, veterans with a certificate or certification are more likely to be employed than non-veterans (73% versus 64%), and earn higher incomes than non-veterans (Clayton & Torpey-Saboe, 2019). Lastly, according to the Strada-Gallup report, the top occupational areas of non-degree veterans with certificates or certifications are:

- Installation, maintenance, and repair (12%)

- Transportation (11%)

- Construction or mining (10%)

- Manager and executive (7%)

- Security and protective services (7%).

(Clayton & Torpey-Saboe, 2019, p. 9)

All of the areas align to the 16 career clusters framework discussed in the previous section of this chapter.

Aerotek (2018) states that "around 200,000 service members transition out of the military each year" (p. 10). Many of these veterans, including those who retired from military service, are in need of finding employment in the civilian workplace. The advantages of veterans in the workforce are numerous, as outlined by Haynie (2016), who reported on ten specific areas in which veteran employees create a "rare, valuable, and differentiating" (p. 8) work environment for the organization that non-veteran employees do not create due to their non-military experience. These ten areas include:

- Entrepreneurship

- Trust

- Skills Transfer

- Advanced Technical Training

- Comfort in Discontinuous Environments

- Resiliency

- Team-Building Skills

- Organizational Commitment

- Cross-Cultural Experiences

- Diverse Work Settings

In 2018, the Bureau of Labor Statistics reported that the veteran unemployment rate was 3.5% (Bureau of Labor Statistics, 2019c). "For manufacturing employers, former military members are an attractive candidate pool" (Aerotek, 2018, p. 10). Characteristics that make veterans good fits for many organizations include their ability to work on a team, their dependability on each other, and a clear understanding of the role each member of the team plays, and the importance that each member plays their role effectively (Aerotek, 2018). Further, Aerotek (2018) states that because many former military members have experience moving people and equipment around the globe, they may be ideally suited for careers in the logistics field. These conclusions are supported by the RAND Corporation (2014) who evaluated the results of veteran hiring of eleven companies who initially founded the 100,000 Jobs Mission in 2011, whose goal was to hire 100,000 veterans by 2020. In surpassing that goal, these companies recognized veterans as being highly skilled in teamwork, flexibility and adaptability in a fast-paced environment, dependability, loyalty, and diversity (RAND Corporation, 2014).

Research conducted by the Institute for Veterans and Military Families (IVMF) show that veterans can flourish in today's dynamic, uncertain, and unpredictable work environment because of their military training, especially those veterans who have combat-related experience (Haynie, 2016). Additionally, Carnevale et al. (2018) found that,

> The demand for adult education increases substantially as veterans found themselves having to develop higher skill levels to enter the workforce, a need recognized within the passage of the GI Bill in 1944. Junior, community, and technical colleges stepped up to meet returning veterans' growing education and training needs. (p. 6)

Student Service Members/Veterans

  The military and higher education institutions in the United States have had a significant and interesting history together. Although historical perspectives take us back to the Civil War era and the Morrill Act of 1862 to begin to understand the connection between postsecondary education and the military (Rumann & Hamrick, 2009; Rumann et al., 2011), the basis of this paper will be The Servicemen's Readjustment Act of 1944, which was known as the first version of what is commonly called the G.I. Bill (Hammond, 2017). This legislation created an important relationship between military veterans seeking new and updated skills after World War II (Vacchi & Berger, 2014) by providing $5.5 billion to cover educational costs for some 2.2 million veterans (Bailey et al., 2019), and postsecondary institutions faced with an influx of new students who were different than the traditional college students of the time. Those differences between military veterans in postsecondary education and traditional college students continues to this day; however, the G.I. Bill has gone through several iterations of the legislation to become what it now is, which is the Post-9/11 Veterans Educational Assistance Act of 2008 (Hammond, 2017).

  Student service members/veterans are those men and women who have served in the U.S. military and who subsequently enroll in postsecondary educational institutions, usually after their military obligations are completed (Cate & Davis, 2016b). One of the major areas that DiRamio (2017) identified as needing further attention regarding SSM/V is preparing this population of students to transition from military service into the private-sector workforce. SSM/V need skills that employers want, and those skills are often refined in college after completing military service (DiRamio, 2017). While a higher percentage of SSM/V seek postsecondary education at for-profit institutions, public community colleges enroll a vastly larger number of SSM/V overall

(Phillippe & Tekle, 2019c). Further, Molina (2014) states that 54% of SSM/V are enrolled in associate degree or certificate-granting postsecondary education programs.

This unique population of students are classified as nontraditional students because they are usually first-generation students who are older than traditional college students, have families or other dependents, and work either full or part-time while attending school (Kim & Cole, 2013; Livingston et al., 2011; Radford, 2009; Vacchi & Berger, 2014). According to Molina (2014), "on average, at the start of their postsecondary education, veterans are 25 years old" (p. 1). Additionally, 44% of SSM/V are married, 52% of have dependents, and 42% of work full-time while in college (Molina, 2014). These categories separate SSM/V from traditional college students who are generally younger and do not have the level of responsibilities and obligations that nontraditional students such as SSM/V have. Some SSM/V are those who have made a career out of their military service and thus do not enroll in college until they have retired from military service, which puts them in a much older age category than their younger military peers and the traditional college student. This age gap can present significant challenges to the older SSM/V who are generally more mature and motivated to complete their college studies, and who usually have a good understanding of the importance of using education to bridge the gap between their current reality and a desired future reality. When comparing SSM/V to other nontraditional students, however, Cate (2014) found that SSM/V earn academic degrees and certificates at a higher rate than their nontraditional student counterparts.

Student service members/veterans are a very diverse group of students, with unique backgrounds and life experiences that make them an asset within postsecondary education (Hammond, 2016). The diversity of SSM/V matches that of other college students with the exception of gender (Vacchi & Berger, 2014). According to Molina (2014) and Cate (2014),

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21% of SSM/V are female (79% male). Additional research shows that 38% of SSM/V are enrolled in public two-year colleges (Molina, 2014). Vaccaro (2015), in her interviews with SSM/V, reminds us that there is a lot of diversity within and between SSM/V groups in postsecondary education, and that SSM/V want to be treated as individuals and not stereotyped into categories based on their military experiences.

Cate et al. (2017), in researching SSM/V who used their Post-9/11 GI Bill benefits found that this population of students tended to return to school to finish their academic program despite the various interruptions to their progress. These obligations as mentioned above (age, family responsibilities, work, etc.) play an important role in the SSM/V decision to take a break from their educational endeavors. Sometimes SSM/V are also required to continue to fulfill military obligations while in school, which may also cause a temporary break in postsecondary learning. The majority of time, the students who take a break from their educational pursuits come back to finish what they started (Cate, 2014). "By most measures, student veterans demonstrated stronger rates of persistence and completion than non-veterans" (Ochinko & Payea, 2018, p. 4).

Student service members/veterans make very good students according to the research conducted thus far on this population of nontraditional students. SSM/V motivation and drive to finish what they started – skills acquired through military service – appear to be strong with this group (Blaauw-Hara, 2016; Rumann & Hamrick, 2010). In 2013, a partnership between Student Veterans of America (SVA), the U.S. Veterans Administration (VA), and the National Student Clearinghouse resulted in the Million Records Project (Cate et al. (2017), whose purpose was to better track and report postsecondary academic outcomes of SSM/V. Cate (2014) found that many of the databases used in the past to track SSM/V data, including completion rates, were

inconsistent in their data collection methods, or weak in their data analysis methods. According to Cate (2014), "The Million Records Project was envisioned, planned, and implemented by Student Veterans of America to address these gaps in knowledge and, with additional research, ultimately determine best practices and policies that promote student veteran success" (p. iv).

In 2017, Cate et al. released an updated report entitled "National Veteran Education Success Tracker: A Report on the Academic Success of Student Veterans Using the Post-9/11 GI Bill." This report is commonly referred to as NVEST, and its purpose was to continue along the lines of research and reporting started by the Million Records Project, but to eliminate some of the limitations related to scope, methodology, and timeliness that were inherent in the Million Records Project report (Cate et al., 2017). According to Cate et al., the NVEST project "…is the first comprehensive in-depth study of the academic success of the modern student veteran using the Post-9/11 GI Bill" (p. viii). Results from the NVEST project show that the success rate of SSM/V in post-secondary education who took advantage of the Post-9/11 GI Bill is 71.6% (Cate et al., 2017). The overall completion rate for SSM/V in postsecondary education is 53.6% according to Cate et al. (2017).

Evidence from research indicates that SSM/V respond to different types of support systems, whether from family and friends, or from other SSM/V, and that these support systems play an important role in SSM/V academic success (Barry et al., 2017). Other support systems important to SSM/V come from the college or university itself; however, not all support systems function as intended due to operations inefficiencies and institutional bureaucracy (Rumann et al., 2011). Miller (2017) found that in a research study commissioned by the California Community College System, SSM/V rated having a campus veterans' resource center highest

within the eight essential practices identified by the study. These resource centers are seen as a vital component of supporting SSM/V academic success.

Some SSM/V find it difficult to manage and navigate the college structure and culture, which is much different than the military structure and culture they are used to (Arminio et al., 2015; Barry et al., 2014). This difficulty may play a role in how SSM/V connect with their college or university, which also can affect the student's overall persistence and attainment. Barry et al. (2014) also found in their review of peer-reviewed research of SSM/V in higher education that these students preferred connecting with other SSM/V on campus for both academic and social support, rather than connecting with civilian student peers.

Durdella and Kim (2012) found that "student veterans tend to have both lower college GPAs and lower level of sense of belonging (to the college) than their civilian peers" (p. 8). This claim is refuted by data from the Institute for Veterans and Military Families (IVMF) and Student Veterans of America (SVA) which state that SSM/V achieve higher academic performance as measured by GPA: 3.34 average SSM/V GPA compared to 2.94 average traditional student GPA (Institute for Veterans and Military Families & Student Veterans of America, 2019). This may be important because research by Allen et al. (2008) shows that first-year college student GPA plays a role in retention, persistence, and achievement, as does social connectedness to the school. Lang et al. (2013) quoting a DePaul University study of the correlation between student GPA and student retention stated that students with higher GPAs have a higher likelihood of retention and persistence than do students with lower GPAs. SSM/V may be prone to lower GPAs and lower social connectedness because of their commitments outside of academics and college life that non-veteran students generally do not have. This is not to say that SSM/V GPAs are low; however, Durdella and Kim (2012) found that they tend to be

lower than non-veteran students who do engage in activities that lead to higher levels of academic achievement (p. 14). SSM/V must also contend with perceived differences in organizational cultures and structures between what they are used to in the military, a highly mechanistic culture/structure as compared to a much more organic culture/structure in the academic world (Durdella & Kim, 2012). These differences enhance the challenges that SSM/V must navigate from one environment to the other.

Further, Durdella and Kim (2012), stating research from Teachman (2005), claim that SSM/V have lower levels of degree attainment than non-military students. The validity of this statement to today's SSM/V may be problematic since Teachman's research analyzed data from the Vietnam War era, which was a time when changes to the GI Bill provided veterans at that time with fewer educational benefits (Hammond, 2017; Vacchi & Berger, 2014). Today's SSM/V are seeing degree or certificate completion rates of 51.7%, according to Cate et al. (2017), which is on par with non-military students.

Lastly, in their report, Durdella and Kim (2012) claim that military culture "seems to socialize enlisted personnel away from higher education" (p. 3). The author of this dissertation, as a former enlisted member of the U.S. Air Force, refutes this claim based on personal experiences. When this author was an active military service member, he was contacted frequently by the base education office and encouraged to begin taking classes and working toward a bachelor's degree. Unfortunately, at that time, the author did not take advantage of those services when offered, which was a regrettable decision.

As stated in Chapter 1, much of the research conducted on SSM/V focuses on the transition from military service to college life, and some research looked at persistence, and attainment of SSM/V; however, none of the research thus far has focused specifically on

persistence and attainment of SSM/V through the earning of community college Career and Technical Education credits. Lang and Powers (2011), who analyzed semester-to-semester retention in their study, found that SSM/V have an overall retention rate of 94%, which is greater than the national average of 65.7%, according to ACT; however, it may be important to note that Lang and Powers' study was limited to retention from a single academic year. Barry et al. (2014) conducted research that reviewed the peer-reviewed literature on SSM/V in higher education. Their investigation found that, at that time, only two longitudinal studies had been conducted on SSM/V, both of which had only been conducted over three consecutive semesters. This finding led Barry, et al. (2014) to conclude that more research is needed in the areas of SSM/V persistence and academic success.

Persistence and Attainment

Persistence and Retention

Although student retention is not a major consideration of this study, it is important enough to warrant a discussion in this chapter as a factor that in some ways is interrelated with student persistence. It is also beneficial to discuss the academic and social integrations of student retention, as these elements will mostly likely be a part of this overall study. Perhaps the scholar who is most recognized for significant scholarly and research contributions to the area of student retention is Vincent Tinto (1987, 1993). Tinto's interactionalist model of student retention posits that student retention is a factor of both academic and social integration of the student into the educational institution, and that student attributes such as "skills, commitments, intentions, and interaction with the members of the college" (i.e., faculty and staff) contribute to the student's decision to stay or leave (Morrison & Silverman, 2012, p. 71). The academic system of a college pertains to the formal academic instruction and education of students inside the classroom or

related venues (Tinto, 1987). The social system of a college pertains to the "daily life and personal needs of the various members of institution, especially the students" (Tinto, 1987, p. 106). The foundation of the social system of college consists of interactions and relationships outside the classroom environment between students and the representatives of the college, including faculty, staff, and perhaps other students serving in various representative roles within the school (Tinto, 1987).

Tinto (1987) theorized that students progressed through three stages in order to become fully integrated into the college environment. Those stages are (1) separation, (2) transition, and (3) incorporation. Students must first separate themselves from membership in previous life communities such as family, high school, and other situations of their life at that time. Then students must go through the transition period in which they begin to create new behaviors and adapt to new norms that are different from the behaviors and norms of their previous life circumstances. According to Tinto (1987), both the separation and the transition stages happen early in the student's college career. The degree of difficulty that a student might have in these first two stages of integration depend on how different the required new behaviors and norms are of the college environment from those of previous behaviors and norms in which the student is familiar. The final stage of this integration process, incorporation, happens as the student learns to navigate the complexities of college life. This stage may require additional help of various constituency groups within the college, both formal and informal, to help new students make contacts and connections with important elements of the college system (Tinto, 1987). Without this help, according to Tinto (1987), incorporation into the college environment may be very difficult.

The stages of integration that Tinto (1987) suggested appear to be aligned with that of the psychologist Kurt Lewin, who proposed that change occurs in three distinct phases: unfreezing, changing, and refreezing (Schermerhorn & Bachrach, 2018). Similar to Tinto's theory, Lewin proposed a model of change that has, at its foundation, a focus on behaviors that lead to outcomes important to an organization. Tinto's theory is about creating change within the individual in order to adapt to a new environment. Both models are similar in that they begin with creating an element of discomfort and stress in order to begin the change process, followed by implementing the desired change through the creation of new behaviors and adoption of new norms, and ending with stabilizing the change through continued support of the new behaviors and new norms.

One point of criticism that Tinto realized in his integration theory is that it may not apply as well to commuter institutions such as community colleges as it does to four-year, residential universities, and that it may apply most fully only to traditional-aged students (DiRamio & Jarvis, 2011; Tinto, 1982). The separation stage for community college students is, in most cases, different than the separation stages of residential university students. Community college students, as non-resident attendees, do not separate from as much of their earlier life environment to the degree that residential university students typically do when moving away from home to attend college. It is important to keep these differences in mind in terms of their potential effect on student persistence. Those students who do not separate very much from their previous life environment may find it difficult to persist in college due to external forces that may inhibit their full integration into the college system. Braxton and Hirschy (2005) and Braxton et al. (1997) also lend support of this criticism in their analysis of the differences in student retention models

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between residential colleges and universities, and commuter colleges and universities, both at the two- and four-year levels. Braxton's work is discussed in more detail later in this chapter.

Tinto (1987) further states that although postsecondary educational institutions consist of distinct organizational cultures, it is not necessary for a student to integrate fully into the college's dominant overall culture in order to be retained and persist, but rather to integrate into those elements of the organization's subcultures in which the student relates to most strongly. The relationship to an organization's subculture comes from the student's identity of certain values that the subculture holds, which are aligned with the student's personal value system either partially or wholly (Tinto, 1987). Likewise, Tinto (1987, 1993) argues that full integration into either the academic or social structures of the organization is not necessary for persistence; however, he suggests that some degree of integration, and therefore membership into the academic and social communities of the college, must exist in order for retention and persistence to exist.

Furthermore, Tinto (1987) states that if a postsecondary student is integrated into either the academic or social system of the institution, it does not imply that the student is integrated in the other just as equally. According to Tinto, it is possible for a student to be integrated into one of the systems and still not persist due to the lack of integration in the other. A simple example that Tinto offers is one in which a student who is integrated into the social system of the institution may not persist if they are unable to maintain sufficiently high grades as part of the academic system (Tinto, 1987). Tinto states clearly that "maintenance of adequate levels of grade performance in the academic system is, for most colleges, a minimum formal condition for persistence. Integration or membership in the social system is not" (Tinto, 1987, p. 107). Lastly, Tinto (1993) suggests that retention efforts should not be the primary goal of educational

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institutions. Instead, he states that, "Institutions and students would be better served if a concern for the education of students, their social and intellectual growth, were the guiding principle of institutional action. When that goal is achieved, enhanced student retention will naturally follow" (Tinto, 1993, p. 4).

Hagedorn (2012) shows that there are multiple types of retention: institutional, system, major (discipline), and course. Institutional retention considers students who remain enrolled in their postsecondary institution from one year to the next. System retention looks at students who may have transferred from one institution to another, but who stayed enrolled within a specific postsecondary system of education, for example, a postsecondary system within a particular state such as the California community college system. Retention within a major or discipline attempts to measure student retention related to majors, disciplines, or academic departments. This type of retention is not usually tracked at the national level but may be tracked at the college/university level. Lastly, the course-level retention, according to Hagedorn (2012), is measured by course completion rates wherein a student enrolls in a particular course and ultimately completes that course. Like major/discipline retention measures, course-level retention is not tracked at the national level but may be tracked and measured at the college/university level for purposes of decision making and planning.

Hagedorn (2012) argues that current measures of student retention are inadequate in that they exclude certain populations of students, such as part-time students, returning students, students who transfer, and students who withdraw from school after their second year. These are important considerations as SSM/V fall well within these categories. Hagedorn (2012) makes a case for a new type of retention formula that also takes into consideration those populations of students who have previously been left out of the calculations. Measuring student retention more

accurately, Hagedorn claims, could have a profoundly positive impact on postsecondary institutions as they work to effectively and efficiently use their limited resources, specifically financial resources used to attract and enroll students to the institution. In a similar manner, retention programs for private companies also use financial resources to attract, recruit, and hire employees. If an employee does not stay long enough for the company to see a return on investment, those financial resources are lost, costing the company more time, money, and other valuable resources to start the process all over again.

Student Retention Within Community College. Student retention among different types of postsecondary educational institutions varies greatly due to a number of student and institutional characteristics. Several scholars have recognized the need to view community college retention differently than that of four-year institutions (Nakajima et al., 2012; Strauss & Volkwein, 2004; Tinto, 1987). Crisp and Mina (2012) remind us of the many reasons why community colleges have not had as high of retention rates as those of four-year universities. Those reasons include differences in student characteristics, commitment to the organization and the students' personal educational goals, and academic preparation and challenges, as well as institutional characteristics such as the commuter nature of community colleges, which may limit a students' ability to fully integrate socially into the institution to the same degree that a student might integrate at a four-year university (Crisp & Mina, 2012; Nakajima et al., 2012).

According to the National Student Clearinghouse Research Center (NSCRC), in 2017, the overall retention rate for students who started college at two-year public institutions was 48.9%, a figure that has held relatively steady since 2009 (National Student Clearinghouse Research Center, 2019). Retention, as the NSCRC defines it, is "continued enrollment (or degree completion) within the same higher education institution in the fall term of a student's first and

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second year" (p. 15). Retention of full-time students who started college in two-year public institutions, according to the NSCRC, was 60.1% in 2017, which is also consistent with retention rates measured as far back as 2009. For part-time students, the retention rate in 2017 was 44.9%, which has held steady since 2015, but is an improvement over the 38.1% retention rate of 2009 (National Student Clearinghouse Research Center, 2019). The NSCRC further reported that for the fall 2017 entering cohort of two-year public institution students,

In terms of race and ethnicity, the NSCRC reports that the fall 2017 cohort of students who began college at a two-year public institution, retention was highest among Asian students at 55.7%, followed by Hispanic students (52.8%), White students (49.6%), and Black students (42%) (National Student Clearinghouse Research Center, 2019). The NSCRC further reports that the retention rates of the top five most popular majors among the 2017 cohort of students who started college within associate degree programs were (1) Computer, Information Sciences, Support Services (57%), (2) Liberal Arts, Humanities (54.7%) and Health (54.7%), (4) Business, Management (51.8%), and (5) Security Protective Services (51.5%) (National Student Clearinghouse Research Center, 2019). The transfer rates for these top five majors varied from 5.9% for Security Protective Services students, to 11.4% for Liberal Arts, Humanities students (National Student Clearinghouse Research Center, 2019).

In terms of the retention rates of first-time college students in the fall 2017 cohort who sought an undergraduate-level certificate, the top five majors and retention rates were, (1) Mechanic Repair Technologies/Technicians (54.9%), (2) Precision Production (54.3%), (3) Health-Related (48.4%), (4) Business, Management (47.1%), and (5) Liberal Arts, Humanities (45.7%) (National Student Clearinghouse Research Center, 2019). With regards to these top five majors reported by the NSCRC, four of the five programs within both the associate degree

program area and the certificate program area fall within the realm of Career and Technical Education.

There is no question that community colleges have room to improve their retention rates, especially as it pertains to nontraditional students who, according to Yu (2015), are less likely than their traditional counterparts to complete academic certificates or degrees. There is no one-size-fits-all model of student retention (Berger et al., 2012), especially as it pertains to community colleges. Diversity among students and student groups in postsecondary education suggests that successful student retention strategies must be customizable and adaptable to the various diversity of student populations within the postsecondary institution, whether a two-year college or a four-year university (Wild & Ebbers, 2002). Morrison and Silverman (2012) suggest that "each college must create and implement its own program uniquely designed to meet its own available resources and institutional purposes" (p. 77).

Student Persistence Within Community College. The terms "retention" and "persistence" have been intertwined in the research over the years. As outlined in Chapter 1; however, these terms should be seen as unique, specific, and separate from each other. The 1990s, according to Berger et al. (2012), saw an emergence of the concept of student persistence in the research, and by the late 1990s, scholars had recognized the importance of separating student retention and student persistence into distinct and unique research categories.

At the community college level, there is evidence to suggest that student persistence is influenced by academic factors more than by social factors (Braxton et al., 2014; Deil-Amen, 2011; Pascarella & Chapman, 1983; Tinto, 1993). A major disadvantage that community colleges have in Tinto's model is the inability to develop social systems that are on par with residential four-year universities. As mentioned previously, community colleges are commuter

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institutions in which the students are not residents of the school, but rather come and go to the campus as needed for classes and other activities. When not in class or attending other college-related functions, the community college student transitions back into his or her personal life and continues serving in whatever roles and responsibilities he or she actively pursues.

Another issue facing community colleges as they pursue retention and persistence strategies is the nature of their open-door admission policies (Craig & Ward, 2008). Community colleges often admit anyone who is willing and able to take desired classes, regardless of the students' academic ability or other factors. Institutional commitment and goal attainment, at least for the long term, do not appear to be as strongly associated with community college students as they are with students of four-year universities. This potential lack of commitment and dearth of personal academic goals presents a challenge for community college systems that are trying to improve student retention, persistence, and success rates.

Braxton Det al. (2014) broke down Tinto's interactionalist theory into thirteen propositions in which to test for empirical evidence of support. They noted that student persistence in residential colleges and universities is different than student persistence in commuter colleges and universities. Their findings found support for five of the thirteen propositions as it pertains to two- and four-year commuter institutions (Braxton et al., 2014). Specifically, Braxton et al. (2014) found support for those propositions most strongly related to student academic and intellectual development and subsequent institutional commitment. At a more granular level, Braxton et al. (2014) found that elements such as students' perceptions of institutional integrity, and perceptions of the institution's commitment to student welfare, are related to higher academic and intellectual development, which, in turn, positively impacts the students' subsequent commitment to their institution. The perception of institutional integrity by

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the students also positively affects the subsequent commitment to the institution, which leads to a greater likelihood that the students will persist in their commuter college or university (Braxton et al., 2014).

Because community colleges have less of an opportunity to build strong social integration with the students (as compared to four-year residential universities), academic integration into the institution becomes vital. A strong emphasis on academic integration has been shown to compensate for weaker social integration (Terenzini & Pascarella, 1980). As discussed previously, faculty members play a key role in the development of academic integration between the students and the school. They are, essentially, an important catalyst that drives this dimension of integration, both inside and outside the classroom (Karp et al., 2010). As Davidson and Wilson (2013) correctly point out regarding campus relationships: "When students form meaningful relationships with others connected to the institution, they are more likely to persist" (p. 341). The importance of the relationships that faculty members have with their students cannot be overemphasized as it pertains to student persistence, especially in community colleges where faculty are often the largest point of contact with the students and representative of the institution.

Self-efficacy and achievement goals of community college students are highly associated with academic performance, achievement, and persistence, according to Fong et al. (2016) and Nakajima et al. (2012). Nakajima et al. (2012) remind us, for example, that demographic factors such as a student's age, ethnicity, financial status, work schedule, high school grade point average, and college GPA, are also important in community college student retention and persistence outcomes. Fong et al. (2016) found a positive relationship between community college student persistence and the psychosocial factors of self-perceptions and motivation.

While there are many demographic risk factors associated with community college students, Nakajima et al. (2012) suggest that focusing solely on these factors exclusively does not improve student retention and persistence. Rather, these scholars posit that attention to environmental and psychosocial factors be made a priority of student retention and persistence efforts in community college. A major part of environmental factors is the quality and quantity of student-faculty interaction within the academic setting (Nakajima et al., 2012), a topic previously discussed in this chapter. The psychosocial factors include self-efficacy and academic achievement goals. Nakajima et al. (2012), through a study of multivariable research, concluded that cumulative college GPA "was the strongest predictor of student persistence when all the variables were considered" (p. 602). Furthermore, enrollment units and English proficiency were also factors that predicted student persistence in community college, according to Nakajima et al. (2012). These scholars found little support for academic integration or psychosocial variables as predictors of community college student persistence. Interestingly, Nakajima et al. (2012), found that it was not the student-faculty interaction itself that accounted for student retention and persistence in community college, but rather the students' perception that faculty members cared about them that had the greatest impact on retention and persistence decisions.

Although there are many scholars who have researched and written about student retention and persistence over the past several decades, Morrison and Silverman (2012) remind us that,

> Regardless of the particular theory, model, or concept, it is Tinto's model of academic and social integration that is generally the cornerstone of the research, along with the notion of institutional fit. Institutional fit is based on congruency theory: the greater the congruence of the individual's background, values, attitudes, and interests with those of a

significant cohort of individuals at the college, the more likely the individual will persist. (p. 77)

The National Student Clearinghouse Research Center (NSCRC) reports that, in 2017, the persistence rate for students who started college in a two-year public institution was 62.3% overall, a number which has stayed relatively consistent since 2009 (National Student Clearinghouse Research Center, 2019). The NSCRC defines persistence as "continued enrollment (or degree completion) at any higher education institution, including one different from the institution of initial enrollment, in the fall terms of a student's first and second year" (p. 15). Of the full-time students who started their college careers in 2017 at two-year public institutions, the persistence rate was 69.7%, which is slightly lower than the persistence rates of the 2015 and 2016 cohorts of students, but relatively consistent with the 2009 to 2014 cohort rates (National Student Clearinghouse Research Center, 2019). Part-time students in the 2017 cohort of students had a persistence rate of only 56.3%, which is relatively consistent with persistence rates from 2009 to 2016 (National Student Clearinghouse Research Center, 2019).

In terms of race and ethnicity, the NSCRC reports that the fall 2017 cohort of students who began college at a two-year public institution, persistence was highest among Asian students at 72.9%, followed by White students (67.1%), Hispanic students (62.1%), and Black students (55.3%) (National Student Clearinghouse Research Center, 2019). The NSCRC further reports that the persistence rates of the top five most popular majors among the 2017 cohort of students who started college within associate degree programs were (a) Liberal Arts, Humanities, 66%; (b) Computer, Information Sciences, Support Services, 63.1%; (c) Health, 62.1%; (d) Business, Management, 60.5%; and (e) Security Protective Services, 57.3% (National Student Clearinghouse Research Center, 2019).

In terms of the persistence rates of first-time college students in the fall 2017 cohort who sought an undergraduate-level certificate, the top five majors and persistence rates were, (1) Liberal Arts, Humanities (62%), (2) Business, Management (57.4%), (3) Mechanic Repair Technologies/Technicians (57.3%), (4), Precision Production (56.3%), and (5) Health-Related (55.9%; National Student Clearinghouse Research Center, 2019).

Student-Faculty Interaction. The academic and intellectual development of students, according to Spady's (1971) research, is greatly affected by contact with faculty members. While Spady's research was most applicable to the particular university he examined, nonetheless, some significant findings from his research may be directly applied at the community college level as well, particularly the interactions between students and faculty members. The work of Pascarella and Terenzini (1977, 1979a) and Pascarella et al. (1978) provides further evidence of the importance of informal, out-of-classroom student-faculty interaction as a factor of student persistence and retention. Academic integration that includes a high frequency of informal student-faculty interactions outside of the classroom environment that focuses on intellectual issues and which show faculty concern for the student's well-being appear to compensate for lower levels of academic and social integration of the student in other areas of their educational endeavors (Pascarella & Terenzini, 1979b).

Bean (2005) advocated for student-faculty interactions inside and outside the classroom as a necessary and important factor of student retention. Specifically, Bean stated,

> Faculty members, more than any other group of employees at the university, shape the psychological processes and attitudes that have the greatest effect on retention. Faculty members' in-class and out-of-class contacts with students affect the students' sense of fitting in, loyalty, institutional quality, satisfaction, sense of self-development, self-

confidence, and self-efficacy, the connection between course work and later employment, and stress. (p. 223)

Bean (2005) recognized other factors that impact student retention are important as well, but none as important, in his opinion, as the relationships between faculty members and students. It is the faculty members, to a great extent and especially in community colleges, that spend the most time with students while they are on campus, and thus have the greatest influence and impact on the students' perceptions of the institution.

Wyatt (2011) found that nontraditional students indicated a preference for interacting with faculty members who are supportive, caring, and friendly, and that faculty who exhibited these characteristics helped shape student engagement in ways that were beneficial to institutional commitment and student retention. The conversations between nontraditional students and faculty members typically centered around coursework, questions about the class, and other academic concerns of the students. Positive interactions between nontraditional students and faculty members were found to benefit nontraditional students as they adjusted to campus life (Wyatt, 2011). Vacchi et al. (2017) state that, as it pertains to student veterans, sufficient and satisfactory student-faculty interactions "may have a positive impact on student veteran persistence" (p. 36).

Retention and Persistence Among Student Service Members/Veterans. As discussed previously in this chapter, an important element of student retention as posited by the scholars, specifically Tinto, is the notion that academic and social integration are key to the overall retention process. When it comes to nontraditional students, such as SSM/V, however, there appears to be more emphasis on the academic integration of students, and less emphasis on the social integration, as being critical for retention and persistence, especially at the community

college level (Bean & Metzner, 1985; DiRamio & Jarvis, 2011; Wilson et al., 2013; Yu, 2015). This is not to suggest that social integration is not important; rather, it is to suggest that the social integration of SSM/V, like other nontraditional students, may be more difficult due to the nature of external environmental factors such as family, work, and other non-academic obligations have on this population of students (Bean & Metzner, 1985).

DiRamio and Jarvis (2011), Olsen et al. (2014), and Vacchi et al. (2017) suggest that one possible way to initiate the integration SSM/V is to create an environment in which they can meet with like-minded students with similar military backgrounds and experiences. DiRamio and Jarvis (2011) further suggest that at some point, transitioning SSM/V into other non-military peer groups at the college will be necessary for continued integration into the educational community. Further, Mentzer et al. (2014) posit that, with regards to SSM/V postsecondary persistence, the stronger the SSM/V identity with the institution, as well as academic presence within the institution, the stronger the overall persistence.

Molina and Morse (2017) remind us that there are a number of factors identified by the U.S. Department of Education and others that may negatively impact persistence and attainment among nontraditional postsecondary students. These factors include "(a) delayed college enrollment, (b) no high school diploma, (c) part-time college enrollment, (d) financially independent, (e) have dependents, (f) single-parent status, and (g) full-time work while in college" (Molina & Morse, 2017, p. 68). Additionally, Summers (2003) states that "A large amount of research supports the general observation that community college students are more likely to drop out if they have no specific educational goals, work full time, and attend college part time" (p. 70). Summers' comments relate to that of Hagedorn (2012) who suggests that community college student retention is difficult to measure when students do not have the goals

of continuous enrollment or graduation. Not every student has the goal of a certificate or a degree. It might be enough just to take one class or a few classes in order to get the knowledge one needs to advance in their career.

Southwell et al. (2019) found in their study that SSM/V had less frequency of interaction with faculty members and other academic advisors than did non-military and traditional students. They also found that there were no differences between the two groups as it pertained to the frequency of visiting other university offices, student organizations, or campus clubs, although they did find that older students were less likely to visit student organizations or campus clubs (Southwell et al., 2019). This only makes sense since older students typically have many other obligations outside of school in which to focus. Age was not a factor when it came to visiting university offices or interacting with faculty or other academic advisors, according to Southwell et al. (2019).

Southwell et al. (2019) also looked at whether the frequency of visits to university services and interactions with faculty and academic advisors had any effect on SSM/V outcomes such as persistence, completion, or student perception of university supportiveness. They found that interactions with faculty members, as well as visits with student organizations and campus clubs, positively affected SSM/V persistence, and that the more frequently SSM/V interacted with faculty members and other academic advisors, the greater the perception of university supportiveness and expectation of degree completion (Southwell et al. 2019). These conclusions appear to support the academic and social integration model proposed by Tinto as important for student retention and persistence, but also differs from the conclusions of scholars such as Bean and Metzner (1985) as it pertains to nontraditional students (Southwell et al., 2019).

In terms of Tinto's interactionalist model and SSM/V, considerable criticism comes from Vacchi and Berger (2014), and Vacchi et al. (2017) who state quite clearly that Tinto's model does not apply well to SSM/V. In their view, like those of other scholars discussed in this chapter, Tinto's model is more applicable for traditional college students, but not for nontraditional students. These scholars posit that Bean and Metzner's model (1985), as well as that of Braxton et al. (2014) is more applicable to the nontraditional student population. Furthermore, regarding DiRamios et al's. (2008) research and model on SSM/V retention, Vacchi and Berger (2014) state that "This particular model adheres perhaps too rigidly to Tinto's theory (1987, 1993) of student departure, a model that focuses on traditional student populations and that is subject to critical scrutiny in terms of its applicability to nontraditional populations" (p. 117).

Vacchi and Berger (2014) continue their analysis of SSM/V retention by stating that "…much of the recent research on student veterans relies heavily on Tinto's seminal model of college departure (1987, 1993), which is arguably not particularly well suited for direct application to student veteran experiences" (p. 118). Vacchi and Berger's (2014) viewpoint, like others, is critical of the necessity of student veterans to adapt and integrate socially to the college environment due to having many external environmental factors to focus on outside of the academic institution. Smith et al., (2017) found that student veterans were no different than non-veteran students in engaging with faculty and student peers, which may relate to Vacchi and Berger's (2014) theory that academic integration, rather than social integration, is more important to student veteran persistence and attainment in postsecondary education.

Vacchi and Berger (2014) recommend a student retention and persistence perspective that focuses on a system-wide approach rather than an institution-specific approach, which means

that researchers should cast a wider net in terms of student retention and persistence and take into consideration students who, rather than staying at a single institution to complete their educational goals, do so through multiple institutions. This leads into the area of student success, what it is, and how it applies to SSM/V.

Student Success and Attainment

A strong argument can be made that success is defined differently for almost everyone. Some may see success as the accumulation of materials wealth, while others define success in more intangible terms. Because the definition of success varies greatly, how it is measured can also vary a great deal. As it pertains to postsecondary education, there have been different viewpoints of success as it relates to students' overall goals, whether to simply take a class to gain personal knowledge, complete a certificate program, earn a degree, or transfer to another institution (Mullin, 2012). Kuh et al. (2006) state that factors such as an institution's policies and structure, student characteristics, and others are important elements of student success in postsecondary education. And while postsecondary education institutions have a role and responsibility in creating policies, structures, and organizational cultures where students can succeed, a great deal of responsibility for success also lies with the students and the effort they put in to succeed in college (Kuh et al., 2006). Some in postsecondary education may define success at the course level as it relates to the number of college units attempted versus the number of college units completed, or the student's overall grade at the end of the course. If the student passed the class with a grade of A, B, C, or CR (credit), for example, many would consider that a measure of success. Certainly, considering success at the course level is indeed important; however, it is also important that researchers and scholars continue to broaden that perspective in terms of larger end results such as certificate or degree completions.

The literature on college student success is voluminous, with evidence that research on this topic may go back as far as 1929 (Bailey, 2006). A ProQuest search of "student success" and "community college" yielded over 34,000 results. When searching these terms in only the document abstract, the results were much less at just over 1,900 results, with the majority falling into the dissertation/thesis category. Although many postsecondary educational institutions and scholars continue to struggle with not only the definition of college student success and how to measure it, they also struggle with how to maintain student success on a consistent basis. Bailey (2006) in doing an analysis of student success literature suggests that much of the research focuses on student characteristics that lead to educational success rather than on institutional factors that create student success. Perhaps too much emphasis has been placed on the student characteristics and not enough on institutional policies and actions (Bailey, 2006). Postsecondary institutions, according to Bailey (2006) and Parker (2018) do not have any control over the student characteristics; however, they do have control over their own policies, practices, and actions. Further, Bailey (2006) recommends that any research done on college student success must be longitudinal in nature. While longitudinal student success data was more limited at the time of Bailey's writing, it has become more widespread since then, and thus preferable in this study.

Parker (2018) states that factors such as student retention, persistence, grade point average, and degree attainment have historically been used as indicators of success in college; however, he also suggests that within higher education, "there exists ambiguity regarding the meaning and definition of college success and how to operationalize and measure college success" (p. 328). Student success may theoretically be easier to define, measure, and track in terms of whether or not a student completed their intended educational goal, if that intended goal

is known to others beyond the student. While it may now be easier to track outcomes such as completions than in the past, what may be harder to track is the alignment between completions and the original goal or intent of the student (Hirschy et al., 2011).

One area of institutional practice for student success that is gaining traction is in the guided pathways model advocated by Bailey et al. (2015). The goal of this model is to both maximize student access to postsecondary education, specifically community colleges, while also improving overall student success rates (Bailey et al., 2015). The guided pathways framework suggests moving away from traditional views of a "cafeteria-style self-service model" (Bailey et al., 2015, p. 3) of community college education, into a "more clearly structured, educationally coherent program pathways that lead to students' end goals" (p. 3). The foundation of this model lies in the institution's structural framework, and Bailey et al. (2015) recommend that colleges rethink their organizational policies and culture in order to improve student outcomes on a substantial scale. While it is beyond the scope of this paper to go further in-depth in the guided pathways model, the researcher can attest to seeing a positive difference at his college based on this model in action, including increased student outcomes in terms of certificate and associate degree completions.

Kuh et al. (2006) make several recommendations regarding improving overall postsecondary student success, including (a) preparing students for success as early in their education as possible, (b) making sure students have the proper personal and educational support systems around them, (c) ensuring that the proper financial resources are in place for student success, (d) using early intervention programs to identity at-risk students, (e) creating an educational environment where students can connect with peers, faculty, and other constituencies in meaningful ways, (f) building an organizational culture with student success as a main core

value of the institution, and g) using data and analytical techniques effectively to measure and assess student success policies, decisions, and actions, and making changes when necessary that is supported by the data.

Student Success and Community College. Community colleges have historically not seen student success rates comparable to other postsecondary institutions for reasons that have already been covered in this chapter. It bears repeating, however, that there are significant differences between these types of educational institutions in terms of mission, enrollment policies, student characteristics, organizational structure and culture, and many other factors (Jenner, 2019). Bailey (2017) argues that in order for success in community college to be sustainable, it must be broadly focused and have an integrated and coordinated set of reforms that are consistent throughout the students' academic careers. Additionally, any large-scale student success programs must include integrated faculty and academic counselors who not only support the comprehensive reforms of the community college to create student success, but who are also willing to break through the barriers present at most community colleges in order to communicate and collaborate effectively and efficiently on the students' behalf (Bailey, 2017).

Calcagno et al. (2008), in their study to measure what institutional characteristics affect community college student success, found that individual student characteristics are more of a predictor of student completion rates in community college programs than are institutional characteristics. They suggest that individual variables are measured more precisely than institutional variables; however, factors such as the subcultures found in postsecondary educational institutions may play an important role in student success. This concept relates to Tinto's (1987) theory of the importance of organizational subcultures on student identity discussed previously in this chapter.

According to Shapiro et al. (2018), the six year completion rates for students who began their postsecondary educational career at two-year public institutions in 2012 was just 39.4%. This includes both degree-seeking and certificate-seeking students. Of the 39.4% who attained a degree or certificate, 27.9% did so at the same institution in which they began their college career, 3.3% of students completed their education at a different two-year school, and 8.1% completed their education at a different four-year institution (Shapiro et al., 2018). Furthermore, of the students who started college in 2012 at a two-year public institution, 14.6% were still enrolled in college six years later, and 46.2% were no longer enrolled (Shapiro et al., 2018).

In terms of race and ethnicity, for the 2012 cohort of beginning college students, Asian students had the highest rate of completion at any institution (49.1%), followed by White students (48.1%), Hispanic students (35.7%), and Black students (27.6%) (Shapiro et al., 2018). With regards to the remaining students in each racial/ethnic category who started college in 2012 at a public two-year institution, 21.9% of Asian students were still enrolled in college six years later, while 29.1% were not enrolled in any institution; 12.9% of White students were still enrolled, with 39.1% not enrolled; 21.5% of Hispanic students were still enrolled six years later, while 42.8% were no longer enrolled; and 17.6% of Black students were still enrolled in college, with 54.9% not enrolled (Shapiro et al., 2018).

Shapiro et al. (2018) further break down the 2012 cohort data by age, with traditional-aged students (20 years old and younger) showing the highest level of completion within six years at 42.3%, followed by adult learners (over age 24) with 34.5% completion, and delayed entry students (20-24 years old) with 28.6% completion. Of these three age groups within the 2012 cohort of postsecondary students at two-year public institutions, traditional-aged students

had the lowest rate of students no longer enrolled in college at 41.5%, followed by adult students at 56.3%, and delayed-entry students at 58.7% (Shapiro et al., 2018).

Lastly, with regards to gender and age for the 2012 cohort of students who began college at two-year public institutions, Shapiro et al. (2018) show that traditional-aged male students had a completion rate of 39.9%, while the same age group of female students had a 46.1% completion rate. Delayed-entry male students showed a completion rate of 28.2%, with 30% of same-aged female students completing, and 34.1% of adult male students completed, with 35.7% of adult female students completed (Shapiro et al., 2018). When race, ethnicity, and gender are combined in this data set, the aggregate completion rate for men across the four racial/ethnic categories is 37.4%, while the women have an aggregate completion rate of 43.7% (Shapiro et al., 2018).

However student success at the community college level is defined and measured, Baldwin et al. (2011) recommend that community colleges (a) tailor a student success strategy that is customized for the student population it serves, while working within the framework of its resource limitations; (b) include faculty and staff in all student success strategy conversations, since these constituency groups, especially faculty, hold a great deal of power, and spend the most time, with students; and (c) effectively use data to analyze trends and direct the student success strategy in terms of decisions made, policies created, and actions taken.

While community colleges face unique challenges in terms of student success, the simplified goal of these educational institutions should be to make the students want to come back week-after-week, course-after-course in pursuit of their educational aspirations. One way that faculty members can contribute in this endeavor is to tie, as much as possible, the content of the class to real-world applications and uses. The more students can understand the connections

between academics and real-world applications, are encouraged to apply what they have learned outside the classroom, and are able to create success outside of class with what they have learned inside of class, the more motivated they may be to continue learning and growing, thus improving retention, persistence, and success.

Student Success and CTE. There are very few models of student success that apply directly to community college students in CTE programs. One such model is from Hirschy et al. (2011) who proposed an expanded model of integration beyond Tinto's model of academic and social integration. Hirschy and her colleagues suggest that a model of student success applicable to CTE students not only include academic integration, what they term "structural integration," as well as social integration, what they term "normative integration," but also include a third component of "career integration" (p. 307), which is how students interact with career-related activities on and off campus, as well as the perceived fit with their chosen career field. Career integration may include such practices as internships, clinicals, or job shadowing as a way to gain real-world experience, as well as to network with industry professionals who may be able to support the students' employment efforts post-college (Hirschy et al., 2011). It is the belief of Hirschy et al. (2011) that strong career integration within community college CTE programs can lead to higher levels of student retention, persistence, and success. Furthermore, Hirschy et al. (2011) support the premise that student-faculty interactions are beneficial for student success; however, such interactions are less likely to occur for commuter students who are preoccupied with activities outside of the campus environment. Overall, Hirschy (2011) and her colleagues suggest that community college student success in CTE programs contain a career integration component, along with the "tracking of student educational goals, and expanding traditional student success measures to better reflect the experiences of CTE students" (p. 314).

Data from the National Center for Educational Statistics (NCES) show that students who began their college education in the 2011-2012 academic year had an attainment rate of 63.1% for sub-baccalaureate certificates in occupational fields of study after three years of college, and 18.1% attainment rate for associate's degrees after three years of college (National Center for Education Statistics, n.d.f, Table B9). Additionally, for the 2011-2012 cohort of sub-baccalaureate students in occupational fields of study, 69.6% of certificate-seeking students attained or persisted after three years, and 55.6% of associate degree-seeking students attained or persisted after three years (National Center for Education Statistics, n.d.f, Table B9).

Student Success and Student Service Members/Veterans. There is relatively little peer-reviewed research literature on the topic of student success among SSM/V in community college education. One recent study by Jenner (2019) found that, not only do SSM/V recognize the importance of traditional measures of student success such as achievement, retention, and completion, but that they are also motivated to create success through opportunities to give back to their communities, as well as to creatively use their educational benefits in ways that help them in their personal life or allows them to extend their educational pursuits beyond the associate or bachelor's degree. Jenner (2019) states that "students succeed when institutions help them develop an explicit educational plan, maintain high levels of motivation, provide easy access to information, learn social skills, and assist them in finding jobs after graduation" (p. 39).

One theme that has been consistent in the community college student success literature is the importance of faculty and how they interact with students inside and outside the classroom. With SSM/V, the expectation and responsibility of faculty in this important endeavor is no different. SSM/V "are strongly affected by faculty members and peers in their classroom environments, according to (Fernandez et al., 2019). DiRamio et al. (2008) found that SSM/V

want faculty members to "understand and acknowledge them" (p. 95) as postsecondary learners. SSM/V also want to be appreciated by faculty members for the unique life circumstances and the challenges they face, both personally and academically (DiRamio et al., 2008).

Semer and Harmening (2015) found that regular and consistent feedback from faculty members regarding academic performance is "a significant positive predictor of veteran's academic success" (p. 39). Feedback and academic advising is an important instructional tool used to let students know of their progress toward course learning outcomes, and this practice is no different and no less important for SSM/V (López et al., 2019; Vacchi et al., 2017). Kim and Cole (2013) report that SSM/V are more likely than non-military students to discuss their grades or other course-related assignments with their instructors. Additionally, it is important for faculty members to remember that SSM/V are individuals just like any other student and should be treated in the same manner that the faculty member would treat any other student, whether inside or outside the classroom (Callahan & Jarrat, 2014; Fernandez et al., 2019). When SSM/V have positive relationships with their professors, they are less likely to leave the institution, thus having a positive effect on persistence and attainment (Fernandez et al., 2019).

Creating an environment of SSM/V success is everyone's responsibility on campus, and it begins with an awareness of who these students are and the resources they need to succeed (Callahan & Jarrat, 2014; Dillard & Yu, 2018). Bailey et al. (2019) found that SSM/V and other nontraditional student academic success is possible through various forms of support structures, such as financial and institutional support. Invoking the assistance of other outside-of-campus resources and veteran constituency groups to assist with SSM/V success on campus is also a viable strategy, according to Dillard and Yu (2018) and Heineman (2016). Community college faculty members must remember the important role they play in student success, not just with

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SSM/V or nontraditional students, but with all students, and faculty must be open to new learning and training as it pertains to their SSM/V population on campus (DiRamio et al., 2008; Gonzalez & Elliot, 2016; Heineman, 2016). In many community college environments, faculty members spend the most time on campus with students, and thus the attitudes that faculty members have of SSM/V can play an important part in SSM/V perceptions of the college, as well as the students' ability to integrate academically into the institution.

Self-efficacy is another important consideration in terms of SSM/V success, according to Blaauw-Hara (2016), Jones (2017) and Williams-Klotz and Gansemer-Topf (2018). The topic of self-efficacy was discussed earlier in this chapter; however, it is also applies strongly in terms of the SSM/V population. Blaauw-Hara (2016) states that "student veterans have a strong sense of self-efficacy, and a number of researchers have connected students' sense of self-efficacy to college success" (p. 816).

In 2013, the Department of Education and the Department of Veterans Affairs introduced the "8 Keys to Success" program, which recommended eight specific strategies that colleges and universities could implement to help SSM/V on campus (U.S. Department of Veterans Affairs, 2013). These eight strategies focus on (a) building an organizational culture that supports SSM/V success, (b) sustaining support from educational leaders, (c) using an early-warning system to identify SSM/V with challenges, (d) creating and coordinating space on campus for SSM/V, (e) collaborating with off-campus resources to provide services for SSM/V, (f) using data to track and analyze SSM/V performance and outcome results, (g) training faculty and staff on the unique challenges that SSM/V face , and (h) ensuring that the systems that are created are sustainable for the long term (U.S. Department of Veterans Affairs, 2013). Many of these

strategies appear to be aligned with the suggestions of Kuh et al. (2006) discussed earlier in this chapter.

Data provided by Student Veterans of America through the National Veteran Education Success Tracker (NVEST) show that SSM/V who have taken advantage of their Post-9/11 GI Bill benefits have a success rate of 71.6% (Cate et al., 2017). The term "success rate" in the NVEST study is a combination of the completion rate (53.6%) and the persistence rate (18%) (Cate et al., 2017). Through their analysis, Cate et al. (2017) found that although SSM/V have many factors that may interrupt their educational pursuits, withdrawing from classes prior to the end of a term does necessarily have an adverse effect on their completion. These researchers found that of the SSM/V who withdrew from classes prior to the end of the semester, 52.3% completed either a certificate or a degree (Cate et al., 2017). "This result suggests that despite breaks, interruptions, or potential setbacks in student veterans' academic careers, a majority of student veterans will return to complete their post-secondary degrees" (Cate et al., 2017, p. 37). Within the NVEST project, Cate et al. (2017) found that the majority of SSM/V who had used the Post-9/11 GI Bill had earned degrees in the following CTE-related programs of study: Business/ Management/Marketing programs (27%); STEM (14.4%); Healthcare (10.4%); Homeland Security/Law Enforcement/ Firefighting (9.6%); Mechanic and Repair Technologies/Technicians (2.7%); Transportation and Materials Moving (1.6%); Precision Production and Construction Trades (.7% and .6% respectively). For comparison sake, SSM/V majoring in non-CTE related programs ranged from 9.8% for Liberal Arts and Sciences, General Studies and Humanities to .2% for Area, Ethnic, Cultural, Gender, and Group Studies (Cate et al., 2017).

For student service members/veterans, academic integration into the college environment is crucial for persistence and attainment. Overall, when it comes to SSM/V retention and persistence, it is quite clear from the research that it takes a community effort to help this population of students to persist and attain their educational goals (Callahan & Jarrat, 2014). SSM/V face a myriad of obstacles that can negatively impact their commitment to the educational institution and to their goal attainment. All areas of postsecondary education must be committed to working with, and helping SSM/V, including faculty members, academic counselors, financial aid and career services staff, administration, and others.

We know that since the end of World War II and the creation of the GI Bill, veterans have been given extraordinary educational opportunities in which they are so deserving. Millions of veterans have taken advantage of the educational benefits offered them from various resources, and many more veterans will continue to use the benefits they are afforded through their military service. As scholars and researchers continue to focus on the importance of student success in postsecondary education, SSM/V and other nontraditional student populations should not be overlooked in this endeavor. Indeed, the admonition of Vacchi and Berger (2014) who stated, "Thus, as we move forward with the study of student veterans, it is important to examine success for this growing population of college students" (p. 113) should be kept in mind.

Gap in the Literature

This chapter has shown that there has been significant research performed separately on the topics of SSM/V, CTE, persistence, and attainment; however, there is a need for research that combines these areas and examines these factors together and at a more granular level to better understand SSM/V performance and outcomes in community college CTE programs and those who earn CTE credits. No research has been conducted to date that has focused specifically on

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SSM/V persistence and attainment as it relates to CTE credit accumulation within the community college environment. As previously stated, much of the research on SSM/V in postsecondary education has focused on their transition from military service to college, or on the physical, emotional, and mental challenges of SSM/V pursuing a higher education.

For the purposes of this study, the researcher hoped to fill some of the gaps in the research and add to the scholarly literature by examining a specific set of variables related to SSM/V through the earning of community college CTE credits as it relates to five specific persistence and attainment outcomes. The data for this examination comes from a large, national data set provided by the U.S. Department of education. The research questions in this study will be used to explore the relationships in SSM/V persistence and attainment through the earning of CTE credits.

Summary

This chapter has covered a myriad of interrelated and important topics. Fluctuating economic conditions may still present opportunities for workers who have knowledge and skills beyond the high school level, and that these opportunities, in the various forms for which they come, may continue for the foreseeable future in some industries more than others. Endeavoring to train workers who are knowledgeable and skilled in high-demand areas of our economy are America's community colleges, which are uniquely situated to teach a wide variety of students and prepare them for the future, not only in high-demand career areas, but also with transferable skills necessary for success in any professional role.

Within many community college systems in the United States is the robust and growing area of Career and Technical Education, whose focus is on creating knowledgeable and skilled workers who are ready to contribute to the global competitive workforce and help the U.S.

economy return to a strong and vibrant system. As employers carefully consider and select qualified workers to fill critical positions, one important population of postsecondary students who should not be overlooked are our military service members and veterans who are transitioning to college after their military obligations are fulfilled. Many of these SSM/V are seeking an education first at the community college level. These students are uniquely qualified to take on highly demanding workforce responsibilities precisely because of the skills learned during their military service coupled with a high-quality postsecondary education.

One of the ways in which community college effectiveness is evaluated is through student success, whether measured by completions/attainment, transfers, or other factors. Students do not succeed, however, unless they persist in their postsecondary endeavors and are motivated through to their academic goal attainment. As the focus on student completion and attainment remains strong for the foreseeable future in postsecondary education, it is important to not forget about our SSM/V who face many challenges inside and outside of the academic environment, and support their efforts to persist and attain any way possible. They deserve our very best efforts.

Chapter 3. Research Methodology

Introduction

This chapter describes the research methodology used to conduct this study, including major topics such as the research question, null and alternative hypotheses, a description of the data sources used, an overview of the IRB process, and the data collection and analysis methods used in this research. The purpose of this study was to explore the relationship of SSM/V who earned career and technical education credits at the community college level as it pertained to five specific outcomes related to persistence and academic attainment.

This is a quantitative research study that employed the use of data that had been collected through the National Center for Education Statistics (NCES) Beginning Postsecondary Students Longitudinal Study (BPS). The BPS surveyed first-time postsecondary students at three timeframes throughout their college experience: at the end of their first year of postsecondary education, and again three and six years after beginning their college education (National Center for Education Statistics, nd, About BPS). The Beginning Postsecondary Students Longitudinal Study is maintained by the U.S. Department of Education through the Institute of Education Sciences (IES) and the NCES.

Research Question and Hypotheses

The following research questions are proposed for this study:

- RQ: What is the relationship between CTE credit accumulation among community college student service members/veterans and the following academic outcomes: (a) persistence, (b) certification completion, (c) degree completion, (d) any award completion, or (e) vertical transfer?

Alternative Hypothesis:

- *H$_a$*: There is a statistically significant relationship between CTE credit accumulation among community college student service members/veterans and the academic outcomes of (a) persistence, (b) certification completion, (c) degree completion, (d) any award completion, or (e) vertical transfer.

Null Hypothesis:

- *H$_0$*: There is no statistically significant relationship between CTE credit accumulation among community college student service members/veterans and the academic outcomes of (a) persistence, (b) certification completion, (c) degree completion, (d) any award completion, or (e) vertical transfer.

Research Design and Methodology

A quasi-experimental, quantitative design was chosen for this study because of the research question being examined and the dataset being used. A quantitative research approach was appropriate for this study because (a) the researcher examined the relationships among variables, and (b) the dataset used is longitudinal (Creswell & Creswell, 2018). The statistical models employed in this study, linear probability modeling and logistic regression, were ideal for longitudinal data studies such as this one that examine a series of dichotomous dependent variables. According to Kleinbaum et al. (2013), "logistic regression analysis is the most popular regression technique available for modeling dichotomous dependent variables" (p. 681). The research equation used for this study was:

$$Y_{is} = \alpha_{is} + \beta_1 CTE_{is} + \beta_2 SSM/V_{is} + \beta_3 (CTE * SSM/V)_{is} + \beta_4 \boldsymbol{X}_{is} + \varepsilon_{is}$$

Where:

- Y = a predicted output, or a general placeholder, referring to 1 of the 5 binary outcomes (dependent variables) of the five possible binary outcomes shown below.

- α = the model intercept, which is the estimated or predicted value for Y when all other model values are set to 0.

- β = all of the estimated regression coefficients.

- CTE = the number of CTE credits earned within the student's first year of postsecondary education.

- SSM/V = a binary indicator of whether or not the student was a student service member/veteran.

- CTE * SSM/V = the interaction between CTE and SSM/V. This variable will be equal to the product of the two terms. If a student was a non-SSM/V, this will result in a 0 since the SSM/V variable is equal to 0 for non-SSM/V.

- X = is a highly dimensional vector of observable covariates, including control variables such as age, gender, income, etc.

- ε = the model's error term. This term represents all of the things related to, or predictive of, the outcome variable Y that has not been accounted for in the model.

Five dichotomous (binary) outcome variables were examined in this study. Those outcome variables are: (a) persistence (b) attained an AA/BA degree (c) attained a postsecondary certificate (d) attained any award (e) vertical transfer to a 4-year institution.

Data Source

The data used for this study came from the Beginning Postsecondary Students Longitudinal Study (BPS), which captured data on first-time postsecondary students, and is

maintained by the National Center for Education Statistics (NCES). The data collected for the BPS include "student demographic characteristics, school and work experiences, persistence, transfer, and degree attainment" (Wine et al., 2011, p. 1). The NCES is a part of the U.S. Department of Education and the Institute of Education Sciences (IES), and is responsible for collecting and analyzing educational data in the United States and other nations (National Center for Education Statistics, n.d.b, About Us). Thomas Bailey (2008), a leading scholar in community college research stated that "Much of the most useful information about what happens to college students comes from the National Center for Education Statistics' superb longitudinal data sets" (p. 29).

The BPS data used for this study came from the 2004-2009 cohort (BPS) of first-time beginner (FTB) college students who were surveyed at three specific points in their postsecondary education lifespan. The first survey occurred during the 2003-2004 academic year, with follow up surveys occurring during the 2005-2006 and 2008-2009 academic years, which represented the cohort's third and sixth year of academics, respectively. The NCES collected cohort data for the BPS through the National Postsecondary Student Aid Study (NPSAS), which is a "comprehensive nation-wide study to determine how students and their families pay for postsecondary education" (Cominole et al., 2006, p. 2). The BPS: 04/09 dataset, which draws from the NPSAS:04 dataset, "contains information on nearly 16,700 students" (National Center for Education Statistics, n.d.b, About BPS). The researcher had access to the restricted-use BPS04/09 dataset, which contained more data points than the public use dataset. Using the restricted-use dataset added to the rigor of this study by allowing additional analyses to be made.

The 2004 National Postsecondary Student Aid Study (NPSAS:04) was the base year from which the BPS: 04/09 was collected (Cominole et al., 2006). The NCES began collecting information through the NPSAS in the 1986-87 academic year. Since then, the study was conducted every three years through 1996, then every four years from 1996 through 2012. (National Center for Education Statistics, nde, About NPSAS). The target population for the NPSAS:04 dataset was any eligible student who enrolled in postsecondary education in the U.S. or Puerto Rico between July 1, 2003 and June 30, 2004 (Cominole et al., 2006). The NPSAS:04 used a two-stage sampling design approach in which eligible postsecondary institutions were chosen in the first stage, followed by eligible students from the responding eligible postsecondary institutions in the second stage (Wine et al., 2011). All levels of postsecondary institutions were used in the sample, including public, private, for-profit, and not-for-profit 4-year, 2-year, and less-than-2-year schools, colleges, and universities. The sample size for this dataset initially began with 109,210 undergraduate, graduate, and first-professional students in postsecondary education; however, 8,200 students were determined to be ineligible for the study and were factored out of the sample size, resulting in 101,010 overall eligible students (Cominole et al., 2006; Wine et al., 2011).

Several sources were used to collect information for the NPSAS:04 study, including student record abstraction/computer assisted data entry (CADE) from participating postsecondary institutions, student interviews, the Central Processing System (CPS) through the U.S. Department of Education, the National Student Loan Data System (NSLDS) through the U.S. Department of Education, and the Integrated Postsecondary Education Data System (IPEDS) through the National Center for Education Statistics (Cominole et al., 2006). Throughout all data collection methods for the NPSAS:04, several steps were undertaken to

ensure the validity and quality of the data collected. Since the publication of the first National Postsecondary Student Aid Study, the information contained within the datasets have been used in over 100 peer-reviewed academic articles, as well as 39 doctoral dissertations. This is an indication as to the validity and reliability of these data sets.

The Beginning Postsecondary Students Longitudinal Study began with the BPS:90/94 cohort, which included approximately 8,000 students, then with the BPS:96:2001 cohort, which included approximately 12,000 students (National Center for Education Statistics, nda, About BPS). The current BPS cohort is the BPS: 12/17; however, the researcher does not currently have access to the restricted-use dataset for this particular study. The National Center for Education Statistics, in collecting data for the BPS:04/09 report used a rigorous process that involved multiple stages of data collection (Wine et al., 2011). These stages included student interviews, transcript data collection, and an administrative records match (Wine et al., 2011).

Prior to conducting the student interviews, batch-locating activities to find qualitied sample members were employed, followed by informed consent of sample members. Student interviews were then conducted via the web, telephone, or through field respondents (Wine et al., 2011). Transcripts of the student sample were also used in this study, for the first time, which went through a "specially-designed keying and coding system" that was completed by "a staff of trained keyer/coders" (Wine et al., 2011, p. iv). Methods of quality control were used for keying/ coding activities that included "key-rekey and expert coder procedures to assess interrater reliability" (Wine et al., 2011, p. iv). Interrater reliability measures "how much two raters agree on their judgments of some outcome" (Salkind, 2017, p. 120).

Variables

Independent Variables

The independent variables in this study were CTE credits earned and SSM/V status as identified in the BPS: 04/09 dataset. CTE credits earned are the "total normalized credits earned in career and technical education courses" (National Center for Education Statistics, n.d.d). This variable is continuous and applied to all students within the dataset. Those students who self-identified as military-affiliated students, either as active duty, reserves, or student veterans, as the BPS data was collected over the three specific timeframes, are the primary consideration in this study. The combination of these military-type categories was merged into a single variable called SSM/V. The SSM/V independent variable was categorical.

Dependent Variables

The dependent variables for this study were the five dichotomous outcome variables shown in Table 2. The first dependent variable was whether or not the student persisted in their postsecondary education within the three- or six-year timeframe. The second dependent variable was whether or not the student earned a certificate within the three- or six-year timeframe from any community college, not just the college in which they began their postsecondary education. The third dependent variable was whether or not the student earned a degree within the three- or six-year timeframe from any community college, not necessarily the college in which they began their postsecondary education. The fourth dependent variable was whether or not the student earned any award within the three- or six-year timeframe from any community college. The fifth dependent variable was whether or not the student vertically transferred from a community college to a 4-year postsecondary institution. Coding for these variables was divided into two

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areas: the area in which the outcome did not occur was coded as a 0, and the area in which the outcome did occur was coded as a 1.

Table 1

Dichotomous Outcome Variables

Outcome	Description	Coding
Persisted	Did the student persist?	0 = Did not persist 1 = Persisted
Certificate Attainment	Did the student earn a postsecondary certificate?	0 = Did not earn a certificate 1 = Earned a certificate
Degree Attainment	Did the student earn a postsecondary degree?	0 = Did not earn a degree 1 = Earned a degree
Any Award Attainment	Did the student earn any postsecondary award?	0 = Did not earn any award 1 = Earned an award
Vertical Transfer	Did the student transfer vertically?	0 = Did not transfer 1 = Transferred

Control Variables

There were several demographic, student characteristic, and institutional factor variables used in this study as control variables, all of which were found in the BPS:04/09 dataset. These covariates were based on the 2003-2004 data collection responses of study participants.

- **Age**. Within the BPS: 04/09 dataset, age was a continuous variable ranging from 15 to 72 (Wine et al., 2011). This was an important factor in this study, as military students, especially student veterans, tend to be older than their non-military or non-veteran peers, and oftentimes have additional responsibilities on top of their

educational pursuits that their peers do not. Because this was a continuous variable, it was not recoded.

- **Gender**. For this study, gender was shown as a dichotomous/categorical variable that was coded as 0 = male and 1 = female. The BPS: 04/09 dataset did not separate gender into any other categories. The variable "female" was created as a covariate for this study.

- **Race/Ethnicity**. In the BPS: 04/09 dataset, race/ethnicity was categorized into eight categories. Those categories were: White, Black or African American, Hispanic or Latino, Asian, American Indian or Alaska Native, Native Hawaiian or other Pacific Islander, Other, and More than one race (Wine et al., 2011). For this study, the researcher recoded the race/ethnicity variable into five categories: White, Black, Latinx, Asian, and Other.

- **Marital Status**. In the BPS: 04/09 dataset, marital status was categorized into three categories: Single, divorced, or widowed; Married; and Separated (Wine et al., 2011). For this study, marital status was coded as a categorical variable based on the values from the BPS dataset. This variable was not recoded.

- **Dependents**. There were a number of variables within the BPS: 04/09 dataset that asked about dependents. For this study, the researcher used a dichotomous variable available in the dataset that simply asked whether or not the student had any dependents when they began their postsecondary education in 2003-2004. This variable was not recoded.

- **Hours Worked Per Week**. This continuous variable within the dataset indicated the average number of hours the students worked per week during the 2003-2004

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academic year (Wine et al., 2011). The range of this variable was 0 to 60 hours per week. Because this was a continuous variable, it was not recoded.

- **First Generation College Student**. A BPS: 04/09 variable was recoded for this study to capture whether or not the student was a first-generation college student. The data in the BPS: 04/09 dataset that was used to recode the variable was based on whether or not the student was eligible for the U.S. Department of Education's TRIO program (Wine et al., 2011). The federal TRIO programs focused on providing educational services for students with disadvantaged backgrounds, including those who were first-generation students (U.S. Department of Education, n.d.).

- **Highest Degree Expected**. The BPS: 04/09 dataset captured information in the 2003-2004 academic school year as to the highest degree the respondent ever expected to receive (Wine et al., 2011). The BPS variable included eight options: No degree or certificate, Certificate, Associate's degree, Bachelor's degree, Post-BA or Post-master certificate, Master's degree, Doctoral degree, and First-professional degree (Wine et al., 2011). For this study, the researcher recoded this variable into two categories: Less than a BA and BA or higher.

- **Full-Time College Attendance**. Within the BPS: 04/09 dataset, several variables related to student attendance patterns; however, for this study, attendance was recoded to measure whether or not the student attended college fulltime.

- **Adjusted Gross Income**. Within the BPS: 04/09 dataset, the adjusted gross income variable was continuous and has a wide range of values (Wine et al., 2011). Because the existing variable was continuous, it was not recoded.

- **Postsecondary Grade Point Average**. Within the BPS: 04/09 dataset, GPA was coded as a continuous variable based on a 4.0 scale (Wine et al., 2011). GPA is considered an important factor of student persistence and attainment in postsecondary education (De La Garza et al., 2016; Gershenfeld et al., 2015; Hagedorn et al., 2001). Chen and Thomas (2001) found that first and second semester GPA "significantly influenced persistence" (p. 48). Because this variable was continuous, it was not recoded for this study.

- **Academic Integration**. In the BPS: 04/09 dataset, academic integration was a continuous variable measured in the 2003-2004 academic year, then again in 2006 (Wine et al., 2011). It measured responses to how often the student participated in study groups, met socially with a faculty member, met with an academic advisor, or met with faculty about academic matters outside of class (Wine et al., 2011). This measure related to the level of persistence and attainment of postsecondary education students, particularly for student veterans. For this study, only the 2003-2004 results were used. This variable was not recoded.

- **Social Integration**. In the BPS: 04/09 dataset, social integration was a continuous variable, measured in the 2003-2004 academic year, then again in 2006 (Wine et al., 2011). It measured responses to how often the student attended college activities, participated in sports or school clubs (Wine et al., 2011). This measure also related to the potential of student persistence and attainment. For this study, only the 2003-2004 results were used. This variable was not recoded.

- **High School Grade Point Average**. High school grade point average data were available within the BPS: 04/09 dataset; however, the variable only applied to respondents under 24 years old who received a high school diploma.

- **Parent's Education**. For this study, the BPS variables for both mother and father education levels were recoded to indicate whether or not the parent had a BA or less or higher than a BA.

- **Distance Education Courses**. For this study, the researcher included a categorical variable from the BPS: 04/09 dataset that indicated whether or not the student took any distance education courses for credit in the 2003-2004 academic year (Wine et al., 2011). This variable was not recoded.

- **Disability**. Disability can be a factor affecting students who are endeavoring to achieve their educational goals. The BPS: 04/09 dataset contained a categorical variable that asked respondents if they had any disability (Wine et al., 2011). This variable was not recoded for this study.

- **Remedial Courses**. This categorical variable in the BPS dataset indicated whether or not the respondent took any remedial or developmental courses in the 2003-2004 academic year (Wine et al, 2011). This variable was not recoded.

- **Distance From First Institution**. This continuous variable indicated the distance between the student's home and the postsecondary institution attended (Wine et al., 2011). Because this variable was continuous, it was not recoded for this study.

- **Number of Institutions Attended**. This variable from the BPS: 04/09 dataset indicated the number of postsecondary institutions the respondent attended in the

2003-2004 academic year (Wine et al., 2011). This was a continuous variable in the

dataset and therefore not recoded for this study.

- **Location of Institution**. This categorical variable in the dataset indicated the degree
  of urbanization in which the student's first postsecondary institution was located in
  the 2003-2004 academic year (Wine et al., 2011). The BPS: 04/09 dataset included
  seven possible responses; however, for this study, this variable was recoded to
  include only three categories: city, town, and rural.

Institutional Review Board (IRB) Process

Contact with Pepperdine's Institutional Review Board (IRB) occurred once the

preliminary oral defense was completed and approved by the dissertation committee. The steps

followed in this process were those outlined in Pepperdine University's "Protection of Human

Subjects in Research: Policies and Procedures Manual" (revised October 2018). The researcher

passed the required Collaborative Institutional Training Initiative (CITI Program) as part of the

research approval process (see Appendix B). Because the data being used for this study had

already been collected (archival), the level of risk to those who completed the interviews from

the National Center for Education Statistics was minimal. According to the Department of Health

and Human Services, minimal risk is defined as "the probability and magnitude of harm or

discomfort anticipated in the research are not greater in and of themselves than those ordinarily

encountered in daily life" (U.S. Department of Health and Human Services, n.d.). No identifying

information was used in this study that presented a risk to those who completed the Beginning

Postsecondary Students Longitudinal Study.

IRB approval came in the form of "exempt" status due to the nature of this study, the data

being used, and the minimal risk to participants. Exempt status fell within "Category #4 –

Analysis of previously-collected, existing, anonymous data," according to Pepperdine University (Pepperdine University, n.d., p. 4). The IRB Exemption Notice is included in Appendix C. The researcher made contact with IRB through Pepperdine University's e-Protocol IRB system, and submitted for IRB approval through that method. All data used in this study and provided through the BPS were anonymous and contained no identifiable information that could cause harm to human subjects. All data was safeguarded in a password-protected computer.

Data Collection

The data for this study were obtained through the Beginning Postsecondary Students Longitudinal Study (BPS) provided by the U.S. Department of Education through the Institute of Education Sciences (IES) and the National Center for Education Statistics (NCES). Specifically, the data used in this study was the BPS: 04/09 dataset because it was the most recently available set of data in which the researcher had full access. The researcher had access to the restricted-use data set that allowed for a more robust analysis of available data. Once IRB approval was granted, the researcher began working with a colleague who holds the license for the restricted-use dataset. Because of the strict licensing requirements of the BPS: 04/09 dataset from the NCES and the U.S. Department of Education, the researcher did not solely possess the data used for this study. Rather, the data were controlled by the colleague who holds the restricted-use data license, and the researcher collaborated with, and directed, the colleague with regards to all data analysis.

Data Analysis

Analysis of the data began as soon as IRB approval was granted. The data were archival and already existed within the restricted-use BPS: 04/09 dataset. The software application, Stata,

was used for all statistical analysis. Stata is a well-known statistical software package that is capable of running the type of statistics used for this research project.

The data were analyzed in the following steps:

- **Data Cleaning**. The researcher began by ensuring that the data was coded correctly. This step also included an analysis of missing observations in the data and what to do about it. Options for missing observations in the data included: (a) ignore the missing observations, or (b) impute the data, if necessary, using multiple imputation.

- **Data Manipulation**. This refers to the creation of new variables from existing variables, or the altering of existing variables (e.g., recoding). The researcher created new variables in the data, as necessary, from existing variables, or altered existing variables, as necessary, through the recoding of variables.

- **Descriptive Data Analysis**. "Descriptive statistics are used to organize and describe the characteristics of a collection of data" (Salkind, 2017, p. 8). This portion of the data analysis was characterized by an inspection of the variables that were planned for this study, and included information on the "means, standard deviations, and range of scores for these variables" (Creswell & Creswell, 2018). Tables and graphs were created to represent the data in visual formats, making the data more transparent and easier for the reader to comprehend.

- **Inferential Data Analysis**. This analysis included analyzing the statistical relationships as it pertained to the research question and hypotheses posed in this study. Inferential data analysis "relate variables or compare groups in terms of variables so that inferences can be drawn from the sample to a population" (Creswell & Creswell, 2018, p. 157). Inferential data analysis involved the collection and analysis of information from a

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sample to see what conclusions, or inferences, could be made about the larger population (Mertler, 2019). The methods of analysis in this study were linear probability modeling and logistic regression as described earlier in this chapter. Linear probability modeling and logistic regression were performed on each of the five dichotomous outcome variables shown in Table 2. The researcher collaborated with, and directed, the colleague who has access to the restricted-use dataset on all statistical models used in this study. The researcher had sole responsibility for the data analysis and interpretation of study results.

The presentation of the results of the data analysis is discussed in detail in Chapter 4 of this study.

Summary

As discussed in Chapter 1 and reinforced in this chapter, the purpose of this study was to examine SSM/V persistence and attainment through earning community college career and technical education credits. Chapter 3 restated the research question and hypotheses that guided this study and presented the research design and methodologies. The data source for this dissertation was discussed in detail, as well as data collection and data analysis rationale. The independent variables were presented in this chapter, along with a description of the five dependent outcome variables, and the various control variables deployed in this research. Information regarding the Institutional Review Board process and approval was discussed, as were the specific steps taken in the data analysis processes.

Chapter 4. Research Findings

Introduction

The purpose of this study was to determine what, if any, relationship existed between community college student service members/veterans (SSM/V) earning CTE credits and the outcomes of persistence, degree attainment, certificate attainment, any award attainment, and vertical transfer. In other words, did earning community college CTE credits have an association with persistence and academic attainment outcomes for SSM/V? The data used for this study came from the Beginning Postsecondary Student Longitudinal Study for the 2004 – 2009 cohort (BPS: 04/09), which was managed by the U.S. Department of Education through the Institute of Education Sciences (IES) and the National Center for Education Statistics (NCES). The first section of this chapter provides an in-depth overview and analysis of the data using descriptive statistical techniques. The second section of the chapter provides an in-depth overview and analysis of the interferential statistical techniques employed in this study. Various tables and graphs are provided throughout the chapter to add visual representations of the data and results.

Descriptive Statistical Analysis

This section summarizes the descriptive statistics of the variables used in this study. The descriptive statistics included measures of central tendency and dispersion, which included the means and standard deviations for three student categories represented in Table 2: (1) All Community College Students, (2) Non-Military Students, and (3) SSM/V (student service members/veterans).

Within the BPS: 04/09 dataset, there were 5,550 students who attended a public 2-year college from the academic years 2004-2009. Of those students, 117 are identified as student veterans in the data, which represented 2.11% of the public 2-year college students within the

BPS dataset. Additionally, 52 students (.94%) in the dataset identified as military reserves, and 21 students (.38%) identified as active duty military. Together, these three categories of students represented 3.4% of the BPS dataset for public 2-year college students, accounting for 190 of the 5,550 students in this sample. These three types of military service identified in the dataset were combined into a single variable used in this analysis, which was named "SSM/V." At some points in this chapter the data were further disaggregated to show differences between these three types of military students. This was done in order to provide more robustness to the study.

Table 2 provides an overview of the descriptive statistics in this study in summary form to include the mean of each variable, and standard deviation where appropriate. The five dichotomous outcome variables are presented first, followed by the predictor variable, which is the number of CTE credits earned. The various control variables used in this study are also presented in Table 2. These variables may have explanatory power as to why SSM/V persist, transfer, or attain postsecondary degrees and certificates. The significance column indicates the significance of the variables to the group category SSM/V, which were found through a series of independent sample *t*-tests performed in Stata. *T*-tests are used to compare two groups on a common dependent variable (Mertler, 2019).

Table 2

Descriptive Statistics

Variables	All C.C. Students		Non-Military Students		SSM/V		Sig.
	Mean	sd	Mean	sd	Mean	sd	
Outcomes							
Persisted	0.57	--	0.57	--	0.55	--	
Attained a Degee	0.30	--	0.30	--	0.21	--	**
Attained a Certificate	0.09	--	0.09	--	0.11	--	
Attained Any Award	0.39	--	0.39	--	0.32	--	*
Vertical Transfer	0.27	--	0.28	--	0.19	--	*
Predictors							
CTE Credits Earned	16.42	19.17	16.25	19.17	20.95	27.16	**
Controls							
Age	22.51	8.12	22.24	7.83	30.21	11.61	***
Female	0.58	--	0.59	--	0.23	--	***
Race/Ethnicity							
White	0.62	--	0.62	--	0.64	--	
Black	0.16	--	0.15	--	0.19	--	
Latinx	0.13	--	0.13	--	0.08	--	*
Asian	0.04	--	0.04	--	0.02	--	
Other	0.05	--	0.05	--	0.07	--	
Marital Status							
Single/Divorced/Widowed	0.86	--	0.87	--	0.59	--	***
Married	0.13	--	0.12	--	0.35	--	***
Separated	0.02	--	0.01	--	0.05	--	***
Has Dependents	0.21	--	0.20	--	0.41	--	***
Hours Worked per Week	20.94	16.10	20.74	15.90	26.67	20.17	***
Adjusted Gross Income	43.81	41.75	43.89	41.83	41.41	39.29	
First Generation College Student	0.72	--	0.71	--	0.75	--	
Full-time College Attendance	0.58	--	0.59	--	0.41	--	***
Highest Degree Ever Expected							
Less than a BA	0.19	--	0.19	--	0.32	--	***
BA or Higher	0.81	--	0.81	--	0.68	--	***
Postsecondary GPA	2.88	0.85	2.87	0.85	3.07	0.83	**
Academic Integration 2004	58.84	43.11	59.12	43.05	51.05	44.16	*
Social Integration 2004	18.65	35.02	18.76	35.01	15.42	35.23	
High School Diploma	0.86	--	0.86	--	0.88	--	
High School GPA	5.37	1.21	5.37	1.21	5.34	1.23	
Parents' Education							
Father (Less than BA)	0.72	--	0.72	--	0.75	--	
Mother (Less than BA)	0.78	--	0.78	--	0.79	--	
Took Distance Ed. Courses	0.12	--	0.12	--	0.22	--	***
Has a Disability	0.12	--	0.11	--	0.14	--	
Took Remedial Courses	0.32	--	0.32	--	0.18	--	***
Distance from 1st Institution	46.07	251.88	44.85	247.97	80.74	343.60	
Number of Inst. Attended	1.08	--	1.08	--	1.06	--	
Location of Institution							
City	0.77	--	0.77	--	0.78	--	
Town	0.19	--	0.19	--	0.16	--	
Rural	0.04	--	0.04	--	0.06	--	
n	5550		5360		190		

* *p* < .05, ** *p* < .01, *** *p* < .001

Outcome Variables – Non-Military Students

As Table 2 shows, in terms of completion, 57% of the students in the dataset persisted to attain either a degree (summed in Table 2 as 13% for a bachelor's degree, and 17% for an associate's degree, to equal 30%), or a certificate (9%), with the remaining students (18%) still enrolled but not yet attained either a degree or a certificate. Combining degrees and certificates, all community college students in this dataset attained at 39%. These data are in line with data from the National Student Clearinghouse Research Center (NSRC), which stated that the six-year completion rate for students at 2-year institutions from 2012 to 2018 was 39.4% (Sharpiro et al., 2018). The Brookings Institution also reported that "Fewer than 40 percent of community colleges students earn a certificate or degree within six years of enrollment" (Mann Levesque, 2018, p. 3). Some students who left community college without earning any credential have transferred to 4-year institutions without first completing an associate's degree or certificate (Chen, 2020). This finding is supported by NSRC data showing that in the 2012-2017 cohort of postsecondary students, 8.1% who began their education at a 2-year public institution completed their degree at a different 4-year institution (Shapiro, et al., 2018). NSRC data further shows that within the 2012 cohort of postsecondary students who started at 2-year public institutions, 46.2% were no longer enrolled in college, while 14.6% were still enrolled six years later (Shapiro et al., 2018).

Outcome Variables –Student Service Members/Veterans

For student service members/veterans in the BPS: 04/09 dataset, the outcome variables told a somewhat similar story as compared to non-military students. As Table 2 indicates, SSM/V were slightly less likely to persist in community college as compared to non-military students (55% to 57%, respectively). Although SSM/V were less likely than non-military

students to earn an associate's degree within the six-year time frame (21% to 30%, respectively), SSM/V did earn postsecondary certificates at a slightly higher rate than non-military students (11% to 9%, respectively). Additionally, as Table 2 shows, SSM/V had a lower overall achievement rate than the non-military students (32% to 39%, respectively).

Separating active duty, reserves students, and student veterans in the dataset, as shown in Table 3, presents a more detailed view of the outcomes within the military student framework. As mentioned above, SSM/V overall had a lower achievement rate than non-military students; however, as shown in Table 3, student veterans achieved at a much higher rate than their active duty or reserve peers (41%, 10%, and 19%, respectively). Additionally, the student veteran achievement rate was higher than that of the non-military population of the dataset (41% and 39%, respectively). Although student veterans had a higher overall achievement rate than their non-military and non-veteran peers, it still remains that after six years in community college postsecondary education, 59% of student veterans have not achieved any type of award. This may be because some military students, such as those who are active duty or in the reserves must delay their educational pursuits while fulfilling military obligations.

Table 3

Comparison of Outcomes for Active Duty, Reserve, and Student Veterans

Variables	Active Duty Students			Reserves Students			Student Veterans		
	Mean	*sd*	Sig.	Mean	*sd*	Sig.	Mean	*sd*	Sig.
Outcomes									
Persisted	0.52	--		0.40	--	*	0.62	--	
Attained a Degee	0.05	--	*	0.13	--	**	0.27	--	
Attained a Certificate	0.05	--		0.06	--		0.14	--	
Attained Any Award	0.10	--	**	0.19	--	**	0.41	--	
Vertical Transfer	0.24	--		0.21	--		0.18	--	*
n	21			52			117		

*$p < .05$, ** $p < .01$, *** $p < .001$

The outcome result data on student veterans found in Table 3 appear to be consistent with the student veteran researchers and scholars who have stated that student veterans specifically have better persistence than their non-veteran and non-military counterparts. Student veterans also do better in attaining postsecondary certificates, as well as attaining any postsecondary award than both their military and non-military peers. However, within the categories of degree attainment and vertical transfer, all three military groups shown in Table 3 have lower overall results than their non-military peers.

Student service members/veterans were shown to have a lower vertical transfer rate than non-military students (19% to 28%, respectively) as shown in Table 2. Although not captured in the BPS: 04/09 dataset, there are a number of reasons why SSM/V decide to transfer. Cate and Davis (2016b) found, for example, that student veterans transfer for a number of reasons other than to attend a 4-year university, including personal reasons, their major/degree program changed, military obligations resulting in relocation, to attend a more veteran-friendly institution, etc. When surveyed in 2004 for the BPS: 04/09 study, 30% of student veterans indicated that their reason for enrolling in college is to transfer to a 4-year college (see Table 4), yet only 19% succeeded in doing so.

Table 4

Student Service Members/Veterans – Reason for Enrollment vs. 6-Year Outcomes

	Enrollment Reason		Outcomes	
	n	Percent	*n*	Percent
Transfer to 4-year University	60	30%	40	19%
Complete an Associate's Degree	90	44%	30	14%
Complete a Certificate	30	15%	20	11%
Improve Job Skills	80	42%	na	na
Personal Interest	90	45%	na	na

Note. Students could choose multiple answers to the Reason for Enrollment question.

As Table 4 shows, SSM/V chose to attend a 2-year public postsecondary institution for a variety of reasons. These reasons were not mutually exclusive; thus, in the NPSAS:04 survey, from which this data is based, respondents were able to choose multiple reasons for attending college. For example, in answering the NPSAS:04 survey, 45% of student veterans indicated more than one reason for attending college. Zoli et al. (2015) found that motivation for pursuing a postsecondary education were as follows: career/job opportunities (86%), self-improvement (71%), potential for making money (69%), professional advancement (56%), and to use benefits (51%).

Predictor Variable

The predictor variable used in this study was the number of CTE credits earned. This continuous variable was used because many students who began the BPS study in 2004 had not yet chosen a college major; however, many students had taken CTE-related courses. The measure of CTE credits earned was provided in the BPS: 04/09 dataset by the Institute of Education Sciences (IES) through the NCES and applied to all students in the dataset. This variable was adapted through the U.S. Department of Education, NCES, and Classification of Instructional Programs (CIP) model for 2010. The data were presented in the BPS: 04/09 dataset as a normalized credit calculation "so that credit units can be compared across students and institutions" (National Center for Education Statistics, n.d.d). Appendix D contains the postsecondary taxonomy categories CIP codes for CTE programs prior to the 2015-2016 academic year.

As shown in Table 2, SSM/V earned more CTE credits than their non-military peers. The *t*-test of this variable between non-military students and SSM/V indicated that it was statistically

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significant at the $p < .01$ level. Figure 2 shows the differences in CTE credits earned between non-military students and SSM/V.

Figure 2

Differences in CTE Credits Earned Between Non-Military Students and SSM/V
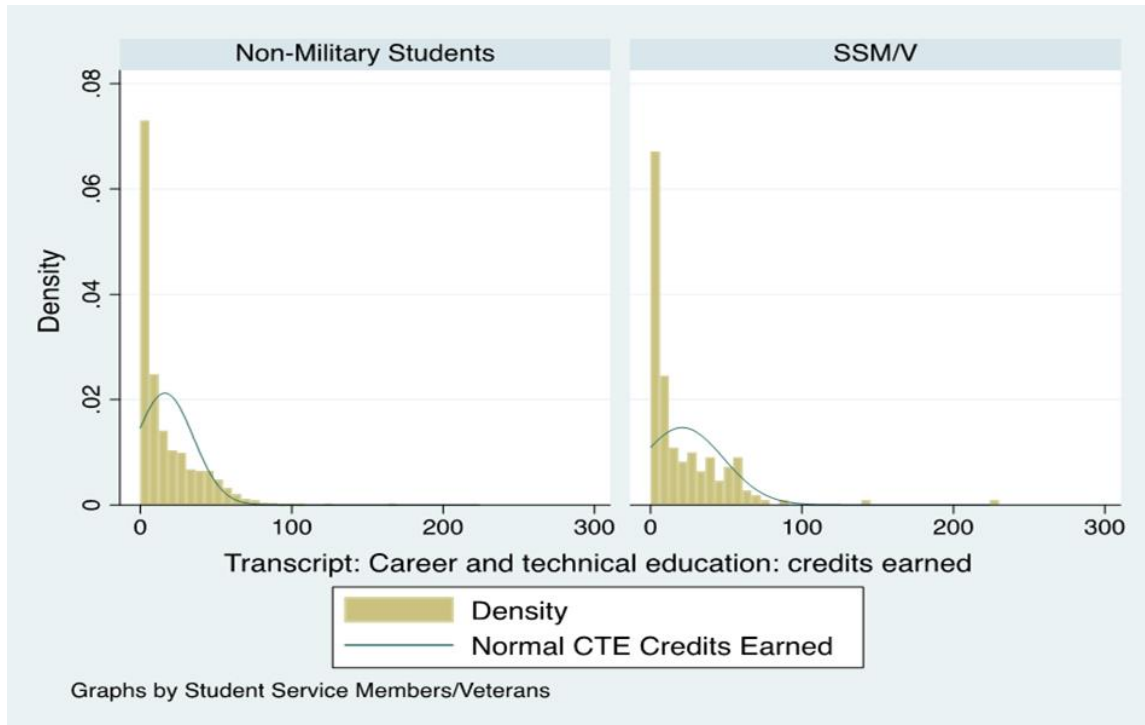
Table 5 shows those SSM/V who had chosen a CTE major in 2004 as compared to those who were either non-CTE majors, or who had not yet chosen a major. As Table 5 shows, in 2004, 53% of SSM/V chose a CTE college major, with 9% of SSM/V indicating a non-CTE major, and 38% of SSM/V left undeclared at that time. By 2009, the number of SSM/V in the dataset who reported CTE as their major dropped to 38%, with 13% of SSM/V reporting as non-CTE majors, and 49% remaining undeclared (see Table 6).

Table 5

CTE Major/Non-CTE Major of SSM/V and Non-Military Students, 2004

2004	SSM/V		Non-Military Students	
	n	%	*n*	%
CTE Majors	100	53%	2870	53%
Non-CTE Majors	17	9%	660	12%
Undeclared Majors	73	38%	1850	34%
n	190	100%	5380	100%

Table 6

CTE Major/Non-CTE Major of SSM/V and Non-Military Students, 2009

2009	SSM/V		Non-Military Students	
	n	%	*n*	%
CTE Majors	72	38%	2220	41%
Non-CTE Majors	25	13%	740	14%
Undeclared Majors	93	49%	2410	45%
n	190	100%	5370	100%

Control Variables

A variety of control variables were used in this study. These variables were selected because they plausibly relate to the relationship between SSM/V and the five dependent variable outcomes.

Age. As Table 2 shows, the mean age for all students in the BPS: 04/09 dataset was just under 23 years of age ($M = 22.51$, $SD = 8.21$). SSM/V, on the other hand, had a mean age of just over 30 years ($M = 30.21$, $SD = 11.61$), which aligns with data from Cate and Davis (2016a), and Molina (2014), indicating that, of the military-affiliated students in postsecondary education, SSM/V are older than their non-military student counterparts. Molina (2014) further states that SSM/V are 25 years old when they begin their postsecondary education. The BPS: 04/09 dataset

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shows that of the students who were military affiliated, active duty and reserves students had an average age of 23.4 years, and student veterans had an average age of 34.4 years. Age is statistically significant at the $p < .001$ level, indicating that there was a significant difference in this variable between SSM/V and non-military students.

The U.S. Department of Veterans Affairs reports that most (85%) SSM/V are between the ages of 24-40 (U.S. Department of Veterans Affairs, n.d.). Age is an important factor for SSM/V. Zoli et al. (2015) state that 37% of SSM/V, for example, identified age differences as a significant problem for them as they pursued their postsecondary education. Figure 3 shows a graphical comparison of age ranges between non-military students and student veterans. Figure 4 then compared the ages of non-military students to active duty students, military reserves students, and student veterans.

Figure 3

Age Comparison Between Non-Military Students and SSM/V

Graphs by Student Service Members/Veterans
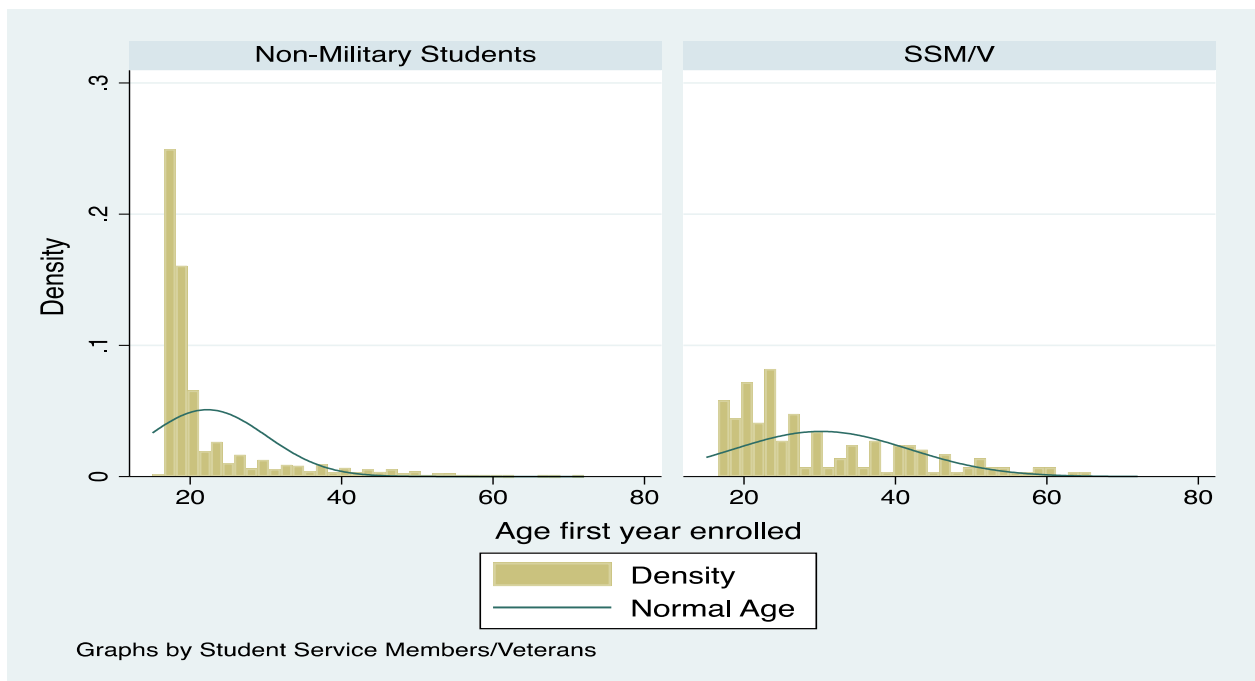
Figure 4

Age Comparison Between Non-Military And Military-Affiliated Students

Graphs by Military service type 2003-04
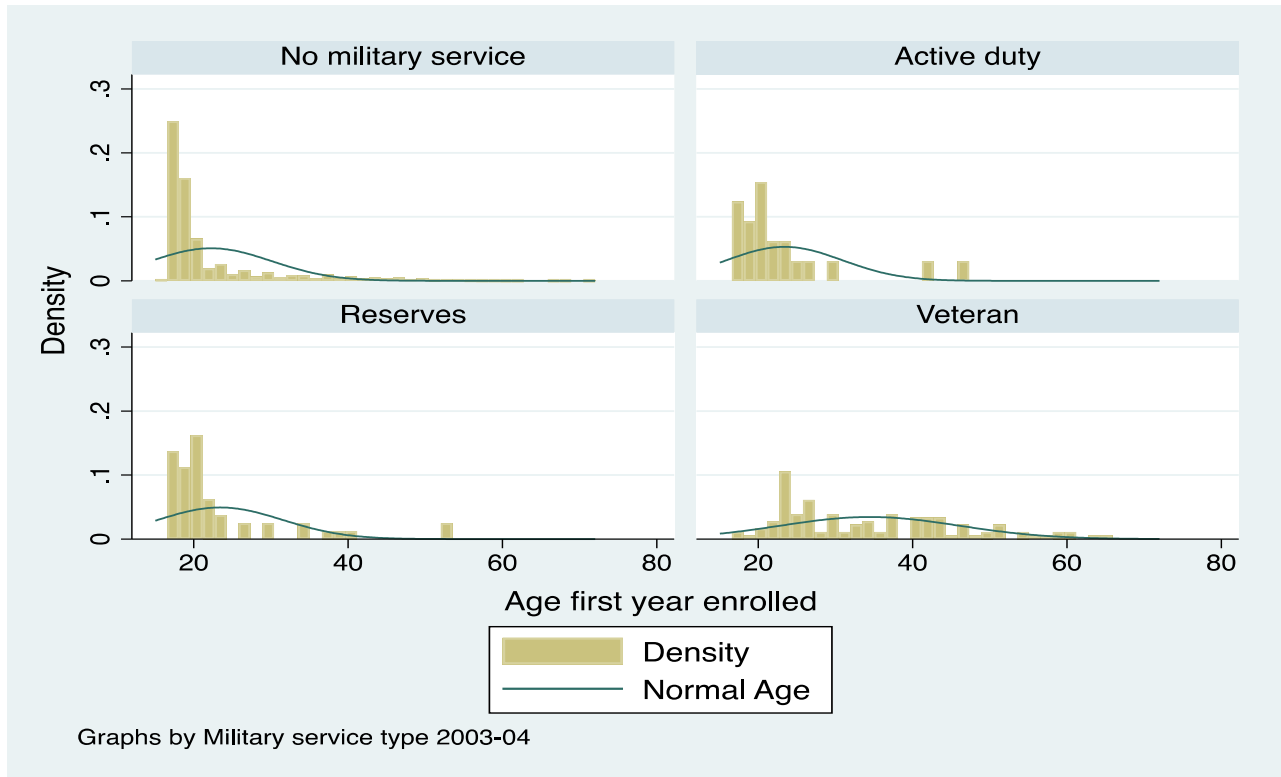
Appendix E contains the results of the control variables for active duty, reserves students, and student veterans.

Gender. Table 2 shows that there were significant gender differences in the dataset between male and female respondents in the non-military and SSM/V categories, with 58% of all students identified as female (42% male) as compared to SSM/V, who identified as 23% female and 77% as male. The difference was statistically significant at the $p < .001$ level. The gender differences reported in Table 2 aligned with data from Cate and Davis (2016a), Molina (2014), and the U.S. Department of Veterans Affairs (n.d.) showing that the percentage of female SSM/V in postsecondary education ranges between 21-27%.

Race/Ethnicity. Table 2 indicates the majority of community college students in the BPS: 04/09 dataset were White (62%), while 16% were Black, 13% Latinx, 4% Asian, and 5% of other races. A majority of the SSM/V in the BPS: 04/09 dataset were White (64%), with the remainder as 19% Black, 8% Latinx, 2% Asian, and 7% as Other. These data differ slightly from Cate and Davis' (2016a) report on SSM/V demographic variables where the race/ethnic breakdown is White/Caucasian (70.86%), African-American (8.06%), Hispanic/Latino (8.58%), Asian (2.48%), Bi-/Multi-Racial (6.78%), and Other (3.24%). This variable was not statistically significant as a whole; however, Latinx, as an individual variable, was statistically significant at the $p < .05$ level. This result indicates that there was a statistically significant difference between non-military and SSM/V Latinx students.

Marital Status and Dependents. Marital status between SSM/V and non-military students in the BPS: 04/09 dataset showed significant differences between the two groups at the $p < .001$ level. For example, only 12% of non-military students were married, whereas 35% of SSM/V were married (see Table 2). Additionally, in terms of family structure, Table 2 shows that SSM/V also had more dependents, on average, than their non-military counterparts (41% to 20%, respectively). This, too, was significant at the $p < .001$ level. When military-affiliated student data was explored further, it showed that 33% of active duty students had dependents, 27% of military reserves students had dependents, and 48% of student veterans had dependents.

Hours Worked Per Week and First-Generation College Student. As Table 2 shows, SSM/V worked more hours per week on average than non-military students ($M = 26.67$, $SD = 20.17$; $M = 20.74$, $SD = 15.90$, respectively), and SSM/V identified higher as first-generation students (75% SSM/V, 71% non-military students). Hours worked per week is significant at the $p < .001$ level. Figure 5 represents the difference in hours worked per week between non-military

students and SSM/V. This result aligns with data from Bailey (2008), Carnevale et al. (2018), Molina (2014) and Radford (2009) regarding SSM/V demographics stating that SSM/V are often older students who are married, have dependent children, work full-time, are first-generation students, and have other responsibilities that non-SSM/V students typically do not have. In terms of problems faced while pursuing an education, Zoli et al. (2015) showed that 29% of SSM/V stated family responsibilities as a key consideration. Kim and Cole (2013) remind us that being a first-generation college student "is a risk factor for not realizing academic success" (p. 6).

Figure 5

Hours Worked Per Week - Non-Military Students and SSM/V

Graphs by Student Service Members/Veterans
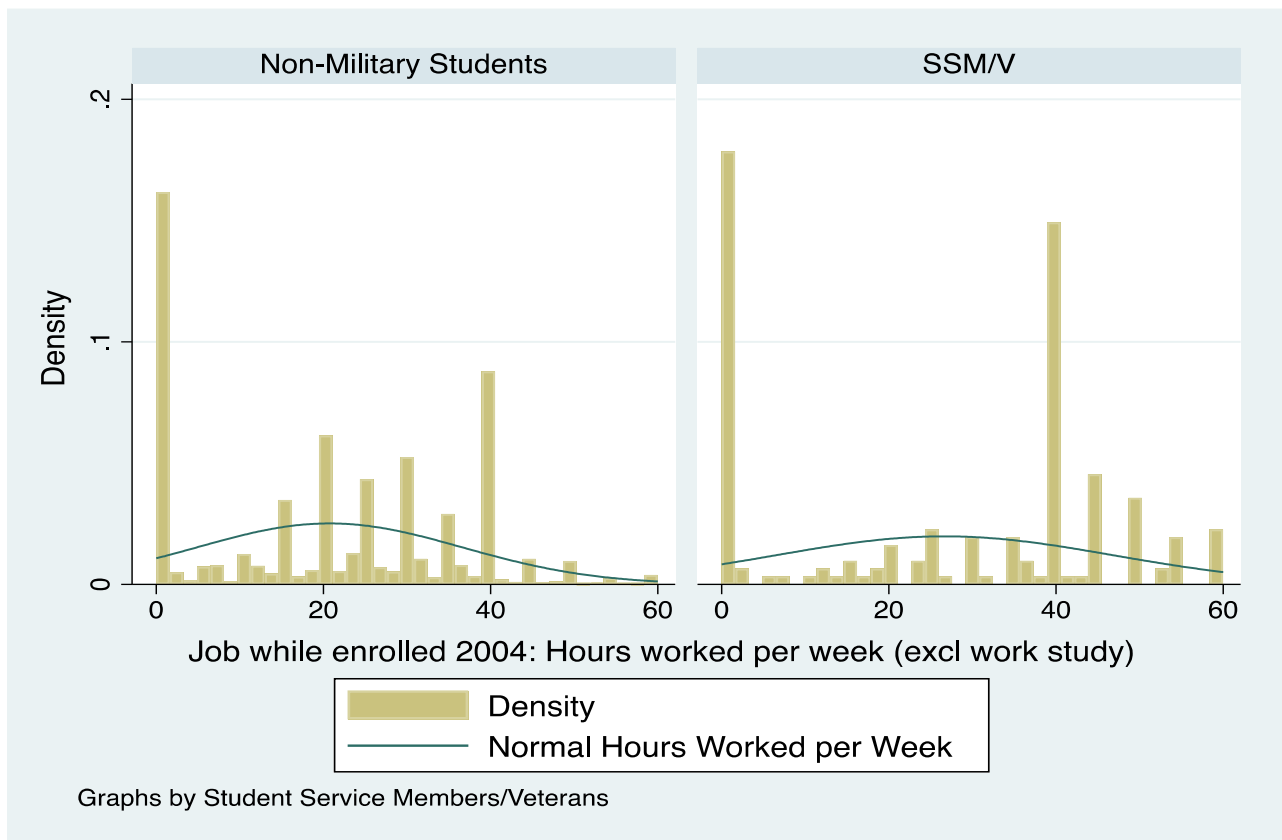
Full-Time Attendance. The perspective of family responsibilities and other obligations also relates to postsecondary attendance status as shown in Table 2. Non-military students were

more likely to attend community college full-time (59%) than SSM/V (41%). The difference between these two groups was significant at the $p < .001$ level. A large number of SSM/V in the BPS: 04/09 dataset attended community college exclusively part-time (46%), with some SSM/V attending a mix of full-time and part-time (14%). Working a full-time job was considered to be a problem for 32% of SSM/V pursuing an education in the study conducted by Zoli et al. (2015). The attendance patterns of SSM/V appears to have shifted since the release of the BPS: 04/09 results, most likely due to the changes in the Post-9/11 G.I. Bill that provided additional benefits to SSM/V, which, in turn allowed them to attend college more often on an exclusively full-time basis, according to Molina and Morse (2015).

Adjusted Gross Income. The adjusted gross income (AGI) of non-military students from the BPS: 04/09 dataset was higher than the income of SSM/V. As Table 2 shows, all students within the dataset have an average of $43,806 adjusted gross income for the 2003-2004 academic year ($M = 43.81$, $SD = 41.75$). Separating the data between non-military students and SSM/V showed that non-military students had a mean of $43,891 of adjusted gross income for that academic year ($M = 43.89$, $SD = 41.83$), while SSM/V adjusted gross income was $41,410 for the 2003-2004 academic year ($M = 41.41$, $SD = 39.29$). Exploring this data further by military type showed that of the military-affiliated students, student veterans had the lowest adjusted gross income of the three groups at $36,419 ($M = 36.42$, $SD = 29.95$), with military reserves students at $44,148 ($M = 44.15$, $SD = 32.16$), and active duty students at $62,436 ($M = 62.44$, $SD = 78.2$). The adjusted gross income by military type is represented in Figure 6.

Figure 6

Adjusted Gross Income by Military Type

Graphs by Military service type 2003-04
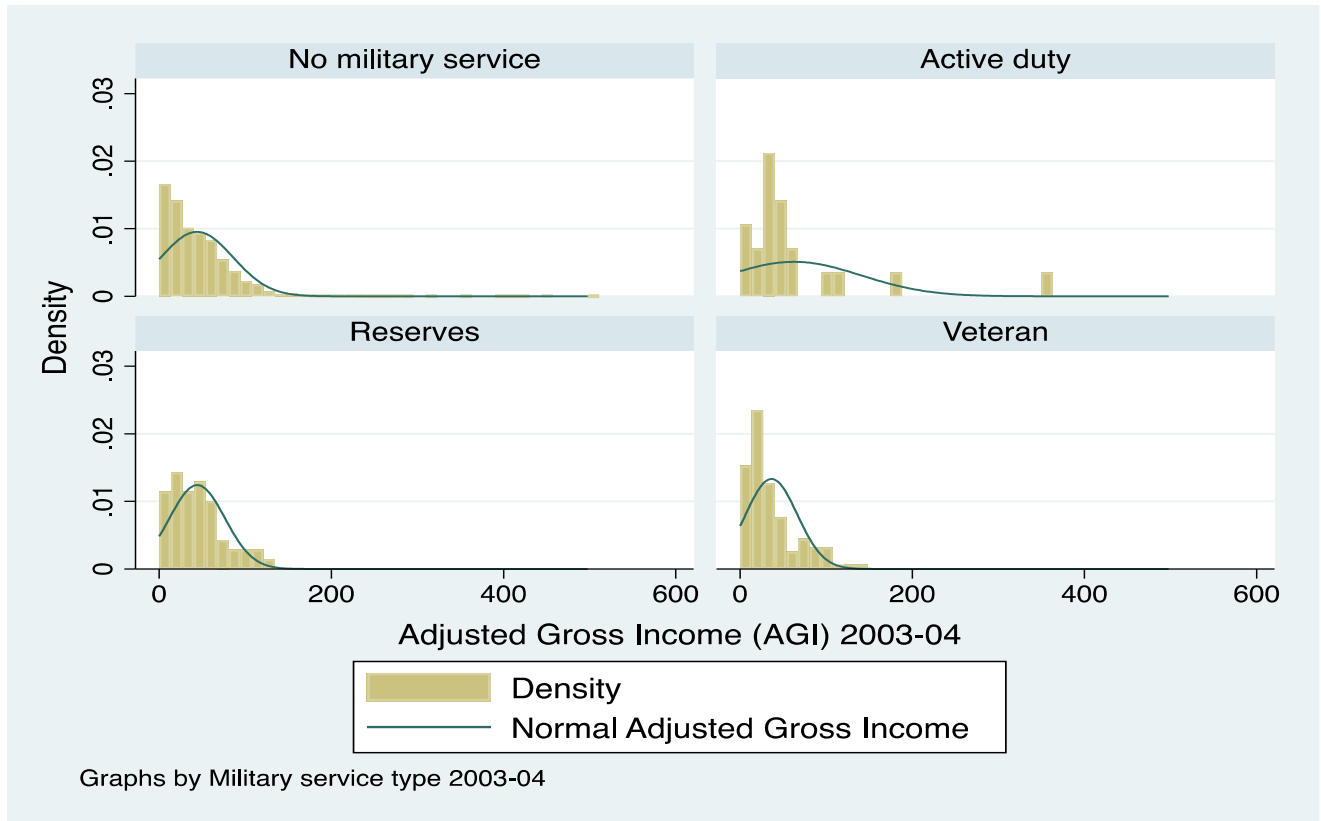
These data are aligned with Zoli et al., (2015) who found that 50% of post-military students earned less than $50,000 per year, with 28% earning less than $25,000 per year. Likewise, Molina and Morse (2015) found that student veteran adjusted gross income was also less than the AGI for other military connected undergraduates (i.e., National Guard, Reserves, Active Duty). There may be a number of reasons for the difference in these numbers, such as differences between civilian and military pay structures, as well as the fact that student veterans were not represented in the dataset as strongly as non-veteran students. Additionally, Zoli et al., (2015) suggest that SSM/V income may be less than their civilian counterparts because veterans

may choose careers in the public sector, which often offer lower compensation than private-sector careers.

Highest Degree Ever Expected. Community college students enter postsecondary education usually with a goal in mind, whether to earn a certificate, a degree, to transfer, or perhaps to earn just enough credits to move them into the next higher job classification at work. The BPS: 04/09 dataset captured that information by asking the respondents to indicate the highest level of education they ever expect to complete. As Table 2 shows, the majority of community college students indicated that they planned to complete at least a bachelor's degree (81%). Only 68% of SSM/V, on the other hand, indicated that they planned to complete a bachelor's degree or higher, which was significant at the $p < .001$ level. Looking at the data further, 23% of SSM/V planned to complete an associate's degree, while 6% planned to complete a postsecondary certificate. Those SSM/V who expected to complete less than a BA was significant at the $p < .001$ level. Of the SSM/V planning to complete a bachelor's degree or higher, 36% indicated a goal of finishing their BA degree, while 26% planned to complete a master's degree. Only 6% planned to complete a doctoral or professional degree.

Interestingly, of the three military types represented in the BPS: 04/09 dataset, 95% of the active duty students expected to complete a BA degree or higher, with 71% of reserves students indicating that they planned to complete a BA or higher, and only 62% of student veterans planning to complete a BA degree or higher. One possible theory about these numbers might be that student veterans may already be established in their career fields and were only looking for an associate's degree, a certificate, or a certain number of educational units to boost them to the next level at work.

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Postsecondary Grade Point Average. SSM/V who attend 2-year public institutions in the BPS: 04/09 dataset showed a higher overall grade point average (GPA) than their non-military counterparts. As Table 2 shows, SSM/V GPA had a mean of 3.07 (on a 4-point scale; $SD = 0.83$) compared with 2.87 ($SD = 0.85$) for non-military students. Graphical representation of the differences in GPA between non-military students and SSM/V is shown in Figure 7. Separately, student veterans showed the highest GPA of the three military types in the dataset, with a mean of 3.18 ($SD = 0.76$). These data are consistent with results reported by the Institute for Veterans and Military Families and Student Veterans of America who stated that the average student veteran GPA was 3.34, compared to non-veteran student GPA of 2.94 (Institute for Veterans and Military Families & Student Veterans of America, 2019). As the data from the BPS: 04/09 dataset showed, student veterans, on average, performed better academically than both their non-military student counterparts, as well as active duty (2.85 GPA; $SD = 0.71$) and military reserves (2.89 GPA; $SD = 0.96$) students. Across all racial/ethnic groups, student veteran GPA was greater than non-veteran student GPA in the 2003-2004 academic year. A t-test of the independent samples showed a statistically significant difference in GPA between SSM/V and non-military students at the $p < .01$ level. Figure 8 shows the graphical representation of the differences in GPA between non-military students and the three military-affiliated student groups.

Figure 7

GPA Comparison Between Non-Military Students and SSM/V, 2003-2004
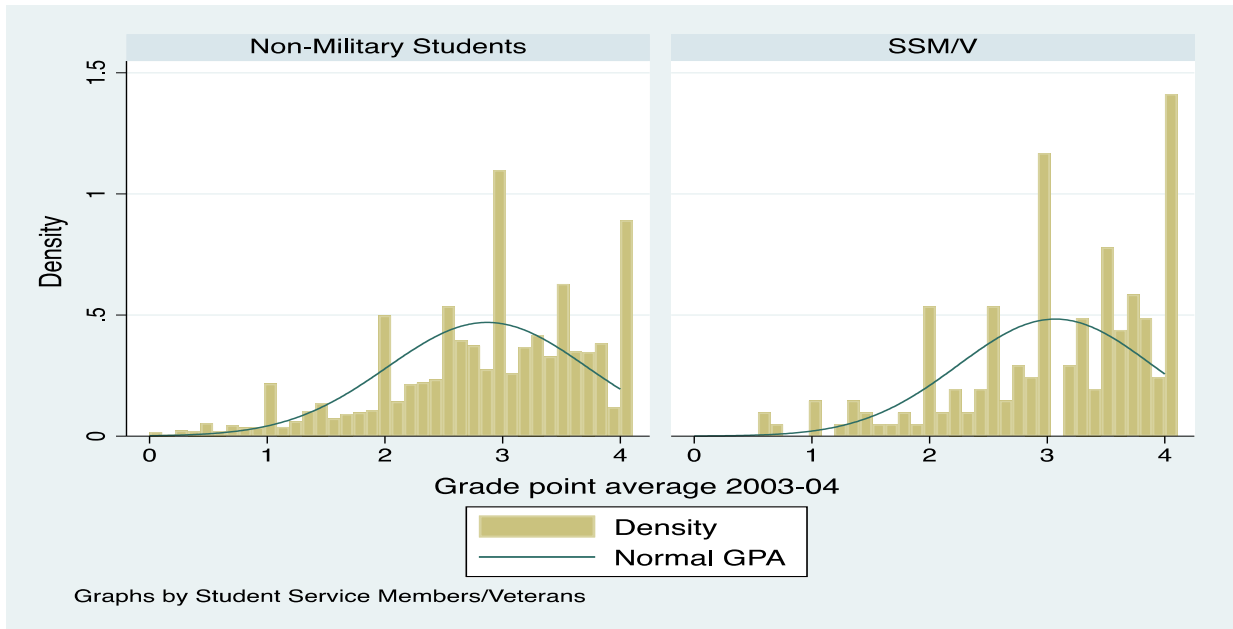
Figure 8

GPA Comparison Between Non-Military And Military-Affiliated Students, 2003-2004
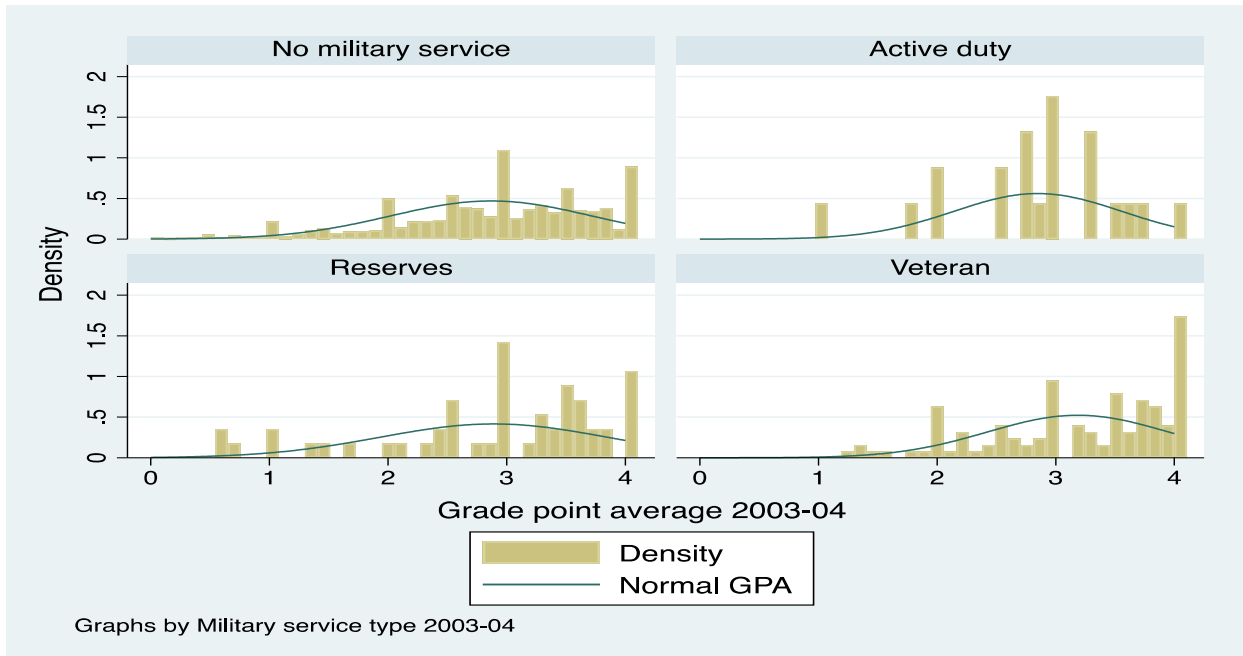
Academic and Social Integration. The next two control variables used in this study were academic and social integration. These variables were chosen because of their connection to student retention and persistence. Tinto (1987, 1993) wrote extensively about academic and social integration as important predictors of student retention in postsecondary education. This topic was discussed in detail in Chapter 2 of this dissertation. Regarding academic integration, Table 7 represents the data of both non-military students and SSM/V for the years 2004 and 2006. This variable measured the students' responses "indicating how often he/she participated in study groups, had social contact with faculty, met with an academic advisor, or talked with faculty about academic matters outside of class" (National Center for Education Statistics, n.d.d, para. 5).

The data shown in Table 7 indicated that both groups of 2-year public college students increased the amount of time spent in the academic integration activities listed above between 2004 and 2006, though SSM/V were less likely overall to be engaged in these activities than their non-military student peers. A *t*-test of the independent samples indicated a statistically significant difference in academic integration between SSM/V and non-military students at the *p* < .05 level. Figure 9 and Figure 10 show the comparison of academic integration between non-military students and SSM/V for the years 2004 and 2006.

Table 7

Academic Integration Index, 2004 and 2006

	2004			2006		
	n	mean	*sd*	*n*	mean	*sd*
Non-Military Students	5360	59.12	43.05	4430	77.06	44.36
SSM/V	190	51.05	44.16	130	71.51	43.50
n	5550			4560		

Figure 9

Academic Integration Index - Non-Military Students and SSM/V, 2004
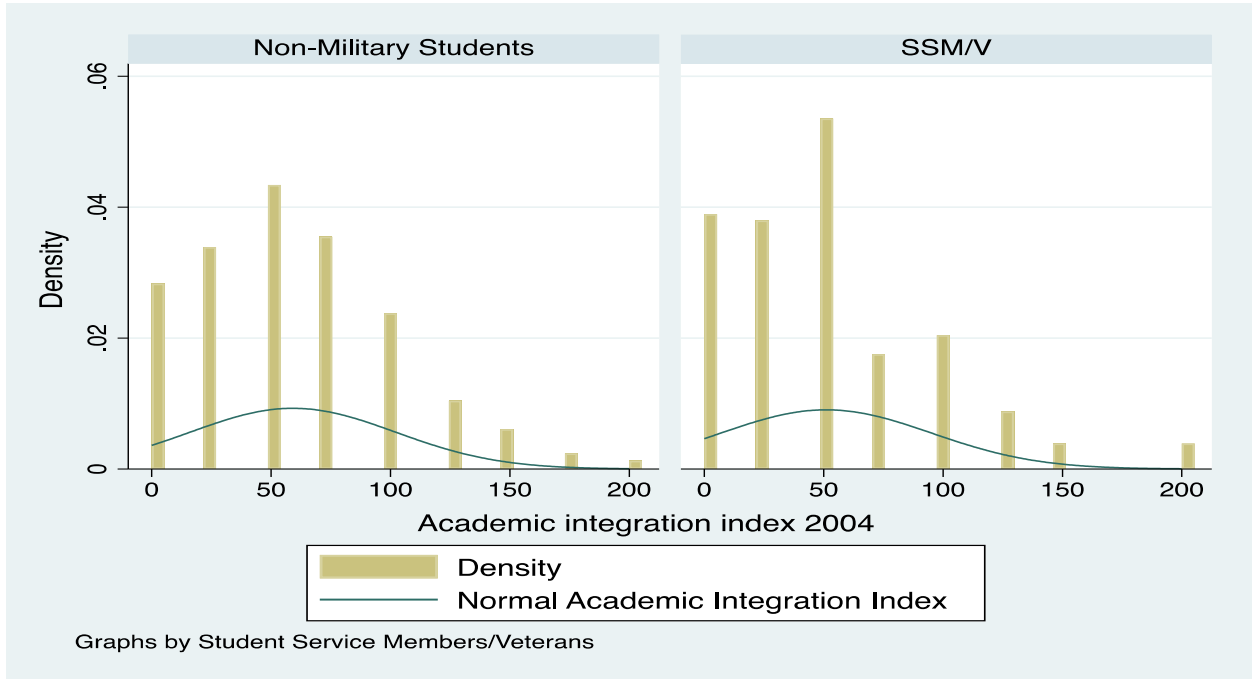
Figure 10

Academic Integration Index - Non-Military Students and SSM/V, 2006
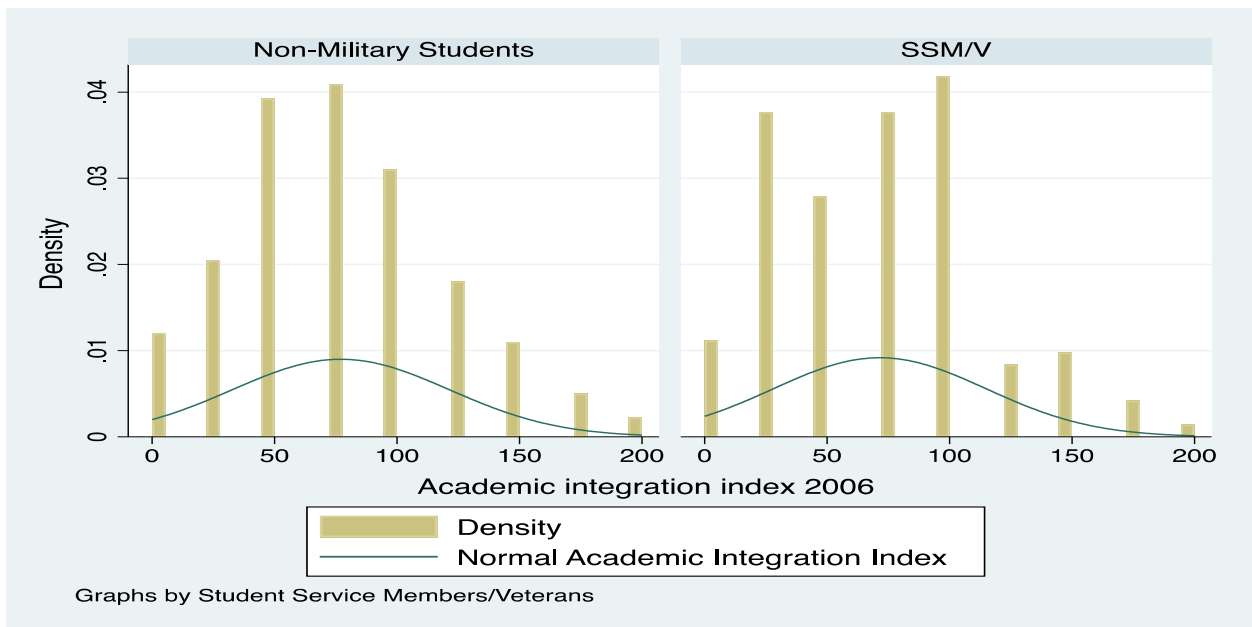
The data on academic integration align with Southwell et al., (2019) who found that SSM/V interacted less frequently with faculty and academic advisors than non-military and traditional students. Likewise, Molina and Morse (2017) state that 44% of SSM/V do not meet with faculty outside of the classroom. On the other hand, Kim and Cole (2013) reported that SSM/V had a slightly higher rate of faculty interaction to discuss assignments, ideas from course readings, and grades than did their non-SSM/V peers. SSM/V were less likely than non-SSM/V students, according to Kim and Cole (2013), to work with faculty on non-coursework activities or with classmates outside of class on course assignments. Despite this lower rate of integration for SSM/V found in this study, NASPA, Student Affairs Administrators in Higher Education found that SSM/V were just as likely as their civilian counterparts to seek out and engage with campus support services as long as doing so did not come with negative connotations (The NASPA Research and Policy Institute, 2013).

The social integration index is represented in Table 8. This variable was based on the responses from community college students in the BPS: 04/09 dataset who indicated that they had "attended fine arts activities, participated in intermural or varsity sports, or participated in school clubs" (National Center for Education Statistics, n.d.d). As the table shows, both non-military students and SSM/V had less social integration than academic integration, and both students groups increased their social integration activities from 2004 to 2006. Figure 11 and Figure 12 show the comparison of social integration between non-military students and SSM/V for the years 2004 and 2006.

Table 8

Social Integration Index, 2004 and 2006

	2004			2006		
	n	mean	*sd*	*n*	mean	*sd*
Non-Military Students	5360	18.76	35.01	4330	28.29	41.63
SSM/V	190	15.42	35.23	130	22.45	40.23
n	5550			4460		

Figure 11

Social Integration Index - Non-Military Students and SSM/V, 2004
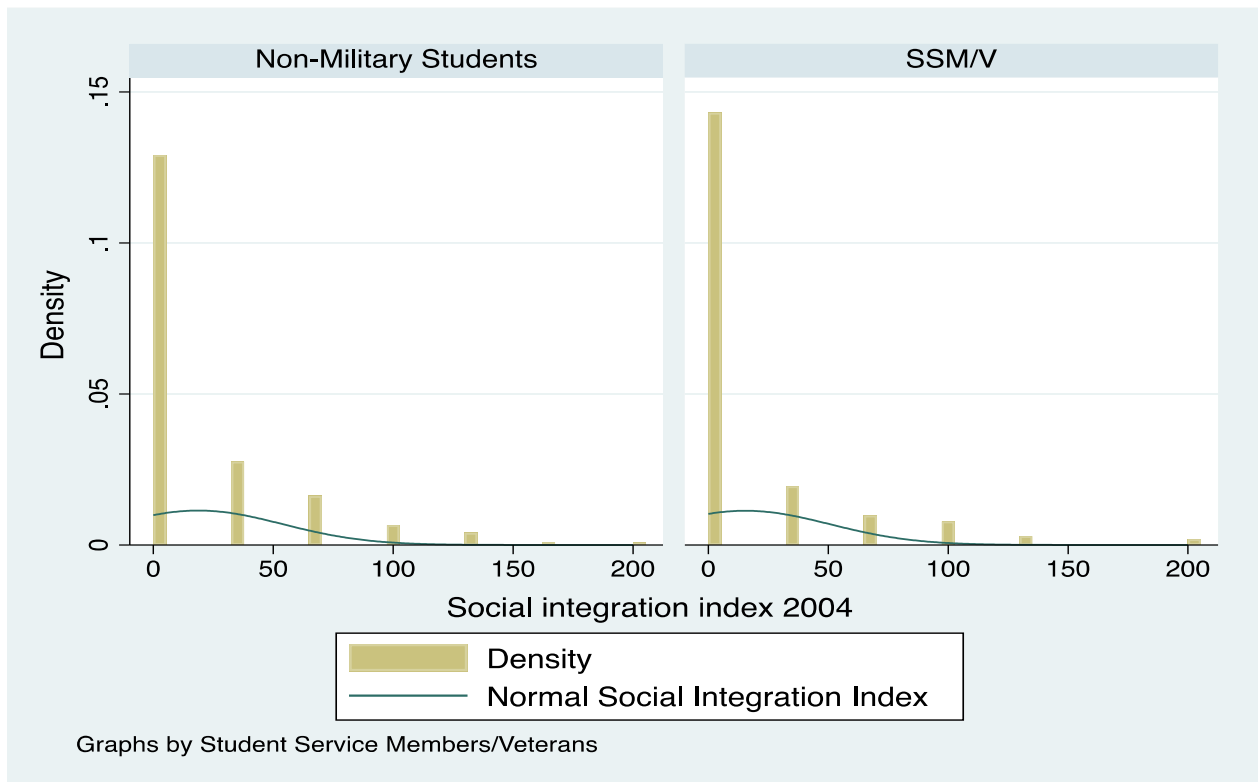
These numbers make sense because they represent community college students, who, because of attending commuter institutions rather than residential institutions, were less likely to attend social events at their college due to other commitments outside of school. As Table 8 shows, student SSM/V were less likely to be engaged in social integration activities than non-military students, most likely due to the added commitments and constraints that SSM/V have as

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compared to non-military students. Overall, these data support the research of Bean and Metzner (1985), DiRamio and Jarvis (2011), Wilson et al. (2013), and Yu (2015) who found that for nontraditional students such as SSM/V, the focus on academic integration over social integration was more important for student persistence. The data from this integration index are aligned with Borsari et al. (2017) who state that SSM/V reported having difficulty connecting socially with non-military postsecondary students who did not have the same life experiences or responsibilities as SSM/V.

Figure 12

Social Integration Index - Non-Military Students and SSM/V, 2006
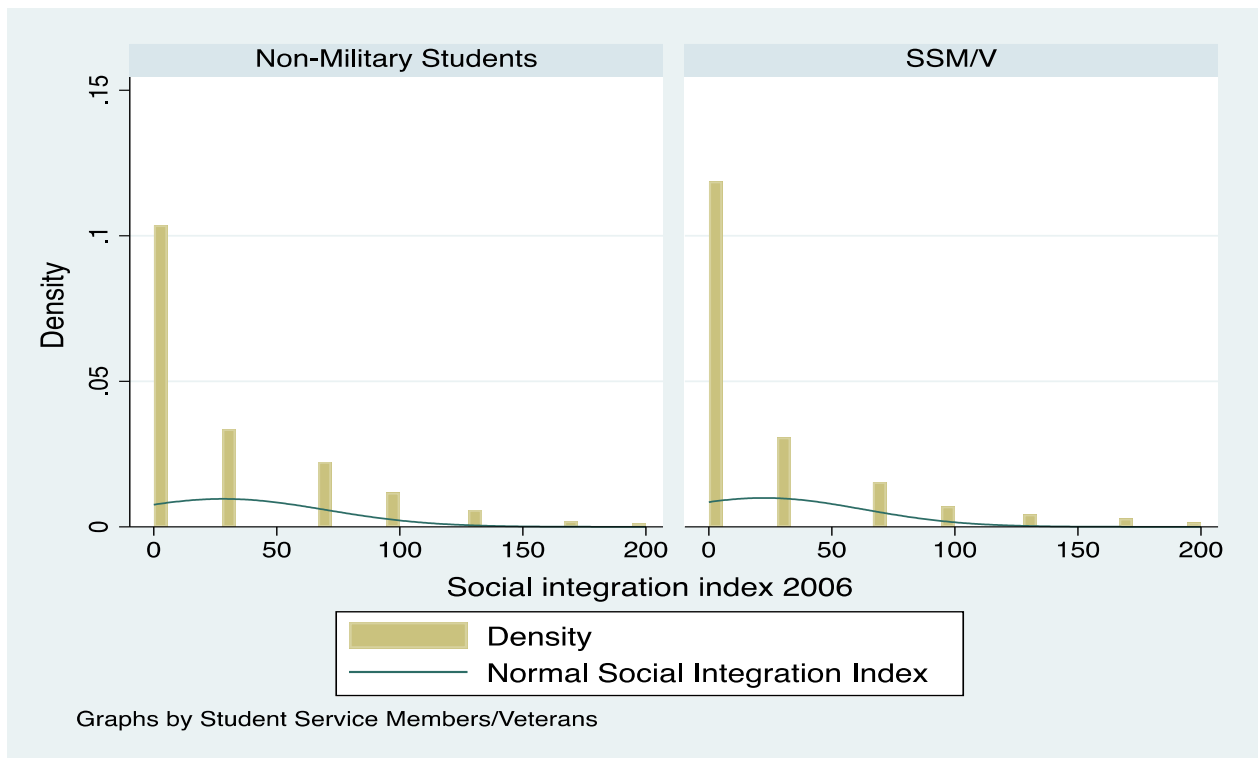
The remaining covariates shown in Table 2 were used as controls within this study to determine what effect they may have on the five outcome variables being studied. These covariates related to such elements as high school performance, parents' education levels, whether the student had a disability, took remedial courses, took distance education courses, and

other institutional factors. Of the remaining covariates, only distance education courses and remedial courses were statistically significant, both at the $p < .001$ level.

Took Distance Education Courses. According to the BPS: 04/09 dataset, and as shown in Table 2, SSM/V were almost twice as likely to take distance education courses than non-military students. The difference between these two groups was statistically significant at the $p < .001$ level. The results do make sense in terms of military-affiliated students having to make adjustments to their educational schedules due to deployment or temporary duty assignments away from their permanent base or home. Distance education courses for SSM/V is a viable option that allows for the continuation of educational pursuits with potentially minimal interruptions. Of the three military types represented in the BPS: 04/09 dataset, a higher percentage of active duty students took distance education courses (29%) than did reserves students or student veterans (both at 21%). A t-test of independent samples shows a statistically significant difference between active duty students and non-active duty students at the $p < .05$ level. Additionally, there was a statistically significant difference in distance education courses between student veterans and non-veteran students at the $p < .01$ level.

Took Remedial Courses. As shown in Table 2, a much smaller percentage of SSM/V took remedial courses at the postsecondary level than did non-military students (18% to 32%, respectively). These differences were statistically significant at the $p < .001$ level. Military training may play a part in explaining why SSM/V do not take remedial courses at the postsecondary level at the same rate as non-military students. Generally speaking, the military encourages educational development and pursuits, whether in active duty status, in the reserves or National Guard, or as a veteran. Military trained students may have had the opportunity to boost their learning while also undertaking their military obligations prior to enrolling in

postsecondary education. Another possible explanation for lower remedial course taking by SSM/V, according to Wheeler (2013), is that SSM/V might see remedial courses as producing feelings contradictory to what the military taught them in terms of rewards for success. She suggests that this perception may create self-esteem issues for SSM/V.

Independent samples *t*-tests were used to determine differences in remedial course taking between the three military types in the dataset and those not associated with the military. The results showed a statistically significant difference in reserves students as compared to non-reserve students at the $p < .05$ level. Additionally, a statistically significant difference was found between student veterans and non-veteran students at the $p < .01$ level.

Summary of the Descriptive Statistical Analysis

The data discussed above, and in the tables and figures presented, described the results of the measures of central tendency and dispersion for the outcome, predictor, and control variables used in this study. These variables were analyzed from the perspective of SSM/V and non-military students. In some cases, the data were disaggregated further to examine the differences between active duty students, military reserves students, and student veterans in postsecondary education. Several of the variables used in this study showed statistically significant differences between SSM/V and non-military students as found through a series of independent samples *t*-tests.

Inferential Statistics

This section begins with the restatement of the study's research question and hypotheses, followed by a brief overview of the statistical techniques employed in this study. The results from each of the five outcome areas are then presented with analysis and include separate tables for each outcome variable. The full linear probably model table can be found in Appendix F.

The research question used in this study was:

- RQ: What is the relationship between CTE credit accumulation among community college student service members/veterans and the following academic outcomes: (a) persistence, (b) certification completion, (c) degree completion, (d) any award completion, or (e) vertical transfer?

The hypotheses used in this study were:

Alternative Hypothesis:

- H_a: There is a statistically significant relationship between CTE credit accumulation among community college student service members/veterans and the academic outcomes of (a) persistence, (b) certification completion, (c) degree completion, (d) any award completion, or (e) vertical transfer.

Null Hypothesis:

- H_0: There is no statistically significant relationship between CTE credit accumulation among community college student service members/veterans and the academic outcomes of (a) persistence, (b) certification completion, (c) degree completion, (d) any award completion, or (e) vertical transfer.

Both logistic regression and linear probability modeling were run in Stata; however, because both types of statistical techniques produced similar results, linear probability modeling was used for interpretation purposes. Von Hippel (2017) stated that linear probability modeling is much easier to interpret than logistic regression. Estimates were produced using three empirical linear probability model specifications: Model 1 included only the dependent and independent variables of CTE credits earned and SSM/V status (no control variables); Model 2 added a set of student demographic control variables; Model 3 included the full set of control

variables listed in Table 2. Each linear probability model was run in Stata and was weighted, which means it included the probability weight. The BPS: 04/09 dataset was the result of a stratified sampling method, which was done strategically to achieve external generalizability to the entire population of community college students.

Persistence. Table 9 shows the results for the dependent outcome variable Persistence. There was a statistically significant relationship between the main effect of CTE credits earned and persistence across all three models ($p < .001$ level). Specifically, in Model 1, which sought to predict persistence from CTE credits earned and from SSM/V status, the results indicated that for every additional CTE credit earned, the probability of persistence increased by a factor of 0.008 or 0.8 percentage points. Model 1 did not include any control variables. For the main effect of SSM/V, Model 1 showed no significant probabilities between the SSM/V independent variable and the outcome of persistence, suggesting that there was no significance between SSM/V and non-military students with this outcome. Lastly, the interaction effect of CTE credits earned and SSM/V status in Model 1 showed no significant probability association between the variables.

In Model 2, demographic control variables were added to the linear probably equation. As Table 9 shows, there was a statistically significant and positive relationship between the main effect of CTE credits earned and persistence. For each additional CTE credit earned in Model 2, the probability of persistence increased by a factor of 0.008 or 0.8 percentage points. Next, Model 2, indicated a statistically significant ($p < .05$ level) and positive relationship between the main effect of SSM/V status and persistence. This result suggests that, when controlling the student demographic variables, SSM/V had a higher probability of persistence than non-military students, by a factor of 0.14 or 14 percentage points. The interaction effect of CTE credits earned and SSM/V status in Model 2 showed no significant relationship to persistence.

In Model 3, all control variables were added to the linear probability equation. These included not only demographic variables, but also student academic characteristic variables and institutional factor variables as well. As with Models 1 and 2, Model 3 showed a statistically significant ($p < .001$ level) and positive relationship between CTE credits earned and persistence. For each additional CTE credit earned, the probability of persistence increased by a factor of 0.007 or 0.7 percentage points. No significant association was found between SSM/V status and persistence in Model 3, nor did the interaction effect of CTE credits earned with SSM/V status produce significant results related to persistence.

Table 9

Results of Linear Probability Modeling - Persistence

Outcome: Persistence	Model 1	Model 2	Model 3
CTE Credits Earned	0.008***	0.008***	0.007***
	(0.0005)	(0.0005)	(0.0006)
Student Service Member/Veteran	0.02	0.14*	-0.01
	(0.07)	(0.07)	(0.09)
CTE Credits X SSM/V	-0.0008	-0.0008	0.004
	(0.002)	(0.002)	(0.003)
R^2	.08	.13	.13
Demographic Variables	No	Yes	Yes
Academic Characteristic Variables	No	No	Yes
Institutional Factor Variables	No	No	Yes
n	4930	4930	3440

*$p < .05$, ** $p < .01$, *** $p < .001$

Attained a Degree. Table 10 shows the results for the dependent outcome variable Attained a Degree. Model 1 of the table shows that the main effect of CTE credits earned had a positive and statistically significant effect on degree attainment ($p < .001$ level). For every additional CTE credit earned, the probability of attaining a postsecondary degree increased by a factor of 0.006 or 0.6 percentage points. Interestingly, as shown in Model 1 in Table 10, there

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was a statistically significant and negative effect of SSM/V status on degree attainment. The probability of degree attainment for SSM/V decreased by a factor of -0.08 or -8 percentage points ($p < .05$ level) as compared to non-military students. Additionally, the interaction effect of CTE credits earned and SSM/V status shown in Model 1 also indicated a statistically significant and negative relationship between these variables ($p < .05$ level). The interaction effect of CTE credits earned and SSM/V status decreased the probability of degree attainment by a factor of -0.003 or -0.3 percentage points.

Model 2 of Table 10 shows the linear probably results with the demographic control variables included to the equation. As with Model 1, the main effect of CTE credits earned had a significant and positive effect on degree attainment ($p < .001$ level). For each additional CTE credit earned, the probability of degree attainment increased by a factor of 0.006 or 0.6 percentage points. For SSM/V in Model 2, no significance was found between the independent and dependent variables. Likewise, with the interaction effect of CTE credits earned and SSM/V status in Model 2, no significance was found in the regression.

Model 3 of Table 10, which included all of the control variables, indicated that, for each additional CTE credit earned, the probability of degree attainment increased by a factor of 0.005 or 0.5 percentage points. For SSM/V in the model, no statistically significant results were found as it pertained to the probability of degree attainment, suggesting that there is no difference between SSM/V and non-military students in this outcome. The same result of no statistical significance was found for the interaction effect of CTE credits earned and SSM/V status in Model 3 as shown in Table 10.

Table 10

Results of Linear Probability Modeling - Attained a Degree

Outcome: Attained a Degree	Model 1	Model 2	Model 3
CTE Credits Earned	0.006***	0.006***	0.005***
	(0.0005)	(0.0005)	(0.0006)
Student Service Member/Veteran	-0.08*	0.04	-0.06
	(0.04)	(0.04)	(0.07)
CTE Credits X SSM/V	-0.003*	-0.003	0.002
	(.002)	(0.002)	(0.004)
R^2	.05	.12	.17
Demographic Variables	No	Yes	Yes
Academic Characteristic Variables	No	No	Yes
Institutional Factor Variables	No	No	Yes
n	4930	4930	3440

$* \ p < .05, ** \ p < .01, *** \ p < .001$

Attained a Certificate. Table 11 shows the results for the dependent outcome variable Attained a Certificate. Model 1 of the table shows that the main effect of CTE credits earned had a positive and statistically significant effect on degree attainment ($p < .001$ level). For each additional CTE credit earned, the probability of attaining a postsecondary certificate increased by a factor of 0.003 or 0.3 percentage points. For SSM/V in Model 1 of Table 11, the regression did not produce statistically significant results attributable to earning a postsecondary certificate as compared to non-military students. Likewise, the interaction effect of CTE credits earned and SSM/V status shown in Model 1 also did not indicate a statistically significant probability association between those variables.

Model 2 of Table 11 shows the regression with the demographic control variables included in the linear probability model. The main effect of CTE credits earned had a significant and positive effect on certificate attainment ($p < .001$ level). For each additional CTE credit

earned, the probability of certificate attainment increased by a factor of 0.003 or 0.3 percentage points. For the main effect of SSM/V in Model 2, no significance was found between the independent and dependent variables, suggesting that there is no difference between SSM/V and non-military students. Likewise, with the interaction effect of CTE credits earned and SSM/V status in Model 2, no significance was found in the regression.

Model 3 of Table 11, which included demographic control variables, academic characteristic variables, and institutional factor variables, indicated that, for each additional CTE credit earned, the probability of certificate attainment increased by a factor of 0.003 or 0.3 percentage points. For the main effect of SSM/V in the model, no statistically significant results were found as it pertained to the probability of certificate attainment as compared to non-military students. The same result of no statistical significance was found for the interaction effect of CTE credits earned and SSM/V status in Model 3 of Table 11.

Table 11

Results of Linear Probability Modeling - Attained a Certificate

Outcome: Attained a Certificate	Model 1	Model 2	Model 3
CTE Credits Earned	0.003***	0.003***	0.003***
	(0.0004)	(0.0004)	(0.0005)
Student Service Member/Veteran	-0.04	-0.06	-0.02
	(0.04)	(0.04)	(0.03)
CTE Credits X SSM/V	0.005	0.005	-0.002
	(0.003)	(0.003)	(0.002)
R^2	.06	.07	.08
Demographic Variables	No	Yes	Yes
Academic Characteristic Variables	No	No	Yes
Institutional Factor Variables	No	No	Yes
n	4930	4930	3440

*$p < .05$, ** $p < .01$, *** $p < .001$

Attained Any Award. Table 12 shows the results for the dependent outcome variable

Attained Any Award. As with the previous outcome variables, there was a statistically

significant positive relationship between the main effect of CTE credits earned and any award

attainment across all three models ($p < .001$ level). In Model 1, the results indicated that for each

additional CTE credit earned, the probability of any award attainment increased by a factor of

0.009 or 0.9 percentage points. For the main effect of SSM/V in Model 1, a statistically

significant and negative relationship was found between SSM/V and any award attainment ($p <$

.05 level). SSM/V status in Model 1 resulted in a decreased probability of any award attainment

by a factor of -0.11 or -11 percentage points when not controlling for demographic, academic

characteristic, or institutional factor variables. Lastly, in Model 1 of Table 12, the interaction

effect of CTE credits earned and SSM/V status showed no significant probability association

between the variables.

In Model 2 of Table 12, demographic control variables were added to the linear

probability equation. As this table shows, there was a statistically significant and positive

relationship between the main effect of CTE credits earned and any award attainment. For each

additional CTE credit earned in Model 2, the probability of any award attainment increased by a

factor of 0.009 or 0.9 percentage points. Model 2 did not indicate a statistically significant

relationship between the main effect of SSM/V status and any award attainment, nor was there

any significance to the interaction effect of CTE credits earned to any award attainment in the

model.

In Model 3, with all control variables added to the regression, a statistically significant (p

$< .001$ level) and positive relationship was found between the main effect of CTE credits earned

and attaining any award. For each additional CTE credit earned, the probability of attaining any

award increased by a factor of 0.008 or 0.8 percentage points. Neither the main effect of SSM/V

status in Model 3, nor the interaction effect of SSM/V with CTE credits earned, produced a

significant probability relationship with the attained any award outcome. These results suggest

no difference in the outcome of SSM/V status as compared to non-military students.

Table 12

Results of Linear Probability Modeling - Attained Any Award

Outcome: Attained Any Award	Model 1	Model 2	Model 3
CTE Credits Earned	0.009***	0.009***	0.008***
	(0.0005)	(0.0005)	(0.0006)
Student Service Member/Veteran	-0.11*	-0.03	-0.07
	(0.05)	(0.05)	(0.07)
CTE Credits X SSM/V	0.001	0.001	0.0007
	(0.002)	(0.002)	(0.004)
R^2	.11	.15	.19
Demographic Variables	No	Yes	Yes
Academic Characteristic Variables	No	No	Yes
Institutional Factor Variables	No	No	Yes
n	4930	4930	3440

*$p < .05$, ** $p < .01$, *** $p < .001$

Vertical Transfer. Table 13 shows the results for the dependent outcome variable

Vertical Transfer. There was a statistically significant, but negative, association between the

main effect of CTE credits earned and vertical transfer across all three models ($p < .001$ level). In

Model 1, for example, the results indicated that for each additional CTE credit earned, the

probability of vertical transfer decreased by a factor of -0.002 or -0.2 percentage points. For

SSM/V, Model 1 showed no significant probabilities between the main effect of SSM/V status

and the outcome of vertical transfer, suggesting no differences in SSM/V and non-military

students. The interaction effect of CTE credits earned and SSM/V status in Model 1 showed no significant probability association between the variables.

In Model 2, with demographic control variables added to the regression, there was again a statistically significant and negative association between the main effect of CTE credits earned and vertical transfer. For each additional CTE credit earned in Model 2 of Table 13, the probability of vertical transfer decreased by a factor of -0.002 or -0.2 percentage points. Model 2 did not indicate a significant association between the main effect of SSM/V status and vertical transfer outcome, nor was there any significance to the interaction effect of CTE credits earned and SSM/V status on the outcome in this model. Again, the results suggest no differences in SSM/V status as compared to non-military students with regards to the vertical transfer outcome.

In Model 3, with all control variables added to the regression, a statistically significant (p < .001 level) and negative relationship was found between the main effect of CTE credits earned and vertical transfer. For each additional CTE credit earned, the probability of vertical transfer decreased by a factor of -0.003 or -0.3 percentage points. The association between the main effect of SSM/V status and vertical transfer in Model 3 of Table 13 showed no statistical significance, suggesting no differences between SSM/V and non-military students.

The interaction effect of CTE credits earned and SSM/V status in Model 3, however, did produce a statistically significant and positive association with vertical transfer (p < .05 level). For each additional unit of interaction between CTE credits earned and SSM/V status, the probability of vertical transfer increased by a factor of 0.008 or 0.8 percentage points. Figure 13 graphically represents the association between the interaction of CTE credits earned and SSM/V status to vertical transfer. For example, the blue line in Figure 13 depicts the predicted probabilities of vertical transfer from CTE credit accumulation among non-military students. As

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shown, there is a negative slope as CTE credits earned increased. By contrast, the red line in the figure shows the predicted probabilities of vertical transfer from CTE credit accumulation among SSM/V. As CTE credit accumulation increased for SSM/V, probabilities of vertical transfer actually increased.

Table 13

Results of Linear Probability Modeling - Vertical Transfer

Outcome: Vertical Transfer	Model 1	Model 2	Model 3
CTE Credits Earned	-0.002***	-0.002***	-0.003***
	(0.0004)	(0.0004)	(0.0005)
Student Service Member/Veteran	-0.06	0.05	-0.12
	(0.05)	(0.06)	(0.08)
CTE Credits X SSM/V	-0.0001	-0.0001	0.008*
	(0.001)	(0.001)	(0.004)
R^2	.01	.08	.17
Demographic Variables	No	Yes	Yes
Academic Characteristic Variables	No	No	Yes
Institutional Factor Variables	No	No	Yes
n	4930	4930	3440

$* p < .05, ** p < .01, *** p < .001$

Figure 13

Interaction of CTE Credits Earned and SSM/V Status on Vertical Transfer

Predictive Margins of SSM/V
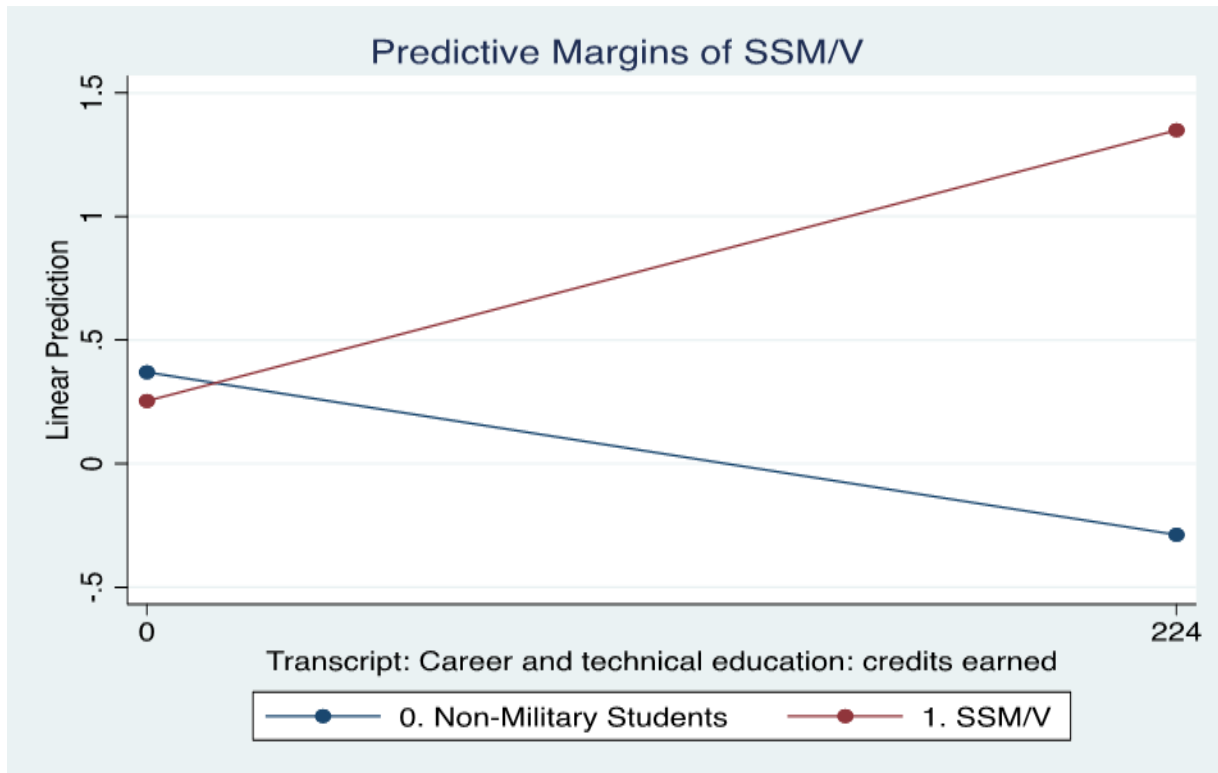
Summary

This chapter discussed the results of the descriptive statistical analysis, as well as the inferential statistical analysis using the dependent outcomes of persistence, degree attainment, certificate attainment, any award attainment, and vertical transfer with the independent variables of CTE credits earned and SSM/V status. Linear probability modeling was used as the statistical method of analysis in this study, which produced three empirical model specifications for all five outcomes. Each of these models utilized distinct control variables in the equations.

The most significant findings of these analyses were that CTE credits earned had a statistically significant and positive association with persistence, degree attainment (AA or BA), certificate attainment, and any award attainment AA, BA, or certificate). As CTE credits earned increased, so did the probabilities of these four outcomes. The analysis also found that a

statistically significant, but negative, association existed between CTE credits earned and the vertical transfer outcome suggesting that as CTE credits earned increased, the probability of vertical transfer decreased. Additionally, a statistically significant and positive association was found in the interaction effect of CTE credits earned with SSM/V status on the vertical transfer outcome, suggesting that as SSM/V accumulate CTE credits, their probability of vertical transfer increases. Chapter 5 will further explore these results as related to the research question used in this study.

Chapter 5. Summary, Recommendations for Future Research, and Conclusions

Introduction

This chapter begins with a summary of the research findings from this study, then discusses the answers to the research question from the perspective of each of the five outcomes tested. The decision to reject or not to reject the null hypothesis for each outcome is also provided for each of the three models within the respective outcomes. A brief note about researcher bias is provided in this chapter. A discussion of the implications for both research and policy are then presented, followed by the limitations of this study. The chapter concludes with a discussion of the recommendations for future research, followed by a note about the impact of the COVID-19 pandemic on this study, and lastly a final summary.

Summary of Key Results

This study found little association between the interaction of CTE credit accumulation among community college student service members/veterans (SSM/V) and the five outcomes of persistence, degree attainment, certificate attainment, any award attainment, and vertical transfer. Two exceptions to note, however, are Model 1 of Table 10, and Model 3 of Table 13 as shown in Chapter 4. The most compelling of these exceptions is the interaction effect of CTE credits earned with SSM/V status within the vertical transfer outcome. Here, the results of Model 3 indicated that the stronger the interaction effect of CTE credits earned and SSM/V status, the higher the probability of vertical transfer. This is compelling because the inclusion of all the covariates used in this study produced both a statistically significant and opposite result than what was found in Models 1 and 2 of that outcome. No other interaction of the independent variables across any of the outcomes tested had a statistically significant result when all of the covariates were included in the equation.

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The main effect of SSM/V status did not show a significant relationship with any of the outcomes when all of the covariates were used in the equation. This suggests no differences between SSM/V status and non-military students as it relates to these five outcomes when controlling for demographic, academic characteristic, and institutional factor variables. The main effect of SSM/V status did show a significant and positive association with persistence when controlling for demographic variables only, indicating that SSM/V have a higher probability of persisting than non-military students when controlling for demographic variables. Lastly, a significant but negative association was found between the main effect of SSM/V status with degree attainment and any award attainment when not controlling for the covariates.

This study found that there was a statistically significant and positive association between the main effect of CTE credits earned and four of the five outcomes among 2-year community college students. This finding was consistent across each of the three models used in this study for the four out of five outcomes. This association suggested that as additional CTE credits were earned, the probability of the students' persistence, degree attainment, certificate attainment, and any award attainment also increased. Though the estimates are small, they are statistically significant as well as practically significant. The vertical transfer outcome, on the other hand, showed a negative, yet significant, association with CTE credits earned. As additional CTE credits were earned, the probability that students would vertically transfer decreased.

Answer to the Research Question

This section discusses the results of the analysis as it relates to each of the specific outcomes and as it pertains to the research question. The research question used in this study was:

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- RQ: What is the relationship between CTE credit accumulation among
  community college student service members/veterans and the following academic
  outcomes: (a) persistence, (b) certification completion, (c) degree completion, (d)
  any award completion, or (e) vertical transfer?

The hypotheses used in this study were:

Alternative Hypothesis:

- H_a: There is a statistically significant relationship between CTE credit
  accumulation among community college student service members/veterans and
  the academic outcomes of (a) persistence, (b) certification completion, (c) degree
  completion, (d) any award completion, or (e) vertical transfer.

Null Hypothesis:

- H_0: There is no statistically significant relationship between CTE credit
  accumulation among community college student service members/veterans and
  the academic outcomes of (a) persistence, (b) certification completion, (c) degree
  completion, (d) any award completion, or (e) vertical transfer.

Persistence

This study found no significant relationship between the interaction effect of CTE credits
earned and SSM/V status with the outcome of persistence when all of the control variables were
included in the equation. This suggests that CTE credit accumulation does not relate to
persistence differently for SSM/V and non-military students at the community college level. This
interaction result indicates that the null hypothesis for this relationship was not rejected.

For the main effect of SSM/V status, the only significant relationship to persistence came
in Model 2, which included only student demographic variables in the equation. In this case,

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SSM/V status resulted in an increased probability of persistence by 14 percentage points. This association was interesting because it was the highest probability within any of the models in this study, and it suggested that when controlling for demographic variables, SSM/V had a 14 percentage point increase in the probability of persistence as compared to non-military students. The significance of the association between the main effect of SSM/V status and persistence in Model 2 suggests that the null hypothesis of no relationship was rejected. When all of the control variables were added to the equation; however, the results showed no significant association between the main effect of SSM/V status and persistence, thus, the null hypothesis for this result was not rejected.

The main effect of CTE credits earned showed a significant and positive relationship to community college student persistence. As additional CTE credits earned increased, the probability of student persistence also increased. One possible explanation for this result is that community college students who earn additional CTE credits may be focused on acquiring job skills that are valuable in the market and can be immediately applied, leading to increased income and other outcomes valuable to the students. Understanding how their CTE education can be immediately applied in the workforce may be a motivational factor leading to the probability of increased persistence. Because of the significant association between the main effect of CTE credits earned and the outcome of persistence, the null hypothesis of no relationship is rejected.

Degree Attainment

This study found no significant relationship between the interaction effect of CTE credits earned and SSM/V status with the outcome of degree attainment when the full model using all covariates was run. Because of this result, the null hypothesis for this relationship was not

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rejected. However, this study did find a significant, yet negative, association between the interaction effect of CTE credits earned and SSM/V status and the outcome of degree attainment when not controlling for any of the covariates (see Model 1). In this case, the interaction of the independent variables resulted in a decreased probability of degree attainment for SSM/V students by -0.3 percentage points. This result suggested that the null hypothesis of no relationship between the interaction effect and the outcome was rejected. When the demographic covariates were added to the equation, the significance of this finding disappeared, thus, the null hypothesis for this relationship was not rejected.

For the main effect of SSM/V status, without the covariates added to the model, there was also a significant and negative probability association between the variable and the outcome, suggesting that SSM/V students have a decreased probability of attaining a degree by -8 percentage points than non-military students. This result suggested that the null hypothesis of no relationship was rejected for this model. There may be a number of reasons for the negative relationship, including interruptions in SSM/V educational endeavors in order to fulfill military obligations, or because of the greater responsibilities that SSM/V have outside of education that may require their attention and therefore cause a delay in attaining a degree. When the covariates are added to the equation, however, the significance of this result disappears, thus, the null hypothesis of no relationship is not rejected.

As with persistence, CTE credits earned had a positive and significant association with degree attainment for community college students. Again, an increase in additional CTE credits earned also increased the probability of degree attainment for 2-year public postsecondary students. Because of this result, the null hypothesis of no relationship between the main effect of CTE credits earned and degree attainment is rejected.

Certificate Attainment

This study found no significant relationship between the interaction effect of CTE credits earned and SSM/V status across any of the models for this outcome, thus, the null hypothesis of no relationship between the interaction and the outcome was not rejected. The main effect of SSM/V status by itself also did not show any significance to community college certificate attainment across any of the three models, suggesting that there were no differences between SSM/V and non-military students in the probability of certificate attainment. This result indicated that the null hypothesis for the relationship between the main effect of SSM/V status and certificate attainment was not rejected across any of the three models. The results of this regression, however, did show a positive a significant association between the main effect of CTE credits earned and certificate attainment across all three models. As CTE credits earned increased, so did the probability of community college certificate attainment. This result suggested that, like the previous outcomes discussed, the null hypothesis of no relationship between the main effect of CTE credits earned and certificate attainment was rejected.

Of interest in these results as it pertains to CTE credit accumulation is the difference in probabilities between degree attainment and certificate attainment. The data showed that students had a higher probability of degree attainment through CTE credit accumulation than certificate attainment (0.5 percentage points and 0.3 percentage points, respectively). Logically, it would seem that CTE credit accumulation would increase certificate attainment by higher percentage points than degree attainment since certificates typically do not take as long to complete or have as many requirements for completion. One possible explanation for this difference may be in the number of sub-baccalaureate students enrolled in a degree program versus the number of students enrolled in a certificate program during the 2004-2009 time period. The NCES reported

that the number of students enrolled in sub-baccalaureate occupational certificate programs in the

2003-2004 academic year was 302,000. The number of students enrolled in occupational degree

programs during that same academic year was 956,000 (National Center for Education Statistics,

n.d.f). When considering the percentage of completers in 2009 when the data was again collected

in these categories, the results showed that 50.3% of Subbaccalaureate students attained a

certificate, while 19.7% attained an associate's degree. This means that approximately 152,000

students attained a certificate, while approximately 188,000 students attained an associate's

degree by 2009.

Any Award Attainment

This study found no significant association between the interaction effect of CTE credits

earned and SSM/V status with the any award attained outcome across all three models, thus, the

null hypothesis of no relationship between the interaction and the outcome was not rejected.

For the main effect of SSM/V status, this study found a significant but negative

association with the attained any award outcome when none of the covariates were used in the

equation, suggesting that SSM/V have a decreased probability of award attainment of 11

percentage points as compared to non-military students when not controlling for demographic,

academic characteristic, and institutional factor variables. This result suggested that the null

hypothesis of no relationship between this main effect variable and the outcome was not rejected.

When the covariates were added to the equation, however, the results for the main effect of

SSM/V status no longer showed a significant association with the any award attained outcome,

suggesting that there was no significant difference in award attainment between SSM/V and non-

military students. The null hypothesis of no relationship between the main effect of SSM/V

status and any award attained is not rejected for Models 2 and 3.

As with the previous outcomes, the main effect of CTE credits earned showed a significant and positive association with the any award attained outcome across all three models, suggesting that students had an increased probability of attaining any award as additional CTE credits were earned. Because of this significant association, the null hypothesis of no relationship between the main effect of CTE credits earned and the attained any award outcome is rejected.

The overall SSM/V attainment outcome reported in this study of 32% (see Table 2) was much less than the 51.7% of SSM/V who attained either a degree or certificate that Cate (2014) reported in the Million Records Project (MRP), which analyzed SSM/V data from 2002 to 2010. This difference may to some extent be associated with the number of records used in the MRP as compared to this study, as well as the differences in data sources and methods of analysis between this study and the MRP. Cate (2014) suggested that if the MRP used the same methodological procedures as the National Center for Education Statistics (NCES), lower attainment rates for SSM/V would be expected due to time-to-completion differences in the data.

Vertical Transfer

This study found a significant and positive relationship between the vertical transfer outcome and the interaction effect of CTE credits earned with SSM/V status when all of the covariates were used in the equation. As the results from this study show, SSM/V do not transfer at the same rate as non-military students (see Table 2), yet there are a number of SSM/V who have as an academic goal to transfer from a 2-year to a 4-year institution (see Table 4). The significant association between the interaction and the outcome suggested that the null hypothesis of no relationship between the interaction and outcome was rejected in Model 3. For Models 1 and 2 of the interaction, the null hypothesis of no relationship with the outcome is not rejected.

For the main effect of SSM/V status, the results showed no significant association with the vertical transfer outcome across any of the three models. This result suggested that there was no difference in vertical transfer for SSM/V as compared to non-military students. The null hypothesis of no relationship between the main effect variable of SSM/V status and the outcome is therefore not rejected across any of the models.

In terms of the main effect of CTE credits earned, the vertical transfer outcome, as with the previous four outcomes, also showed a statistically significant association; however, this association was negative rather than positive. This result suggests that for each additional CTE credit earned, the probability of vertical transfer decreased for 2-year postsecondary students. This makes sense because many community college CTE programs are focused for the most part on either certification or 2-year degree attainment and not necessarily transfer to a 4-year university. As stated previously, it is often the case that students taking CTE courses want to apply their knowledge and skills in the workforce sooner rather than later in order to take advantage of potential workplace opportunities. What is interesting is the opposite result of SSM/V earning additional CTE credits having a positive outcome of vertical transfer. This raises the question of why, which needs to be explored further. It may be that SSM/V who are taking advantage of military-provided educational benefits, want to fully use those benefits, thus, they transfer to a 4-year institution in order to do so. Another possible explanation might be that SSM/V are pursuing CTE education in areas that are more aligned with a bachelor degree pathway, such as those in science, technology, engineering, and math (STEM) or computer science/information technology (C. Sublett, personal communication, October 1, 2020).

In four of the five outcomes tested in this study, the null hypothesis was not rejected for the interaction effect, suggesting that there was no statistically significant relationship between

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CTE credit accumulation among community college SSM/V and the outcome. This means that CTE credit accumulation impacts SSM/V and non-military students similarly, and that there is no unique effect of earning CTE credits for SSM/V. The exception to these results was with the vertical transfer outcome, in which there was a statistically significant relationship between the interaction of CTE credit accumulation among SSM/V and the outcome. In this case, the null hypothesis of no relationship between the interaction and the outcome was rejected, which suggested that there was a unique effect for SSM/V over non-military students earning CTE credits.

Avoidance of Research Bias

Although the author of this study was a military veteran, there were no expected outcomes that the author hoped the results would show. The data in this study were analyzed in an unbiased fashion with the overall goal to simply report the results truthfully and as found based on the dataset used and the research question asked. All possible data associated with CTE and SSM/V within the dataset were utilized in this study, and there was no intentionality by the researcher to ignore or emphasize any part of the data or results.

Implications for Research and Policy

The results from this study have direct implications for both research and policy. From the research perspective, although SSM/V studies continue to increase in number, there is still room to add important knowledge to the discussion of the challenges and needs these students face in postsecondary education. While this study did not find significant relationships between the interaction effect of CTE credits earned with SSM/V status in four of the five outcomes, it did find that, based on the estimates, increased CTE credits are associated with increased academic performance across all outcomes regardless of SSM/V or non-military status, and it

may be possible that studies with larger datasets of these variables could produce results with stronger statistical power. State agencies, for example, that have access to large postsecondary student datasets such as longitudinal data systems or statewide longitudinal data systems (Massa & Gogia, 2017), could reproduce this study using their proprietary data to see if stronger significant results can be obtained. Using robust datasets such as these can benefit SSM/V when the data is collected in ways that capture all the uniqueness of the SSM/V educational experience. Even more powerful are results that are collected, analyzed, and reported in a near real-time environment. We are not there yet, but it is something in which to aspire.

Likewise, Institutional Effectiveness departments within individual colleges and universities could also replicate this study with their proprietary data, as long as those data have been collected at those institutions. Massa and Gogia (2017) report that some 66% of 2-year public colleges collect data specifically on SSM/V, though not many put this information to effective use, so there is room to improve in this area across many 2-year public postsecondary institutions. State agencies and college Institutional Effectiveness offices must properly collect data on SSM/V in order to better understand an important segment of their student population. Collaboration of data collection, analysis, and reporting across local, state, and federal levels is the ideal threshold for which to strive. Only through good data, that has been properly collected and analyzed, can good decisions be made.

From the policy perspective, for community college CTE leaders, this study showed a significant and positive relationship with important outcomes, which should be considered when discussing CTE policies that affect student success and other important measures through CTE credit accumulation. Knowing that CTE credit accumulation has a positive effect on persistence and attainment outcomes should encourage CTE leaders and decision makers to use this

information when promoting and marketing their programs and courses both inside and outside their institutions.

This information should be communicated through all of an institution's CTE departments so that individual faculty members reinforce their understanding of the importance of CTE credits earned, as well as CTE courses and programs in general, not just for their SSM/V population, but also for their broader student audiences, including other underrepresented and nontraditional student populations. Because faculty members are often the ones who spend the most time with the students while they are on campus and in classes, it is important that CTE faculty members are encouraged to use this knowledge about CTE credit accumulation to continue to strengthen their students' fortitude toward academic persistence and attainment outcomes.

For college Institutional Effectiveness offices, beyond collecting general data about SSM/V, Molina and Morse (2017) suggest disaggregating SSM/V data into not only persistence and attainment categories, but also into "financial affordability and student debt" (p. 70) as well. The more Institutional Effectiveness offices can collect and disaggregate SSM/V data, the better prepared those offices are to make recommendations to key college decision and policy makers, and other key stakeholders, and to help their institutions properly allocate scarce resources to serve the needs of SSM/V and other nontraditional student populations (Daly & Fox Garrity, 2017; Molina & Morse, 2017).

All constituencies within the 2-year postsecondary environment must continue to be flexible in their efforts to support SSM/V, and to work together collectively to address the needs and challenges of the SSM/V community at their schools. This collective effort to better understand and serve SSM/V on college campuses has made noticeable improvements over the

past several years, and it is important that these efforts continue in earnest well into the future; however, it should also be understood that SSM/V academic needs are not all the same. This population of students are very diverse, not only from their non-military peers, but also within the different segments of military type. SSM/V can help with this effort by using their important voices to communicate openly and honestly with the various college constituency groups about the specific SSM/V needs and challenges in a manner that will facilitate continued positive persistence and attainment results.

Limitations

The current study was limited in a number of ways. The dataset used in this study was older than more current Beginning Postsecondary Students Longitudinal Study (BPS: 12/17) dataset that was made available in late 2019 by the Department of Education and the National Center for Education Statistics. The researcher did not have access to the newer restricted use dataset for this study because the process of getting access to the BPS: 12/17 dataset was slowed due to the worldwide pandemic. Only one dataset was used for this study, which contained limited data on SSM/V.

Although the data came from a national representative dataset, the smaller sample size of SSM/V limited the statistical power of this study. It is possible that military-affiliated students in the BPS: 04/09 dataset did not identify themselves as SSM/V thereby limiting the number of observations used in this study. Furthermore, there were only five outcomes used in this study, which suggests that there may be other important outcomes to consider for future research, not only for SSM/V in CTE, but also for SSM/V in non-CTE areas, as well as non-military students within and outside of CTE. Additionally, there were many important variables collected through

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the BPS: 04/09 dataset that were not included in this study. Those variables may or may not have had an impact on this study had they been included as covariates.

Recommendations for Future Research

While the research on SSM/V in postsecondary education continues to grow, there is still much research to do on this important population of students and their educational endeavors. This study focused on data from 2004-2009; however, further research should be conducted using newer datasets, such as the Beginning Postsecondary Students Longitudinal Study 2012-2017 cohort (BPS: 12/17). Using the newer dataset and comparing those results with the results from the BPS: 04/09 dataset could produce a more robust picture of the relationship between CTE credit accumulation of community college SSM/V and the outcomes of persistence and attainment over a longer time period. This could also provide insights into any differences between SSM/V using pre- Post-9/11 GI Bill benefits and those using the Post-9/11 GI Bill benefits.

In addition to newer datasets, future research should gather a much larger sample of SSM/V to analyze the relationship of CTE credit accumulation with SSM/V status as it relates to persistence and attainment. Doing so may create statistically significant relationships between the interactions and possibly negate the limited statistical power of this study due to the small sample size. State researchers and policy makers could use their large datasets or other administrative records at their disposal to conduct studies similar to this one to see if the interactions of CTE credits earned and SSM/V status produces results with significant statistical power. Studies could also be done at the institutional effectiveness level within individual community colleges, provided they track and maintain data on CTE and SSM/V.

This study focused specifically on CTE credit accumulation; however, further research could be conducted to evaluate SSM/V persistence and attainment outside of CTE academic credits and programs. Within CTE, further research could be conducted that analyzes SSM/V persistence and attainment in each of the CTE clusters discussed in Chapter 2. To this end, research could look at which CTE clusters SSM/V tend to gravitate toward, explore reasoning behind those decisions, and what successes and challenges SSM/V face in pursuit of their education in those fields.

Future research could also look at SSM/V perspectives in CTE based on qualitative methods rather than just quantitative methods. Meeting with, and interviewing, SSM/V in a qualitative format could expand the narrative and provide richer perspectives of the successes and challenges these students face in persistence and attainment, whether at the 2-year or 4-year level. This may help researchers and policy makers better understand the why of the relationships produced by the results from this study, especially those from the vertical transfer outcome where SSM/V had a significant and positive association when interacted with CTE credits earned. Additionally, because faculty members often play an important role in student persistence and attainment, future qualitative research on SSM/V could seek to understand the role faculty members play in the eyes of SSM/V as they pursue their educational goals.

Other future research on SSM/V could consider how factors, such as student characteristics, campus support services for SSM/V, or other institutional factors might affect student persistence and attainment within the realm of community college CTE programs and credits earned. In terms of student characteristics within the SSM/V community, future research could look at the characteristics specific to those who persist versus those who do not persist, especially at the community college level or within certain academic programs such as CTE.

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Additionally, future research could be disaggregated into specific categories of military students, whether active duty, National Guard, reserves, or student veterans to find similarities or differences in their postsecondary performance, whether persistence, attainment, or through other measures (Molina & Morse, 2017). Daly and Fox Garrity (2017) argue that understanding differences within the categories of SSM/V may be more important that understanding the differences between SSM/V and non-military students.

A Note About COVID-19

When I began working on this dissertation, the world had not yet heard of COVID-19. As I now complete this journey, not only has the world heard of COVID-19, it has profoundly impacted almost every aspect of our lives. As the world works through these challenging times, much remains unclear about what life will look like as we continue to manage through this pandemic and once we move past it. As of October 1, 2020, according to Johns Hopkins University, there are over 34 million cases of COVID-19 worldwide, with global deaths of greater than 1 million and over 24 million recovered cases. In the United States, as of October 1, 2020, there are over 7.3 million cases of COVID-19, with over 208,000 total deaths and almost 3 million recovered cases (John Hopkins University, 2020).

Our military veterans already faced many challenges prior to COVID-19, but according to the Bob Woodruff Foundation, the pandemic may worsen these challenges for veterans in areas such as housing, employment, finances, and social isolation/loneliness among others (Ramchand et al., 2020). Additionally, those organizations and programs that serve the veteran community may be negatively impacted by the financial strains brought on by the pandemic (Ramchand et al., 2020). While we may not yet fully grasp the severity of the challenges veterans face due to COVID-19, we can be certain that the veteran community will be affected

by the pandemic and will need assistance with not only managing through the pandemic, but also ensuring that they are in the best possible position to thrive post-pandemic.

Student Service Members/Veterans, as a sub-population of the overall veteran community, may also face new and unexpected challenges due to COVID-19. SSM/V that begin at, or return to, community college during the pandemic may find difficulty in enrolling in courses they need, or may experience some trepidation in an online learning environment that so many colleges and universities have implemented. Community colleges are facing myriad uncertainty due to COVID-19, and many have begun the painful process of making across-the-board budgetary cuts due to declining enrollments (Jaschik, 2020). These cuts can affect the number and type of courses available to students, as well as other valuable resources necessary for student success that may be limited for the foreseeable future. Any budgetary cuts or resource limitations will undoubtedly impact all students, especially those that are already disadvantaged and vulnerable, not just SSM/V.

Although there is at present much uncertainty in postsecondary education, America's community colleges may be in a unique position to help with the economic recovery by training displaced workers on new skillsets and helping those most affected by the pandemic prepare for a not yet known future (Deming, 2020). Deming (2020) further argues that in order to do this, community colleges must be properly funded at the state and national levels. Though no one at this point has definitive knowledge of the future post-pandemic, an education can better prepare people to take advantage of whatever the future holds.

What we do not know right now for certain is just how profoundly industries such as those in CTE will be impacted by COVID-19 for the long term. At present, the data appear to be inconsistent in terms of the overall economic impact from the pandemic. Some current economic

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indicators are moving in a positive direction, while others are not. Organizations such as McKinsey & Company, however, are reporting increased economic optimism among business leaders worldwide for the months ahead (FitzGerald et al., 2020). Optimism among leaders is good, but a level of caution should be maintained as things can change quickly in the current environment. A report by the Bureau of Labor Statistics showed that there are several CTE-related industries that are considered essential, even during a pandemic, including communications, critical manufacturing, emergency services, energy, food and agriculture, healthcare, information technology, transportation, and others (Torpey, 2020). These industries are still going to require workers who are trained in the specific skillsets that these jobs require.

No matter what the future holds, logic dictates that the U.S., and indeed the world, will eventually get past this crisis. Future research on the impact that that the COVID-19 pandemic has had on students, CTE, and community colleges would certainly be needed and warranted. In the meantime, postsecondary students should not let the challenges of the COVID-19 pandemic deter them in their educational endeavors. It may require taking a different path for the time being to get there, but it does not need to prevent students from persisting and attaining their educational goals.

Final Summary

As the country works through this period of unknown and turbulent times, one thing that appears clear is the need to continue to have an educated, prepared, and productive workforce. The need for people who are trained in CTE areas, for example, have, in recent months, shown how important and valuable those skills are to our way of life. To many, these skilled and knowledgeable workers have become essential, though those within the realm of CTE have known this all along. As the nation, and indeed the world, faces an uncertain future, 2-year

postsecondary institutions continue to stand ready to train a workforce to meet the nation's challenges head on with affordable and accessible courses, certificates, and degrees that allow for greater economic prosperity and mobility. No matter what the future holds, CTE is going to remain an important and indelible part of the local, state, and national landscape. A significant finding from this study showed the importance of postsecondary CTE credit accumulation as it relates to student persistence and educational attainment.

Military personnel continue to return home from overseas assignments and, whether separating from the military or not, seek out educational programs from which to build a future. Many of these warriors start or reenter this journey at the 2-year public institutional level (Molina, 2014), and many of them struggle with the transition from the military to college to civilian life. Active duty, reserves, National Guard, and veterans, together and separately, have unique challenges as postsecondary learners. Although much work still remains, 2-year public colleges are generally well positioned to receive and serve the needs of the SSM/V community.

Employers understand the value and benefit of including military-trained employees in their organizational structures. Despite the challenges and uncertainty of today's workplace climate, military-trained employees will continue to be a valuable resource to employers because of their valued skills and can-do attitude that accompany many of today's service members. Employers would be wise to promote and increase military personnel hiring practices within their organizations in order to create or sustain a competitive advantage in the marketplace.

There are still many things we do not know about SSM/V, but this study's goal of adding to the extant literature on this important population of postsecondary students was achieved. Though some researchers may strive to find life-altering "a-ha" moments through their scholarly pursuits, or, to use a baseball analogy, "hit one over the fence," oftentimes, real progress is made

not by swinging for the fences, but rather by the consistent base hits. We know a little more about SSM/V and CTE than we did previously, which is a definite base hit, and we will continue to explore, be curious, ask questions, seek answers, and collaborate with like-minded people until we have won the game.

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APPENDIX A

Federal Laws Related to Career & Technical Education

The following are relevant federal laws pertaining to vocational/career and technical education (Gordon, 2014; Imperatore & Hyslop, 2017; O'Banion, 2019):

- Morrill Land-Grant Act, 1862
- Smith-Hughes Act, 1917
- George-Reed Act, 1929
- George-Dean Act, 1937
- Employment and Training Act, 1946
- George-Barden Act, 1946
- Health Amendments Act, 1956
- Manpower Development and Training Act, 1962
- Vocational Education Act, 1963
- Amendments to the Vocational Education Act, 1968, 1972, 1974
- Comprehensive Employment and Training Act, 1973
- Career Education Act, 1974
- Career Education Incentive Act, 1977
- Job Training Partnership Act, 1982
- The Carl D. Perkins Vocational Education Act, 1984
- Amendments to the Perkins Act, 1990 (Perkins II), 1998 (Perkins III), 2006 (Perkins IV), 2018 (Perkins V)
- School-to-Work Opportunities Act, 1994
- Advanced Technical Education-NSF, 1994
- School-to-Work Opportunities Act, 1998
- Workforce Investment Act, 1998
- Trade Adjustment Assistance Community College and Career Training, 2011
- Workforce Innovation and Opportunity Act, 2014

APPENDIX B

CITI Human Subjects Training

Completion Date 17-Sep-2018
Expiration Date 16-Sep-2023
Record ID 28651842

This is to certify that:

Brennan Carr

Has completed the following CITI Program course:

GSEP Education Division (Curriculum Group)
GSEP Education Division - Social-Behavioral-Educational (SBE) (Course Learner Group)
1 - Basic Course (Stage)

Under requirements set by:

Pepperdine University

Collaborative Institutional Training Initiative

Verify at www.citiprogram.org/verify/?w39461e0e-3a78-408e-aa6e-832126d12eb1-28651842

APPENDIX C

Institutional Review Board Approval

PEPPERDINE

NOTICE OF APPROVAL FOR HUMAN RESEARCH

Date: March 30, 2020

Protocol Investigator Name: Brennan Carr

Protocol #: 20-03-1300

Project Title: Retention, Persistence, and Success Among Student Veterans in Community College Career and Technical Education Programs

School: Graduate School of Education and Psychology

Dear Brennan Carr:

Thank you for submitting your application for exempt review to Pepperdine University's Institutional Review Board (IRB). We appreciate the work you have done on your proposal. The IRB has reviewed your submitted IRB application and all ancillary materials. Upon review, the IRB has determined that the above entitled project meets the requirements for exemption under the federal regulations 45 CFR 46.101 that govern the protections of human subjects.

Your research must be conducted according to the proposal that was submitted to the IRB. If changes to the approved protocol occur, a revised protocol must be reviewed and approved by the IRB before implementation. For any proposed changes in your research protocol, please submit an amendment to the IRB. Since your study falls under exemption, there is no requirement for continuing IRB review of your project. Please be aware that changes to your protocol may prevent the research from qualifying for exemption from 45 CFR 46.101 and require submission of a new IRB application or other materials to the IRB.

A goal of the IRB is to prevent negative occurrences during any research study. However, despite the best intent, unforeseen circumstances or events may arise during the research. If an unexpected situation or adverse event happens during your investigation, please notify the IRB as soon as possible. We will ask for a complete written explanation of the event and your written response. Other actions also may be required depending on the nature of the event. Details regarding the timeframe in which adverse events must be reported to the IRB and documenting the adverse event can be found in the *Pepperdine University Protection of Human Participants in Research: Policies and Procedures Manual* at community.pepperdine.edu/irb.

Please refer to the protocol number denoted above in all communication or correspondence related to your application and this approval. Should you have additional questions or require clarification of the contents of this letter, please contact the IRB Office. On behalf of the IRB, I wish you success in this scholarly pursuit.

Sincerely,

Judy Ho, Ph.D., IRB Chair

cc: Mrs. Katy Carr, Assistant Provost for Research

Postsecondary CTE Taxonomy – CIP Codes

Postsecondary taxonomy categories	CIP 2000 Code
Career Education (career/technical education at the subbaccalaureate level)	
Agriculture and natural resources	
Agriculture	01.
Natural resources/conservation	03.
Business management (includes accounting, entrepreneurship, finance management, and management information systems)	52., except 52.04, 52.14, 52.15, 52.18, 52.19
Business support	52.04
Communications and design	
Communications technologies	10.
Design (includes commercial art, fashion design, and interior design)	50.04
Journalism and other communications	09.
Computer and information sciences	11.
Consumer services	
Family and consumer sciences (includes child care, family studies, and nutritional services)	19., except 19.09
Personal and culinary services	12.
Parks, recreation and fitness	31.
Education	13.
Engineering, architecture and science technologies	
Architecture	04.
Engineering	14.
Engineering technologies	15.
Military technologies	29.
Science technologies	41.
Health sciences	51.
Marketing	
Marketing	52.14
Real estate	52.15
Sales and merchandising	52.18, 52.19
Protective services	43.
Public, legal, and social services	
Law/legal studies	22.
Library sciences	25.
Public administration and social service	44.
Theology	39.
Manufacturing, construction, repair, and transportation	
Apparel and textiles	19.09
Construction	46.
Repair	47.
Manufacturing	48.
Transportation	49.

This table was recreated from the Career and Technical Education (CTE) Statistics – Postsecondary Taxonomy website: https://nces.ed.gov/surveys/ctes/tables/postsec_tax.asp

Results of Control Variables by Military Type

Variables	Active Duty Students			Reserve Students			Student Veterans		
	Mean	sd	Sig.	Mean	sd	Sig.	Mean	sd	Sig.
Controls									
Age	23.38	7.51		23.42	8.08		34.44	11.57	***
Female	0.19	--	***	0.21	--	***	0.24	--	***
Race/Ethnicity									
White	0.71	--		0.60	--		0.6	--	
Black	0.10	--		0.15	--		0.2	--	*
Latinx	0.10	--		0.12	--		0.1	--	*
Asian	n/d	--		0.06	--		0.01	--	
Other	0.10	--		0.08	--		0.1	--	
Marital Status									
Single/Divorced/Widowed	0.62	--	**	0.75	--	*	0.52	--	***
Married	0.38	--	***	0.23	--	*	0.40	--	***
Separated	n/d	--		0.02	--		0.08	--	***
Has Dependents	0.33	--		0.27	--		0.48	--	***
Hours Worked per Week	40.62	16.73	***	28.35	18.26	***	23.42	20.52	
First Generation College Student	0.71	--		0.63	--		0.81	--	*
Highest Degree Ever Expected									
Less than a BA	0.19	--		0.19	--		0.38	--	***
BA or Higher	0.81	--		0.81	--		0.62	--	***
Full-time College Attendance	0.33	--	*	0.50	--		0.38	--	***
Adjusted Gross Income	62.44	78.20	*	44.15	32.16		36.42	29.95	
Postsecondary GPA	2.85	0.71		2.89	0.96		3.18	0.76	***
Academic Integration 2004	38.10	45.84	*	59.62	49.05		49.57	41.13	*
Social Integration 2004	20.62	46.54		26.92	45.76		9.368	25.04	**
High School Diploma	0.95	--		1.00	--		0.99	--	
HS GPA (2.5 or higher)	0.79	--		0.81	--		0.63	--	
Parents' Education									
Father (Less than BA)	0.86	--		0.87	--		0.86	--	
Mother (Less than BA)	0.76	--		0.87	--		0.92	--	
Took Distance Ed. Courses	0.29	--	*	0.21	--		0.21	--	**
Has a Disability	0.00	--		0.04	--		0.21	--	**
Took Remedial Courses	0.19	--		0.17	--	*	0.19	--	**
Distance from 1st Institution	195.29	421.54	**	167.60	585.42	***	21.57	41.91	
Number of Inst. Attended	1.14	--		1.06	--		1.05	--	
Location of Institution									
City	0.75	--		0.80	--		0.78	--	
Town	0.20	--		0.12	--		0.16	--	
Rural	0.05	--		0.08	--		0.06	--	
n	21			52			117		

n/d = No Data

* $p < .05$, ** $p < .01$, *** $p < .001$

Full Linear Probability Output

Outcome: Persistence	Model 1	Model 2	Model 3
CTE Credits Earned	0.008***	0.008***	0.007***
	(0.0005)	(0.0005)	(0.0006)
Student Service Member/Veteran	0.02	0.14*	-0.01
	(0.07)	(0.07)	(0.09)
CTE Credits X SSM/V	-0.0008	-0.0008	0.004
	(0.002)	(0.002)	(0.003)
R^2	.08	.13	.13
Outcome: Attained a Degree			
CTE Credits Earned	0.006***	0.006***	0.005***
	(0.0005)	(0.0005)	(0.0006)
Student Service Member/Veteran	-0.08*	0.04	-0.06
	(0.04)	(0.04)	(0.07)
CTE Credits X SSM/V	-0.003*	-0.003	0.002
	(.002)	(0.002)	(0.004)
R^2	.05	.12	.17
Outcome: Attained a Certificate			
CTE Credits Earned	0.003***	0.003***	0.003***
	(0.0004)	(0.0004)	(0.0005)
Student Service Member/Veteran	-0.04	-0.06	-0.02
	(0.04)	(0.04)	(0.03)
CTE Credits X SSM/V	0.005	0.005	-0.002
	(0.003)	(0.003)	(0.002)
R^2	.06	.07	.08
Outcome: Attained Any Award			
CTE Credits Earned	0.009***	0.009***	0.008***
	(0.0005)	(0.0005)	(0.0006)
Student Service Member/Veteran	-0.11*	-0.03	-0.07
	(0.05)	(0.05)	(0.07)
CTE Credits X SSM/V	0.001	0.001	0.0007
	(0.002)	(0.002)	(0.004)
R^2	.11	.15	.19
Outcome: Vertical Transfer			
CTE Credits Earned	-0.002***	-0.002***	-0.003***
	(0.0004)	(0.0004)	(0.0005)
Student Service Member/Veteran	-0.06	0.05	-0.12
	(0.05)	(0.06)	(0.08)
CTE Credits X SSM/V	-0.0001	-0.0001	0.008*
	(0.001)	(0.001)	(0.004)
R^2	.01	.08	.17
Demographic Variables	No	Yes	Yes
Academic Characteristic Variables	No	No	Yes
Institutional Factor Variables	No	No	Yes
n	4930	4930	3440

$* p < .05, ** p < .01, *** p < .001$

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