ABSTRACT

SITZES, JANICE DAWN. Enabling Persistence of Veteran Students at North Carolina Community Colleges through Institutional Support Programs and Policies. (Under the direction of Dr. Duane Akroyd.)

Over two million service men and women, returning from the wars in Iraq and Afghanistan, will take advantage of the educational benefits of the Post-9/11 GI Bill and will enroll in community colleges. Despite over 70 years of education benefits for U.S. veterans, there has been little research into the availability and effectiveness of institutional support programs and policies on U.S. college campuses, especially at the community college level which historically has had attrition challenges.

This study examined the relationship between institutional support mechanisms and veteran student persistence at North Carolina community colleges. This non-experimental research used a cross-sectional predictive design that utilized two sets of surveys to gather information from college administrators and veteran students. Twenty-five of the 58 North Carolina community colleges agreed to participate in the study. Administrators from 13 of the participating colleges completed surveys. Seventeen of the participating colleges provided lists of veteran students for a total of 2,860 veteran students. The researcher received 517 student surveys, of which 348 were included for analysis. Data from the administrators’ survey were analyzed with descriptive statistics to ascertain the community colleges’ current and planned services in support of their veteran student populations. Data from the students’ survey were analyzed with logistic regression to determine the predictive ability, if any, of independent academic, background, environmental, and institutional variables on veteran students’ intent to persist.
Analysis of the 19 independent variables that comprised the study’s original model revealed a significant relationship between intent to persist and family and friends support, counseling and psychological services, and peer mentoring. Subsequent analysis of a revised model with eight additional variables confirmed the significance of family and friends support and counseling and psychological services, and also found financial aid/tuition assistance counseling, child care, and veteran recognition activities to be statistically significant. This study did not find statistical significance for institutional support programs and services that would connect veteran students with each other—possibly due to the lack of availability of these programs and services on the campuses of study participants.

Funding their education is a primary concern of veteran students—the two highest rated institutional support services, in terms of both importance and frequency of use, were financial aid/tuition assistance counseling and VA education benefits counseling; financial aid/tuition assistance counseling was also the strongest predictor of intent to persist. College administrators seem to be aware of the importance of these issues—they indicated that the three most frequently used programs and services are VA education benefits counseling, financial aid counseling, and academic advising; in addition, they indicated that the three most pressing issues that affect veteran students’ educational progress understanding of VA educational benefits, academic-related stress, and financial issues. However there seems to be a disconnect between awareness and action.

The administrators’ survey revealed that there is not yet widespread implementation of initiatives in support of veteran students and that in many areas they are falling behind national averages. Seventy-seven percent of the responding colleges offer programs and services specifically designed for veteran students. The most-offered service is the second-
most important service to veteran students—VA education benefits counseling; however, only 54 percent of the responding colleges provide this service. Only 54 percent indicated they provide any type of social support services; and only 54 percent identified veteran student retention/degree or certificate completion as a priority. At the time of this study, the North Carolina Community College System had neither records of nor tracking of its veteran student population at the system level. The findings confirmed North Carolina community colleges’ oversight of their veteran student population.
Enabling Persistence of Veteran Students at North Carolina Community Colleges through Institutional Support Programs and Policies

by
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A dissertation submitted to the Graduate Faculty of North Carolina State University in partial fulfillment of the requirements for the Degree of Doctor of Education Higher Education Administration Raleigh, North Carolina

2015

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DEDICATION

To my mother, Wendy Idelson Levine, my most ardent supporter for the last 53 years. None of what I have accomplished and achieved would have been possible without her unwavering love and support. Ek is lief vir jou.
BIography

Janice Dawn Sitzes was born in Queens, New York and raised on Long Island, New York. After graduating from Oceanside High School in 1980, she attended Case Western Reserve University in Cleveland, Ohio where she obtained her Bachelor of Science degree in Management in 1984. Her undergraduate studies also included a summer semester at Trinity Hall College at Cambridge University in England. Janice completed her Master of Business Administration in Marketing and International Business at the Leonard N. Stern School of Business at New York University in 1992. While pursuing her MBA, she spent a semester studying at the Australia Graduate School of Management at the University of New South Wales in Sydney, Australia.

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Janice moved to North Carolina in 1997, where she continued her marketing career. She joined the Office of Professional Development, part of the McKimmon Center for Extension and Continuing Education, at North Carolina State University in 2003; she currently holds the position of Assistant Director, Marketing.
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CHAPTER 1: INTRODUCTION

Over two million service men and women will be returning from the wars in Iraq and Afghanistan and transitioning back to civilian life (American Council on Education, 2009; Cook & Kim, 2009; McBain, Kim, Cook, & Snead, 2012). The number of returning military personnel is larger than the populations of 15 U.S. states (U.S. Census Bureau, 2010)! To facilitate their re-introduction to mainstream America, many veterans will need to acquire new skills, knowledge, and credentials.

Veterans without a college degree face even more daunting barriers given that the unemployment rate for high school graduates is twice that of college graduates (Lang & Powers, 2011), and by 2018 nearly two-thirds of all American jobs will require a postsecondary degree or certificate (American Association of Community Colleges, 2012). The benefits of a college education can be further quantified in dollars and cents—median earnings for individuals aged 25-34 who worked full-time, full-year in 2011 was $29,950 for a high school graduate, $37,030 for individuals with an associate degree, and $44,970 for individuals with a bachelor degree (Aud, Wilkinson-Flicker, Kristapovich, Rathbun, Wang, & Zhang, 2013).

These returning service men and women, taking advantage of the Post-9/11 GI Bill, will look to postsecondary institutions to provide them with the skills, knowledge, and credentials needed to successfully transition to civilian life. The need to prepare for the influx of Iraqi and Afghani veterans to college campuses has been receiving widespread attention by higher education institutions, with many initiating new programs and services
and/or expanding existing ones to serve this student population (American Council on Education, 2009; McBain et al., 2012; O’Herrin, 2011; Smith-Osborne, 2009).

150 Years of the Higher Education-Military Connection

The Early Years

American higher education and the military have been connected since the 1862 passage of the Morrill Act, which not only established land grant institutions but also mandated that military training be part of their curriculum (Abrams, 1989; Alexander & Thelin, 2013). Subsequent legislation—the National Defense Acts (NDA) of 1916 and 1920, and the 1933 amendment to the 1916 NDA (which established the Reserve Officers’ Training Corps, or ROTC, and the National Guard)—enhanced the connection (Abrams, 1989; Hacker, 1993).

World War II

The relationship was strengthened after World War II when, recognizing the need to provide returning veterans with programs and services to help them readjust to civilian life, President Franklin Roosevelt signed into effect the Servicemen’s Readjustment Act, or GI Bill, on June 22, 1944. By 1950, two million of the eligible 14 million World War II veterans had taken advantage of their benefits for postsecondary education afforded by this legislation (Rumann & Hamrick, 2010); by the time the GI Bill ended on July 25, 1956, 7.8 million of 16 million World War II Veterans had received training and education (McKenna, 2009; U.S. Department of Veterans Affairs, 2013). By empowering veterans to further their education than would have been possible otherwise, this legislation also helped expand the
middle class and democratize higher education (Bound & Turner, 2002; O’Herrin, 2011; 
(Rumann, Rivera, & Hernandez, 2011; Smith-Osborne, 2009). Between World War II and 
the start of the Vietnam War, veterans sought out academic degrees; those who took 
advantage of the GI Bill’s educational benefits enrolled in two-year institutions and 
vocational programs more than other undergraduate college programs (Caspers & Ackerman, 
2013).

The Vietnam Era

The Vietnam-era GI Bill (originally known as the Post-Korean GI Bill) was in effect 
from 1966-1976 (Caspers & Ackerman, 2013); educational stipends were increased in 1972 
through the Readjustment Assistance Act (Angrist, 1993). Vietnam veterans tended to prefer 
occupational and vocational education and pursued those choices at community colleges 
(Caspers & Ackerman, 2013). The educational benefits afforded by the GI Bill enabled more 
than half of all Vietnam veterans to enroll in postsecondary education and consequently 
realize higher earnings, on average, than veterans who did not return to school (Angrist, 
1993). The individual benefits afforded by veterans’ educational benefits were quantified in 
Angrist’s (1990, 1993) study of educational attainment and earnings of Vietnam era veterans 
and those who served in the first years of the all-volunteer forces (AVF) (veterans who 
served between August 1964 and September 1980). Angrist found that benefit users obtained 
an additional 1.4 years of schooling compared to non-users; this additional educational 
attainment translated into higher earnings of approximately six percent.
Post-9/11

Educational benefits were expanded to a new generation of veterans through the Post-9/11 Veterans Assistance Act of 2008 (also known as the Post-9/11 GI Bill or the new GI Bill). Signed into law on June 30, 2008 with its provisions going into effect on August 1, 2009, the Post-9/11 GI Bill offers increased support for veterans’ educational expenses, including tuition, fees, and housing and book stipends to military service members and veterans with at least 90 days of active duty since September 10, 2001 (Caspers & Ackerman, 2013; Cook & Kim, 2009; Elliott, Gonzalez, & Larsen, 2011). Some of the provisions of the Post-9/11 GI Bill were revised in 2011—effective October 1, 2011, educational benefits may be used for non-degree programs (the original provisions stipulated pursuit of a college degree). The updates also eliminate the cap on in-state tuition and fees but are stricter about out-of-state fees, with the student responsible for any amount over the in-state rate (previously the out-of-state premium was partially covered) (Caspers & Ackerman, 2013).

The government’s promise of support for postsecondary education and assistance in returning to civilian life has been a valuable recruiting tool, incenting many to enter (or re-enter) into service and is expected to precipitate a significant increase in postsecondary education enrollments (Ackerman, DiRamio, & Mitchell, 2009; American Council on Education, 2009; Angrist, 1993; Carnevale, 2006; Caspers & Ackerman, 2013; Cook & Kim, 2009; Fernandez, 1980; Johnson, 2009; McBain et al., 2012; Mikelson & Saunders, 2013; Radford, Wun, & Weko, 2009; Rumann & Hamrick, 2009; Simon, Negrusa, & Warner,
2010; Smith-Osborne, 2009). During the first year of the Post-9/11 GI Bill’s implementation, more than half a million veterans applied for certificates of eligibility and more than 300,000 veterans and their family members used the Bill to attend classes (Steele, Salcedo, & Coley 2010); in the fall 2012 semester, 480,000 veteran students were enrolled (Sander, 2013).

The U.S. Department of Veterans Affairs (VA) expected to spend nearly $9 billion in 2012 on educational benefits for nearly 600,000 veterans, service members, and other beneficiaries through the Post-9/11 GI Bill (U.S. Senate, Committee on Veterans’ Affairs, 2012). According to M. Wells with the National Center for Veterans Analysis and Statistics at the Department of Veterans Affairs, Office of Policy and Planning (personal communication, November 16, 2012), between August 1, 2009 and January 23, 2012, a total of 817,521 veterans, active duty military personnel, or their dependents took advantage of Post-9/11 GI Bill training benefits at more than 6,000 institutions.

Among those institutions serving the educational needs of veterans and soldiers are American community colleges—long viewed as gateways to higher education and a better life. Forty-three percent of students with military experience attend community colleges (Radford, 2009). American community colleges—with their fundamental mission of ensuring that all those who seek a college education can attain one and responsiveness to constituent needs—are well positioned to meet the needs of the military student population and are an ideal venue for returning veterans to enroll as students (Craig & Ward, 2008; Rumann et al., 2011). As cited by Caspers & Ackerman (2013), during fiscal year 2010
approximately 37 percent of Post-9/11 GI Bill beneficiaries pursued degrees while attending community colleges.

**Community Colleges and Veterans**

In 2010, of the 15 institutions that enrolled more than 1,000 students using Post-9/11 GI Bill benefits, five were community colleges (Sewall, 2010). As noted by Colonel Archie Bates III, a White House fellow in the Office of the First Lady, during the February 2013 meeting of the American Association of Community Colleges to address how community colleges can better serve veterans, community colleges are appealing to many veterans because they tend to serve older, working students with families (Dembicki, 2013).

The California Community College System enrolls the largest number of veterans in the nation—approximately 80 percent of California’s returning veterans who utilize their educational benefits at one of the state’s public higher education institutions, do so at a California community college (California Community Colleges Chancellor’s Office, 2011). Between August 1, 2009 and January 23, 2012, a total of 97,954 veterans, active duty military personnel, or their dependents used Post-9/11 GI Bill training benefits at California institutions (M. Wells, personal communication, November 16, 2012). In 2010-11, more than 44,000 veterans utilized education benefits at a California community college (California Community Colleges Chancellor’s Office, 2012).

North Carolina community colleges also enroll a high percentage of veterans returning to school. Of the 20,712 veterans, active duty military personnel, or their dependents who used Post-9/11 GI Bill training benefits at North Carolina institutions from
August 1, 2009 through January 23, 2012, 8,255 did so at 55 of the 58 North Carolina community colleges (the three remaining community colleges each had less than 10 enrollments) (M. Wells, personal communication, November 16, 2012).

Dramatic growth of veteran student populations at community colleges will most likely increase further as the wars in Iraq and Afghanistan continue to wind down; over two million military men and women will be returning, many of whom will require additional training and education to return to civilian life. As enrollments of this population escalate, increasing attention must be paid to the issue of persistence at community colleges.

Success in education is one measure of a veteran’s positive transition to civilian life, and is a means to an improved quality of life and positioning within their community (Smith-Osborne, 2009). However, transitioning to college is among the most difficult adjustments that veterans will make when returning from wartime service (DiRamio et al., 2008). It is imperative that community colleges not only provide access to educational opportunities, but that they also put in place programs, policies, and procedures to ensure that veterans accomplish their educational goals, thereby facilitating acclimation to civilian life and attainment of a better future.

In a recent survey conducted by the American Council on Education, 85 percent of participating community colleges indicated that they have increased their focus on meeting the needs of their veteran students since 9/11 (McBain et al., 2012). Community colleges must identify barriers to completion and then implement programs, policies, and procedures
to overcome these obstacles, and thereby increase enrollments, improve retention, and increase completion rates.

**Statement of the Problem**

The community college system, established to provide a quality higher education to all who seek it, and regarded as a gateway to higher education for nontraditional students, is well positioned to meet the needs of a specific subpopulation of nontraditional students—veteran students. Despite the fact that nontraditional students have continued to comprise an increasingly larger percentage of undergraduate enrollments (Carnegie Council on Policy Studies in Higher Education, 1980), and have a higher rate of attrition than traditional students (Johnson, 1991), little research has been devoted exclusively to the persistence of nontraditional students in general. There is a paucity of studies of nontraditional students guided by theory; the few that do exist, compare nontraditional with traditional students and use theory that was developed for traditional students. Persistence studies of nontraditional students, particularly at community colleges, has been predominantly descriptive and lacking a theoretical framework (Bean & Metzner, 1985; Metzner & Bean, 1987).

Even less frequent are studies dedicated to a specific subpopulation of nontraditional students—veteran students—who are expected to enroll in increasing numbers with the winding down of the wars in Iraq and Afghanistan and the educational benefits provided by the Post-9/11 GI Bill (DiRamio, Ackerman, & Mitchell, 2008; Livingston, Havice, Cawthon, & Fleming, 2011; McBain et al., 2012; Rumann et al., 2011). Most of these returning
soldiers will be enrolling in open enrollment institutions such as community colleges (Fehr-Snyder, 2010; Field, 2008; Sokolow & Lewis, 2008).

According to Patty Murray, Chairman of the Senate Committee on Veterans’ Affairs, in 2012 the U.S. Department of Veterans Affairs (VA) was expected to spend nearly $9 billion on educational benefits offered through the Post-9/11 GI Bill (U.S. Senate, Committee on Veterans' Affairs, 2012) for nearly 600,000 veterans, service members, and other beneficiaries. In all, the Post-9/11 GI Bill has invested over $30 billion in more than 1 million beneficiaries (Cate, 2014). The significance of these figures—in terms of enrollments and taxpayer dollars—has created increased interest in the experiences and outcomes of veteran students, with calls for accountability reaching as far as the Executive Office.

On April 27, 2012 President Obama signed an executive order mandating (among other stipulations) that any institution that receives veteran education benefits must provide outcomes data (Servicemembers Opportunity Colleges, 2012; The White House, 2012). However, databases that would facilitate the tracking of veteran student outcomes are not available—there are no accurate counts on the number of veterans enrolled in U.S. postsecondary institutions, there is limited information on the success rates of veteran students, there is a lack of knowledge of the factors that affect the success of veteran students and institutional practices likely to enhance their persistence (Servicemembers Opportunity Colleges, 2012; NASPA Research and Policy Institute & InsideTrack, 2013). As Hunter Riley, Director of Programs for the Pat Tillman Foundation, notes,
Measuring the progress of student veterans toward their intended degrees is a vital step in assessing the success of the institutions…we can showcase the value of education as one of the most transformational steps for military veterans in transitioning back into the civilian world and finding employment. (Lang & Powers, 2011, p. 3)

Despite the significance of the situation, there is a dearth of accurate, reliable data on the academic outcomes of veteran students. In addition, the limited research often presents conflicting reports. On the one hand, the literature reports that a majority of the soldier-to-student transitions end in failure. According to Ginder-Vogel (2012), an analysis by the U.S. Senate, Committee on Health, Education, and Labor and Pensions showed that 88 percent of veterans attending college drop out during their first year and only three percent graduate; and the National Center for Education Statistics, managed by the U.S. Department of Education, claimed that the six-year veteran student completion rate was 11.2 percent for associate degrees and 9.9 percent for baccalaureate degrees (Radford, Wun, & Weko, 2009).

On the other hand, several studies report that student veteran completion rates are high. The Department of Veteran Affairs’ 2010 National Survey of Veterans claimed a postsecondary completion rate as high as 68 percent (Westat, 2010); the U.S. Census Bureau’s 2012 American Community Survey indicated that 64 percent of veterans have completed at least some college (U.S. Census Bureau, 2012); and the Million Records Project—a national study undertaken by Student Veterans of America, the National Student Clearinghouse, and the Department of Veteran Affairs’ Veterans Benefits Administration—reported that 51.7
percent of veterans in their sample earned a postsecondary degree or certificate, and that many went on to earn subsequent higher degrees (Cate, 2014).

Despite the incongruous nature of the data, Cook and Kim (2009) reported that 75 percent of the postsecondary institutions that participated in their study indicated that student retention and persistence towards degree completion were top, pressing issues facing veteran students. This issue is particularly relevant to the state of North Carolina, home to 58 community colleges and eight military bases. Veterans represent a growing population on community college campuses, yet there have been limited investigations into the attrition of veteran students in these settings (Tinto, 1982). The few studies that do exist were predominantly conducted in single institutional settings and lacked an appropriate, dedicated theoretical framework. Quantitative studies are rare and very few studies have been conducted of “contemporary veterans”—military personnel who have served since 9/11 in Iraq and Afghanistan (i.e., Operation Noble Eagle, Operation Enduring Freedom, and Operation Iraqi Freedom, among other conflicts) and are now retired from active duty.

The limited research that is available suggests that veteran students may have trouble connecting with their non-military counterparts and could be at risk for social isolation (Mikelson & Saunders, 2013; Whiteman, Barry, Mroczek, & MacDermid Wadsworth, 2013). Bean (1985) posited that feeling that one does not fit in results in cognitive dissonance which could provide the initiative to dropout. Veteran students often feel disconnected in higher education and desire interactions with other veterans (DiRamio et al., 2008; Livingston et al., 2011; Rumann & Hamrick, 2010; Strickley, 2009; Summerlot, Green, & Parker, 2009).
Numerous studies document conflicts between veteran students and their civilian counterparts, as well as faculty members (DiRamio et al., 2008; Elliott et al., 2011; Livingston et al., 2011; Persky & Oliver, 2011; Rumann & Hamrick, 2010). A student’s interactions with other students, faculty, and staff must be positive and create an environment where the student feels a sense of belonging, appreciation, and security. The quality of interpersonal relationships and instructor contacts have an indirect effect on students’ feelings of self-esteem, alienation, and stress, and a direct effect on psychological outcomes and satisfaction levels; feelings of isolation, loneliness, alienation, and stress are commonly associated with decisions to drop out (Johnson, 1991). Research has noted that veteran students utilize various academic and social support systems in order to increase their persistence in colleges and universities (Dolan, 2008; Redden, 2008; Teachman, 2005); Weber (2012) found, in a recent study at Arizona State University, that campuses can improve the likelihood of student veteran retention by focusing on improving social support and cultural congruity; however there is a gap in the literature as to how social support, in the form of institutional programs, facilities, and services, correlates with the persistence of veteran students at community colleges.

**Persistence of Nontraditional Students**

**Bean and Metzner (1985).**

In an extensive literature review of several hundred studies, Bean and Metzner (1985) found only four studies that specifically addressed attrition of part-time commuter students, and only five studies that included separate analyses of older commuter students. Metzner
and Bean’s (1987) study of nontraditional freshmen at a primarily commuter university was the first such study to be guided by a conceptual model dedicated to explaining attrition of nontraditional students. Their theory of nontraditional student attrition differs from models of traditional student attrition (such as those put forth by Spady, Tinto, and Pascarella) in that they believed nontraditional students are more affected by their external environment and the institution’s academic offerings than they are by social integration variables. Nontraditional students are generally commuters who spend very little time on campus and therefore experience lessened socialization opportunities, in terms of both duration and intensity with faculty and peers. To reflect the differences in influential factors, their model omits social integration as a primary component but incorporates two environmental variable categories—college environment and external environment. Drawing on Bean’s (1980, 1982, 1985) findings that intent to leave was the most powerful predictor of dropout at a Midwestern land grant university, their model emphasizes psychological processes—namely intent—as a determinant of a student’s decision to persist. Their beliefs were affirmed when their study found that the best predictors of dropout were GPA and intent to leave. While their model is monumental in terms of being the first model to focus exclusively on nontraditional students, they did not test their model with data from a community college or older nontraditional students. Additionally, very little research is devoted to assessing Bean and Metzner’s model with community college data or advancing a dedicated community college outcome model.

Johnson (1991) formulated a conceptual model of nontraditional student attrition in postsecondary vocational programs. His model, based on the work of Bean and Metzner (1985), Pascarella, Duby, and Iverson (1983), Spady (1970, 1971), and Tinto (1975), contained four primary sets of variables—background characteristics, social/psychological integration, academic/institutional integration, and environmental mediating factors—with expanded variables of interest to accommodate the new subgroups and educational settings under consideration. This was only an initial conceptualization and lacked empirical evidence; Johnson did not test the model to verify the importance and statistical quality of the included variables.


Stahl and Pavel (1992), finding a lack of studies to validate Bean and Metzner’s model, used structural equation modeling to assess the model with data from a large urban community college. They determined that Bean and Metzner’s model was a weak fit and subsequently used exploratory factor analysis to develop a new model, the Community College Retention Model with 22 variables.

Stahl and Pavel’s model retained many of the variables proposed by Bean and Metzner, but in different associations or groupings. They chose to focus on variables that would help explain the dropout decision but could also be influenced by the college in efforts to increase persistence. As such, three background variables—age, ethnicity/race, and gender—were omitted seeing they are attributes that cannot be affected by interaction with
the college environment. Additional constructs were incorporated—academic advisement, absenteeism, course availability, outside encouragement, utility, goal commitment, and stress. Their computer program (LISREL, Linear Structural RELationships) helped to identify ten additional relationships whose incorporation improved the chi square/degrees of freedom ratio.

This model was tested with their community college data, as well as two gender-specific student subgroups; while their overall goodness-of-fit measures indicated that the model was plausible for explaining retention for both genders, it appeared to be stronger for male students. Although the model is comprehensive with 22 measurement variables, not all were significant or indicated reasonable influence. Boyles (2000) noted some additional faults in Stahl and Pavel’s analyses: Stahl and Pavel dropped Bean and Metzner’s ethnicity and social integration variables before examining the model’s fit; just because Bean and Metzner’s model did not explain persistence at the large urban community college being studied by Stahl and Pavel, that does not make it an invalid model for all community colleges; citing Kelloway (1998), the use of the chi square/df ratio in evaluating Bean and Metzner’s model was unwise due to the subjective nature of the statistic’s interpretation (based on the researcher’s experience); and the cross-validation in their study is questionable seeing Stahl and Pavel used their existing data set to not only develop their model, but to test it as well. Structural equation modeling (SEM) literature (Kelloway, 1998; Maruyama, 1998; Mueller, 1997) recommends that when a model is substantially altered, a new data set—not the one used to generate the model—should be used for cross-validation purposes.
There were some additional limitations that made Stahl and Pavel’s model an unattractive model for this proposed study. Stahl and Pavel’s model was neither developed nor tested to examine the subpopulation of veteran students at community colleges and these students’ unique traits and circumstances. Their sampling included a number of biases: the sample included only those students who were present in class the day the survey was administered and included only White, mainly traditional-aged students (Barnhart, 2011). Their methodology of dropping those variables over which the college has no control from the model is not sound logic; although the college cannot control for a student’s age, gender, or ethnicity, they can address those variables through actions on their part—so the college does, in fact, have some control over those variables’ effect on persistence.

Additionally, there is a scarcity of documented replication and validation with only two references to Stahl and Pavel’s work. Sandiford and Jackson (2003) combined Tinto’s (1975) Student Integration Model, Bean’s Student Attrition Model, Bean and Metzner’s (1985) Nontraditional Undergraduate Model, and Stahl and Pavel’s (1992) Community College Retention Model to examine the relationship among academic, socioeconomic, and motivational variables to attrition of 190 first-semester students in a community college nursing program. Their correlational study used a discriminant analysis procedure and five independent variables—pre-semester GPA, English proficiency level, achievement tendency, hours planned to work, and difficulty in educational financing—to predict the dependent variable, the final course outcome of pass or no pass. They found that college language level assessment and pre-semester GPA were significant predictors and inversely related to final
course outcome (pass or no pass) and that the three nonacademic variables of hours planned to work, financial difficulty attending college, and achievement tendency were not significant predictors. The second citing of Stahl and Pavel’s work was Cunningham’s (2010) study of factors associated with persistence of students receiving learning support in a two-year college. In that case, the study was guided by Bean and Metzner’s (1985) model but incorporated elements of Stahl and Pavel’s Community College Retention Model as the operational model; Cunningham also adapted Stahl and Pavel’s Community College Retention Model Questionnaire to serve as her study’s instrument.

The greatest objection to the use of this model for the proposed research is the belief by Stahl and Pavel that nontraditional, two-year college students do not make persistence decisions based on the fit of the college. The purpose of the current study was to examine the relationship of institutional support mechanisms and veteran student persistence; the relationship between the institution’s supply of support mechanisms and veteran students’ demand of support mechanisms can be considered a measure of institutional fit. Stahl and Pavel’s tenet in their model seems to be contradictory to the model needed to study institutional support mechanisms and veteran student persistence.

Their model, despite its shortcomings, did advance the work of Bean and Metzner by recognizing the need to not only explain the attrition of nontraditional students, but to address nontraditional students within a community college setting; however, as noted earlier, their model has not been replicated or tested. Theirs seems to be the first of only two models developed specifically for community colleges. The second model, Cunningham’s
Two-Year College Learning Support Persistence Model, was also developed for community college students but for a very specific sub-population.

**Cunningham (2010).**

Cunningham (2010) studied 481 students enrolled in learning support, diploma, and degree courses at a Southeastern community college to identify factors associated with persistence of students receiving learning support. The study was guided by Bean and Metzner’s (1985) Conceptual Model of Nontraditional Student Attrition but also incorporated findings from Stahl and Pavel’s (1992) Community College Retention Model by omitting the social integration construct. The resultant framework, the Two-Year College Learning Support Persistence Model, examined the correlation between academic and environmental variables on intent to persist, and the influence of biographic and demographic variables on the academic and environmental variables. Cunningham adapted Stahl and Pavel’s Community College Persistence Model Questionnaire to devise her study’s survey instrument, the Two-Year College Learning Support Persistence Questionnaire. Her results showed that for learning support students, the academic variables of class attendance, study habits, and admittance status were important determinants of persistence, with class attendance the most significant; and the environmental variables of outside encouragement and opportunity to transfer were significant predictors of persistence. The researcher also found that the biographic and demographic variables of gender and ethnicity were influential on academic and environmental variables.
Cunningham’s findings did not fully support Bean and Metzner’s model. In Bean and Metzner’s model there is a compensation interaction effect between environmental and academic variables, with environmental variables being more influential than academic variables; the findings from Cunningham’s study suggested that some academic variables were more important than environmental variables. Additionally, of the 475 respondents for whom age was provided, 143 (30 percent) were age 18-20; an additional 149 (31 percent) were age 21-26. Since a nontraditional student is defined as someone who is over 24, more than half of the study’s participants were traditional aged students (an exact percentage cannot be calculated since Cunningham’s age categories do not align with the cut-off for traditional/nontraditional). Despite Cunningham’s claim that her study extended Bean and Metzner’s model to learning support students in a community college setting, the model does not seem to be a good fit.

One final shortcoming is that Cunningham’s study employed a convenience, non-random sample of students at one institution, thereby limiting the generalizability of her findings.

**Recent (21st century) studies utilizing earlier models.**

Although there does not appear to be any newly developed models to explain persistence of nontraditional students, there have been recent studies that have utilized earlier frameworks.
Boyles (2000).

Boyles (2000) sought to propose and examine a theoretical model of persistence that would be appropriate for the general population of community colleges. Using a sample from the Beginning Postsecondary Students (BPS) data set of first-time students who enrolled in community colleges in 1990, the researcher compared the use of a framework with a universal model versus group-sensitive models (based on gender and race). The model included variables from Bean and Metzner’s model (one of the study’s shortcomings is that the BPS database did not contain measurements for eight variables used in Bean and Metzner’s model), along with three variables—institutional size, academic integration, and academic self-confidence—that had been found to be predictive of persistence among community college students. The model had three sets of variables—background and defining variables, academic variables, and environmental variables—plus seven singular variables—academic self-confidence, academic integration, academic outcome (GPA), institutional size, social integration, psychological outcomes (utility), and persistence. The full sample was examined utilizing the universal model; the sample was then sub-divided into four groups (based on gender and race) and analyzed using group-sensitive models.

The analysis provided mixed, inconclusive findings. While a greater number of nonzero parameter estimates and GFI fit index indicated that the universal model provided a better fit, four other indicators implied that the framework with group-sensitive models provided a better fit. However, negative confirmatory factor analysis also suggested that the
framework with group-sensitive models did not adequately fit the sample and that improvements could still be made.

*Byun (2000).*

Byun’s (2000) secondary data analysis of three data sets appears to be the first multi-institutional, longitudinal study of two-year colleges to utilize Bean and Metzner’s (1985) model of nontraditional student attrition. Using data from the 1989-90 Beginning Postsecondary Students (BPS) longitudinal study and two follow-up studies, BPS 90/92 and BPS 90/94, the researcher analyzed 268 first-time, associate degree-seeking students aged 22 and older on four measures of persistence—short-term institutional persistence, short-term system persistence, long-term institutional persistence, and long-term system persistence. Utilizing 1989-90 as the base year, short-term persistence was defined as enrollment (in the same or another postsecondary institution) the following fall (September 1990); long-term persistence was defined as enrollment (in the same or another postsecondary institution) or degree attainment by the second follow-up study (BPS 90/94). Bean and Metzner’s model was modified for this study through the omission of certain variables (residence, educational goals, outside encouragement, opportunity to transfer, utility, stress, absenteeism, major certainty, and course availability) and the inclusion of additional variables (socioeconomic status and type of high school diploma in the background variables category; remedial instructions received and perceived intellectual ability in the academic variables category; and employment plan in the environmental variables category).
The results indicated a difference in predictor variables for short-term versus long-term measures of persistence (with a difference in rank-ordering within each of the two short-term measures and each of the two long-term measures). For short-term measures, the top predictors of persistence included intent to persist, GPA, employment plan, and academic involvement; for long-term measures, the top predictors of persistence were financial need, enrollment status, type of high school diploma, GPA, and goal commitment.

The researcher came to five conclusions regarding the components of Bean and Metzner’s model: background variables showed greater predictive ability for long-term persistence measures than for short-term measures; the effects of environmental variables were almost exclusively indirect (rather than direct as proposed by Bean and Metzner) for short-term persistence measures and stronger than expected for long-term persistence measures; GPA had a strong direct positive effect on all four measures of persistence (consistent with Bean and Metzner’s model); goal commitment had a direct positive effect on the long-term persistence measures and proved to be the strongest predictor of long-term system persistence; and while intent to persist was important in predicting short-term persistence, it was negligible in predicting long-term persistence. Byun hypothesized that the lack of fit in Bean and Metzner’s model could be attributed to her study’s omission of several variables in the psychological outcomes category and/or the vulnerability of Bean and Metzner’s model to the definition of persistence in terms of timeframe (short-term versus long-term) and how it is operationalized (i.e., in her study, intent to persist was defined as
"plan to be enrolled in the same program currently enrolled in next year" (2000, p. 135) which meant that students who intended to transfer would be considered non-persisters).

Based on her findings, Byun proposed that Bean and Metzner’s model be re-conceptualized based on how a particular study defines persistence. When persistence is defined on a short-term basis, the effects of both background variables and environmental variables should be posited as indirect rather than direct (as put forth by Bean and Metzner); yet when persistence is defined on a long-term basis, the effects of background variables should be seen as direct (as claimed by Bean and Metzner) and the effects of environmental variables should be determined by further research. Both GPA and psychological outcomes should remain as direct effect variables, regardless of how persistence is defined.


Jones-Ford (2002) adapted Metzner and Bean’s (1987) model to examine factors that could affect persistence among nontraditional age, female students at Fayetteville Technical Community College in North Carolina, and whether there was a difference between White persisters and those of color. Her sample included 202 first-time, degree-seeking female community college students who were at least 30 years old; and had enrolled for the first time during the fall 1999 semester and had persisted to the fall 2002 semester. Her findings indicated 10 statistically significant differences between White students and students of color: marital status, amount of time spent studying, availability of courses, frequency of meetings with instructors and academic advisors, institutional commitment, employment status, conflict between home and schedules, knowing how to get a tutor, how to get financial
aid, and interest expressed by faculty and staff. There are two shortcomings to her research that limit the generalizability of her findings—her methodology introduced an element of bias seeing results were based on responses from persisters only; the researcher did not receive any useable surveys from non-persisters, whose responses could be significantly different and which resulted in a re-focusing of the study. Additionally, data for academic performance, often found to be significant in persistence research, was inaccessible.

**Butters (2003).**

Butters (2003) used a mixed methods approach and Bean and Metzner’s (1985) model to examine retention issues of second-year nursing students at six Massachusetts community colleges. The researcher sought to uncover which construct of Bean and Metzner’s model—environmental or social integration—was more predictive of persistence; which variables—academic, social integration, environmental, and background/defining—students identified as affecting persistence decisions; and whether there were differences between White and minority students. Her findings, based on 268 returned surveys and six interviews with minority students, confirmed the usefulness of Bean and Metzner’s model for predicting persistence of nursing students; both the academic and environmental scales proved significant in distinguishing between students who stopped out and those who persisted; the social integration and background/defining scales were not significant. Some background demographics of her respondents are worth noting. Not all of her participants were nontraditional in terms of age—participants ranged in age from 20 to 56, with a mean age of 33.3 (nontraditional students are considered older than 24). Not all of her participants
were first-time students—58 held associate’s degree, 55 held bachelor’s degrees, 124 held CAN (certified nursing assistant) certifications, and 41 held LPN (licensed practical nurse) certifications.

Sandiford and Jackson (2003).

Sandiford and Jackson (2003) used a theoretical framework that combined Tinto’s (1975) Student Integration Model, Bean’s Student Attrition Model, Bean and Metzner’s (1985) Nontraditional Undergraduate Model, and Stahl and Pavel’s (1992) Community College Retention Model to examine the relationship among academic, socioeconomic, and motivational variables to attrition of 190 first-semester students in a community college nursing program. Their correlational study used a discriminant analysis procedure and five independent variables—pre-semester GPA, English proficiency level, achievement tendency, hours planned to work, and difficulty in educational financing—to predict the dependent variable, the final course outcome of pass or no pass. They found that college language level assessment and pre-semester GPA were significant predictors and inversely related to final course outcome (pass or no pass) and that the three nonacademic variables of hours planned to work, financial difficulty attending college, and achievement tendency were not significant predictors. Despite the fact that the researchers’ framework included four persistence models, three of which emphasize the significance of intent as a predictor of persistence, this study looked at persistence only from an academic success perspective; its variables measured the likelihood of academic success (passing) which in turn would determine persistence.

In order to make the most effective use of limited resources, Abbott (2004) sought to identify which student support services (SSS) were associated with persistence and achievement (as measured by GPA) of students at New Mexico Junior College. SSS is a federally-funded TRIO program whose goals are to increase the retention, graduation, and transfer rates of low-income, first generation, and/or disabled students. The study’s independent variables were nine SSS programs; the dependent variables were persistence and GPA. The researcher’s findings, based on 577 participants in nine SSS programs, indicated that four SSS services predicted persistence and two services predicted GPA.

These findings should be interpreted with caution, however. The researcher did not present a theoretical framework for her study, although she did discuss the relevance of and similarities among the works of Spady (1971), Tinto (1982, 1993, 1997), and Bean (1979, 1983), and that Tinto’s is one of the most widely accepted models among the TRIO community. Her data collection process—compiling data regarding service participation, graduation status, and GPA from databases—completely overlooked what she discussed as important assumptions (supported by Spady, Tinto, and Bean): that personal, environmental, and organizational experiences influence a student’s perceptions, decisions, goals, intentions, and persistence; students are more likely to persist when they feel a sense of involvement; involvement is more likely to result when students feel a sense of institutional commitment based on the offering of services in support of academic and social needs. Lastly, as with Butters’ (2003) study, not all of the participants were nontraditional in terms of age—they
ranged in age from 19 to 57, with a mean age of 29. Lack of an underlying framework, coupled with inadequate data collection and analysis, make it difficult to determine any relationships and generalize the findings.

**Boice (2007).**

Boice’s (2007) mixed methods study sought to uncover key retention issues faced by 54 freshmen at a two-year proprietary college and whether there were differences between traditional and nontraditional students. Boice’s framework was based on Quigley’s (1997) early departure model which posited that the most important factors in identifying students least likely to persist include direct observation by staff during the enrollment process (placement testing, financial aid application, academic advising, and registration), students’ reporting of their perceptions of past educational experiences, and students’ expectations for future programs. Although Boice’s methodology was based on Quigley’s model and instrument, she made a number of references to Bean and Metzner’s model, noting the fit of Bean and Metzner’s model to the nontraditional student population at the institution where her research was conducted and that a number of her findings confirmed the variables in Bean and Metzner’s model. She found differences between traditional and nontraditional students in terms of commitment; academic preparation, expectations, and self-confidence; levels of encouragement from others; amount of social integration; and frequency of interactions with faculty and advisors. Significant persistence factors included gender, employment, and psychological outcomes. The generalizability of Boice’s findings is
limited given the small sample size and that her research was conducted at a private, rather than a public, two-year institution.

**Museus and Quaye (2009).**

Museus and Quaye (2009) used Kuh and Love’s (2000) eight cultural propositions to examine the persistence of ethnic minority students at a community college. Although they did not examine nontraditional students *per se*, one can posit that nontraditional students are a subset of minority students; a larger limitation of their study is that their findings were based on students who persisted. Highlighting the connection between student-perceived campus climate and persistence, they found that the efforts of individual agents can be more important than student organizations.

**Karp, Hughes, and O’Gara (2010/2011).**

The qualitative research of Karp, Hughes, and O’Gara (2010/2011) of 44 students at two community colleges not only found support for Tinto’s framework in a community college setting, but also found an interconnection between academic and social integration. The researchers found that academic experiences led to academic relationships and integration, which in turn led to social relationships and integration.

**Deil-Amen (2011).**

In her mixed methods study of 125 students at 15 community colleges (7 public and 8 private), Deil-Amen (2011) validated the significance of Tinto’s constructs of academic and social integration to persistence within a community college setting. Additionally, she found that the two forms of integration were interconnected and indistinguishable, with in-
classroom experiences and interactions providing the foundation for both forms of integration. Her study also brought to light the significant role of institutional agents—faculty, staff, and advisors—in the socioacademic integrative process.

The studies of Deil-Amen (2011) and Karp et al. (2010/2011) demonstrate the applicability of Tinto’s student departure theory, developed for traditional students at four-year institutions, to nontraditional students at two-year institutions—with some adaptation to accommodate the characteristics and situations that differentiate nontraditional students from traditional students. Whereas academic and social integration are central tenets to persistence in both types of institutions, the source of social integration differs—provided by social activities and interactions at four-year institutions compared with academic experiences at two-year institutions.

*Barnett (2011).*

To examine the impact of community college students’ interactions with faculty on persistence decisions, Barnett (2011) tested two of Tinto’s propositions utilizing Rendón’s (1994, 2002) validation construct as her framework. Rendón posited that validation—feelings of self-worth and the ability to succeed that are generated through interactions that demonstrate recognition, respect, and appreciation—is more important than integration in the persistence of nontraditional and community college students. Barnett’s study, the first to use correlational methods to examine students’ experiences with validation, sought to understand the relationships among validating experiences, academic integration, and intent to persist. Barnett found that both faculty validation and academic integration predicted
intent to persist; however, academic integration had a direct effect while faculty validation had an indirect effect that was mediated by academic integration.

Significant to the current study is Barnett’s finding empirical support of the importance of validation by faculty and others in the community college population in student persistence. Equally relevant are the four subconstructs she uncovered—that students are known and cared for, caring instruction, appreciation for diversity, and mentoring—all of which can be designated as institutional support variables. A major shortcoming of Barnett’s study, however, was the sample’s lack of representation of the studied population (or the overall community college population) in terms of enrollment status—whereas 63 percent of the campus enrollments were part-time students, only 36 percent of the sample respondents were enrolled part-time.

_Capps (2012)._}

Capps (2012) affirmed the influence of campus climate on students and their persistence decisions (although not necessarily in obvious, recognizable ways) in her qualitative study of nontraditional student persistence at a community college. Although the interviewed students credited themselves and their families for their persistence, they made frequent mention of the impact of teachers and advisors on their institutional outlooks and decision-making, demonstrating the influence of institutional representatives.

_Nakajima, Dembo, and Mossler (2012)._}

Nakajima, Dembo, and Mossler’s (2012) multivariate study simultaneously investigated psychosocial variables, environmental variables, and demographic variables.
They found that when all variables were considered, cumulative GPA was the strongest predictor of persistence, suggesting that post-enrollment occurrences are more influential than pre-college variables. Contrary to expectations and previous research, neither academic integration nor psychosocial variables predicted persistence. Their findings also revealed that almost all of the variables were interrelated, implying that persistence decisions are not simple univariate decisions—they are most likely the result of a combination of factors.

**Persistence of Veteran Students**

Going hand-in-hand with providing educational incentives and benefits to veterans is the need to understand the challenges and issues these individuals face as they enter/re-enter higher education. The importance of understanding the unique needs of veteran students was recognized after World War II when college campuses were not prepared (Humes, 2006) for the 2,232,000 WWII veterans who used the GI Bill to attend college during the 1940s and 1950s (Olson, 1973). Numerous studies were conducted, including: Toven’s (1945) look at career counseling for veteran students; Menninger’s (1945) examination of returning veterans’ mental health; Kinzer’s (1946) study of veteran students’ academic adjustment issues as they relate to study habits, lack of concentration, and fear of failure; and Aaronson’s (1949) investigation of student veterans’ readjustment to university life and studying.

Numerous studies in the 1970s examined the college experiences of Vietnam veterans, usually in comparison to non-veteran students. Hagen, Peterson, and Ray (1973) compared the GPA, attrition rate, and persistence rate, of veteran and non-veteran students at a California junior college and found that there was no significant difference between the two
populations. Sutton (1975) examined the effect of financial aid on withdrawal from a Florida community college and found that GI Bill recipients (veterans) did not exhibit a higher withdrawal rate than other financial aid recipients (non-veterans). In one of the only studies dedicated exclusively to veterans, Weiss (1976) examined the academic achievement of veterans at a Minnesota community college; looking at credit hours, GPA, credit course completion, and persistence, she found that veteran students did not differ from non-veteran students in terms of academic achievement.

These studies, conducted 35-65 years ago, demonstrate the long-recognized need to understand the complexities of the veteran student subpopulation. However, studies of veteran students from earlier eras do not provide substantial insights into the circumstances of today’s student veterans and their institutions (Hamrick & Rumann, 2013). Despite this need to know, there is inadequate coverage in the current literature.

Although there have been an increasing number of articles exploring the experiences of veterans from post-9/11, they predominantly provide growing coverage of the unique needs of veterans with combat-related physical and psychological issues such as post-traumatic stress disorder (PTSD), traumatic brain injury (TBI), alcohol abuse, and relationship problems (Burnett & Segoria, 2009; O'Herrin, 2011; Ostovary & Dapprich, 2011; Smith-Osborne, 2009) and do not focus on educational issues.

A number of studies have been undertaken in educational settings but concentrate on the impact of veterans’ physical and psychological issues (Barry, Whiteman, MacDermid Wadsworth, & Hitt, 2012; Elliott et al., 2011; Whiteman & Barry, 2011; Widome, Kehle,
Carlson, Laska, Gulden, & Lust, 2011; Widome, Laska, Gulden, Fu, & Lust, 2011). There have been studies of the needs of returning veterans in order to assist educational institutions develop policies and programs, however they looked primarily at experiences at four-year institutions (DiRamio et al., 2008; Elliott et al., 2011; Livingston et al., 2011; Rumann & Hamrick, 2010; Sargent, 2009; Whiteman et al., 2013). Only a handful of studies have focused on community college students (Barnhart, 2011; Persky & Oliver, 2011; Savage & Smith, 2008; Wheeler, 2012; Zinger & Cohen, 2010). While there has been a growing body of research on returning veterans, there is a dearth of information on how to enhance persistence of veteran students, especially at community colleges.

**The veteran student experience.**

The close to 2.2 million student veterans/returning veterans who are eligible for Post-9/11 GI Bill education benefits represent 4 percent of all undergraduates enrolled in postsecondary education—a significant presence. These students bring to campus numerous strengths—maturity, leadership experience, familiarity with diversity, a mission-focused orientation, cultural literacy, advanced training, and real-life experience and first-hand knowledge of world issues (Kelley, Fox, & Smith, 2012). Simultaneously, however, veteran students face not only the challenges (that threaten persistence) experienced by other nontraditional students, but often must overcome other issues that are a result of their military experience (Association of Private Sector Colleges and Universities, 2013). This generation of veterans is returning from war with nonfatal service-related injuries that have profound implications for their educational success (Hamrick & Rumann, 2013); their
educational experiences are affected by both academic and social factors (DeSawal, 2013).
Consequently, routine tasks, daily functioning, and roles and relationships will be approached
differently by veteran students; mundane situations could possibly pose challenges, cause
stress or duress, and inhibit their persistence (Ackerman et al., 2009; O’Herrin, 2011; Smith-

Due to both medical and military advances, veterans of the wars in Iraq and
Afghanistan have a much higher combat injury survival rate than veterans of earlier wars.
Klocek (2008) estimated that 90 percent of injuries sustained during these conflicts will be
survived, compared with 70 percent of combat-related injuries from the Vietnam War (and
even lower percentages from earlier wars such as the Korean War and World War II). The
U.S. Department of Defense reported that as of February 28, 2014, 51,000 servicemen and
women have been wounded during the initiatives in Iraq and Afghanistan (Cate, 2014).
These injuries can directly and indirectly (through the side effects of medications used to
treat them) affect veteran students’ educational experiences by impacting their attendance in
class as well as their ability to see and/or hear well, concentrate and stay focused, take notes,
and retain information (Ackerman et al., 2009; Cate, 2014; Church, 2009; DiRamio et al.,
2008). Learning disabilities—disorders which affect the brain’s ability to receive and
process information (learn)—can affect a student’s reading, writing, math,
attention/distraction level, executive functioning, and memory. Examples of learning
disabilities include dyslexia (an inability to apply knowledge of letter-sound relationships in
order to interpret and pronounce written words), dysnomia (an inability to recall a word from
memory, affecting written and/or verbal communication), visual processing disorder (the brain’s difficulty in processing information received visually), auditory processing disorder (the brain’s difficulty in processing information received auditorily), reading comprehension, dysgraphia (communication deficiencies between the brain and the hand, making it difficult to write), dyscalculia (difficulty with math and the decoding of math symbols), and short- and long-term memory issues (Kelley et al., 2012).

In addition to injuries and disabilities, some soldiers return to the classroom with perspectives that may differ from those of their classmates (McBain et al., 2012). Some veteran students face transition issues involving confidence (many have been out of school for a long time and approach this new environment warily) and community. Whereas they were once members of a tight-knit military community, they must now establish new relationships as they re-enter civilian society and enter an academic environment; this could possibly result in a sense of alienation, withdrawal, or wariness of fellow students and instructors if they feel a lack of understanding or prejudice (Ford, Northrup, & Wiley, 2009; Philpott, 2012), as well as friendsickness as they are now in a new social environment without their military comrades, a sense of isolation, and increased interpersonal conflict (Buote, Pancer, Pratt, Adams, Birnie-Lefcovitch, Polivy, & Wintre, 2007; Chappell, 2010; Mikelson & Saunders, 2013). Some veteran students must also deal with anti-military sentiments and/or a culture of marginalization (Association of Private Sector Colleges and Universities, 2013).
The challenges of reintegration into a world that has become estranged and unfamiliar are reaffirmed in a compilation of autobiographical pieces generated by veteran students. During the fall 2010 veterans-only orientation course at Eastern Kentucky University, Travis Martin and Brett Morris offered veteran students the option to submit short stories, poems, and artwork in lieu of two exams; the submissions, compiled into *The Journal of Military Experience*, provide a window into the strange new reality of a veteran student’s world.

Students expressed loneliness and uncertainty of being disconnected from their classmates and society (Foley, 2011); they experienced fear, stress, anxiety, and anger outbursts, as well as a lack of patience and concentration on simple tasks (Gilbert, 2011). “…it felt like I had lost something in Iraq. It felt like I had lost who I used to be before entering the military…For some time, this made me feel lost and confused. Things seemed hopeless. I had no sense of direction after leaving the military” (Gilbert, 2011, p.87). The authors acknowledged that while leaving the military is drastic change, talking with fellow veterans helped alleviate the stress and tension associated with adapting to their strange new reality.

**Persistence studies of veteran students.**

*Weber (2012).*

Weber (2012) used Tinto's interactionist model of college student attrition to frame her study of the academic success and well-being of 323 military/veteran students enrolled at Arizona State University (ASU) who had served at least one combat deployment in Iraq and Afghanistan. Her research investigated the students’ psychosocial functioning and whether the use of educational benefits and campus programs/services were associated with more
positive academic persistence decisions. Weber found that cultural congruity and social support were significant predictors of academic persistence decisions—higher levels of PTSD symptoms, depression, anxiety, and anger/aggression were associated with less cultural congruity and lower perceived social support. She also concluded that use of campus programs and services was associated with more positive persistence decisions. Approximately two-thirds reported utilizing academic advising services and veteran benefits and certifications; library services, financial aid services, and university sporting events were the next most frequently utilized. Over 71 percent indicated that increased recognition activities would facilitate their academic success. Almost 40 percent recommended a veteran student lounge and improvements to VA education benefits counseling. An additional 30 percent suggested that ASU provide professional development for its faculty and staff on veteran readjustment issues, offer a veteran-specific orientation, and establish a department or center for military/veteran programming. This study contributed significantly to the literature in that it examined persistence of veteran students in the context of social support; however, it examined persistence of veteran students at a four-year institution which differs significantly from a community college in terms of academic and social environs.

_Million Records Project._

The Million Records Project sought to rectify the lack of accurate data on the academic outcomes of veteran students at postsecondary institutions. This national study, a partnership among Student Veterans of America, the National Student Clearinghouse, and the Department of Veterans Affairs’ Veterans Benefits Administration, examined the
completion rate, time to completion, level of education, and field of study/degree pursued of nearly one million veterans who initially used GI Bill benefits between 2002 and 2010. Using secondary data analysis, the research found that student veterans exhibited strong postsecondary academic outcomes, with 51.7 percent earning a postsecondary degree or certificate; additionally, many (20.8 percent - 35.8 percent, depending on degree level) continued on to achieve higher levels of degree attainment. This study represented not only one of the most comprehensive examination of veteran student outcomes, but also provided a national benchmark—something that had been lacking (Cate, 2014).

**Persistence studies of veteran students at community colleges.**

**Barnhart (2011).**

Barnhart (2011) used Bean and Metzner’s (1985) model to study the relationship between academic and social integration and persistence of veteran students at two-year colleges. Conducting secondary data analysis of data from the Beginning Postsecondary Student longitudinal survey (BPS:04/06), he focused on first-time veteran and non-veteran students in public and private two-year colleges who began their education in fall 2003.

His findings indicated that veteran and non-veteran students had similar higher education experiences, with similar academic and social experiences and similar environmental stressors such as family and work. For both groups, background and defining variables were the most important persistence factors, with enrollment status exerting the greatest influence. However, veteran students who were enrolled full-time were more likely to persist whereas two-year college students who were enrolled both part- and full-time
(mixed status) were more likely to persist. A major difference between the two groups was the significance of academic integration as a predictor of persistence—whereas academic integration was significant for all two-year college students, it was not significant for veteran students. Additionally, age and the psychological outcome of stress were bigger factors for veteran students than non-veteran students, while financial need was not as important a factor for veteran students compared to non-veteran students.

Barnhart found that veterans were most likely to persist if they attended college full-time and pursued practical, short-term educational goals. His study provided both support of and challenge to Bean and Metzner’s model for studying veteran students at two-year institutions—support in that background variables exerted a significant direct influence on persistence decisions of nontraditional students in two-year colleges; challenge in that certain integration variables (advising, interaction with professors and peers, and involvement in extracurricular activities) were not significantly related to persistence of veteran students.

*Persky and Oliver (2011).*

Persky and Oliver’s (2011) mixed methods examination of the needs of veterans attending community colleges was framed by human capital theory of education and Rendon’s theory of validation. Their research resulted in the emergence of five themes concerning the needs of veteran students—these themes dealt with credit streamlining; streamlining of programs and services; faculty, advisor, and counselor training; difficulties encountered by veterans; and factors that constitute a veteran-friendly campus. While they sought to uncover the perceived areas in need of improvement, they did not specifically
examine persistence. However, their findings are useful for guiding future attrition-dedicated studies by highlighting areas of importance and concern for veterans that, if addressed, could aid community colleges in improving retention, and enhancing completion rates.

**Savage and Smith (2008).**

Savage and Smith (2008) conducted a quantitative study that specifically examined persistence of military students at Community College of the Air Force (CCAF). Using Snyder’s (2000) hope theory, they focused on the psychological orientations that could possibly explain student success, as measured by degree attainment. They found that goal orientation was the strongest predictor of degree attainment for their sample. Only two other variables, ASVAB (Armed Services Vocational Aptitude Battery test) scores and shift worked, were significant predictors of CCAF graduation. Theirs is one of the few studies that specifically looked at veteran persistence. However, they studied a unique population (active duty Air Force master sergeants) enrolled in a unique institution (CCAF does not have a campus of its own—students attend civilian institutions located in or near the communities where they are stationed). Their population members are still active military personnel who may not face the same challenges as non-active duty veterans returning to school. Their findings, while insightful in guiding future research, may not reveal all the variables that may come into play at institutions that are not dedicated exclusively to military students.
Wheeler (2012).

Wheeler (2012) used Schlossberg’s (1984) theory of adult transitions to guide her qualitative study of veterans’ transitions to first-time community college students. Her research revealed three themes as to how veterans manage this transition: academic experiences, personal relationships and connections, and benefit bureaucracy. Similarly, Zinger and Cohen (2010) used qualitative research to examine the challenges that veterans face when they return to the classroom. Although both studies addressed the same population (post-9/11 veterans) and setting (community colleges) under consideration for the current study, neither was quantitative in nature nor did either address the use of institutional support programs and policies to enable persistence of veteran students.


Finding that the limited research available on adjustment-related issues suggests that veteran students may have trouble connecting with their civilian counterparts and be at risk for social isolation, Whiteman et al. (2013) compared the development and predictive ability of peer emotional support of 199 military students (both service members and veterans) and 181 civilian students. Earlier studies had found that peer attitudes can influence integration within postsecondary education programs and enhance academic achievement and persistence (Anderson, 1981) and that relationships with instructors outside of class, friendships, informal or casual relationships, and mentoring had a positive relationship with persistence (Bean, 1986; Bean & Metzner, 1985; Lenning, Beal, & Sauer, 1980; Nelson, Scott, & Bryan, 1984; Pascarella & Chapman, 1983; Pascarella & Terenzini, 1980; Spady,
1970, 1971; Tinto, 1975). In the study conducted by Whiteman et al., veterans reported receiving less peer emotional support than their civilian counterparts; however emotional support increased similarly for both groups of students. Their findings also showed that increasing peer emotional support was related to better academic and mental health outcomes.

**Persistence of veteran students at North Carolina community colleges.**

Currently, there have not been any studies conducted of student veteran persistence at North Carolina community colleges. While a number of studies have been conducted in other states, there is no assurance that the studied populations are representative of North Carolina community college student bodies and the findings may not be generalizable. None of the existing studies examined the possible relationship between persistence and veteran-specific student characteristics (such as number of deployments, length of service in the military, military branch) and institutional characteristics that determine the veteran-friendliness of a postsecondary institution (such as the campus’ proximity to a military base, a dedicated Veteran Services Officer, existence of a Veteran Student Center).

Perhaps most significant to the void in the literature is the fact that the North Carolina Community College System does not keep track of veteran students on a system level (Chris Cline, personal communication, May 14, 2013).

These factors pointed to the need for a quantifiable study that examines how to enable persistence of veteran students at North Carolina community colleges through institutional support programs and policies.
Conclusion

There is a lack of empirical evidence of the factors—personal, environmental, academic, and/or institutional support—that contribute to the persistence of veteran students at North Carolina community colleges. While previous studies have made a substantial contribution to understanding persistence and the interactive forces that affect it, there is insufficient attention to the difficulties experienced by a subgroup of nontraditional students—veterans—while attempting to successfully complete postsecondary education. In addition, the models used to study persistence of nontraditional students have not incorporated variables that are unique to veteran students.

The one-size-fits-all explanation of student persistence has become invalid as changing institutional, curricular, political, economic, and social factors have altered—and continue to impact—student demographics (Bean & Metzner, 1985). Researchers (Bean, 1985; Bean & Metzner, 1985; Pascarella & Chapman, 1983; Pascarella, Duby, & Iverson, 1983) have emphasized the need to adapt existing models to reflect varying student subgroups in different types of institutions. A model, dedicated to nontraditional students and that incorporates variables unique to the veteran students, was needed to describe the persistence of veteran students in North Carolina community colleges. Information was needed on the organizational, environmental, and personal factors that contribute to persistence. A greater understanding of these factors will allow community colleges to develop and institute policies, procedures, and programs to improve veterans’ college-going experience and persistence.
Theoretical Framework

As Braxton and Hirschy (2005) note, “A multitheoretical approach to reducing institutional rates of student persistence is needed because college student departure is best characterized as an ill-structured problem… [which defies] a single solution” (p. 61). With this in mind, the underlying model of this study was Bean and Metzner’s (1985) model of nontraditional undergraduate student attrition with additional components informed by social support theory.

A number of recent studies of community college students have used all or parts of Bean and Metzner’s model of nontraditional student attrition (Boice, 2007; Butters, 2003; Byun, 2000; Hoyt, 1989; Jones-Ford, 2002; McMillen, 1995; Nippert, 2000-2001; Wade, 1995), however none have examined the persistence of veteran students within a community college setting. Given that other studies have noted the importance of social support for both college students (Astin, 1993; Dennis, Phinney, & Chuateco, 2005; Hefner & Eisenberg, 2009; Hurtado, Carter, & Spuler, 1996; Procidano & Heller, 1983; Robbins, Lauver, Le, Davis, Langley, & Carlstrom, 2004) and veterans’ adaptation to higher education (DiRamio et al., 2008; Elliott et al., 2011; Livingston et al., 2011; Persky & Oliver, 2011; Rumann & Hamrick, 2010; Weber, 2012), the inclusion of social support could greatly enhance Bean and Metzner’s model for examining the persistence of veteran students at community colleges.
Bean and Metzner’s Model of Undergraduate Student Attrition

The most critical variable in Bean and Metzner’s model, in terms of differentiating nontraditional from traditional students, is residence (Stahl and Pavel, 1992). Nontraditional students are typically commuters who spend very little time on campus outside of the classroom and are therefore afforded few opportunities for social integration, the foundation of Tinto’s (the stalwart of persistence theory) model. Bean and Metzner’s theory differs from models of traditional student attrition (such as those put forth by Tinto, Spady, and Pascarella) in that they believe nontraditional students are more affected by their external environment than social integration variables. Findings from studies at two-year colleges affirmed the lack of significance of social integration for persistence (Halpin, 1990; Mulligan & Hennessy, 1990; Nora, Attinasi, & Matonak, 1989; Pascarella & Chapman, 1983; Voorhees, 1987).

According to Bean and Metzner’s model, dropout decisions are based on four sets of variables that can be categorized as background variables (age, enrollment status, residence, educational goals, high school performance, ethnicity, gender), academic variables (study habits, academic advising, absenteeism, major certainty, course availability), environmental variables (finances, hours of employment, outside encouragement, family responsibilities, opportunity to transfer), and intent to leave. Their framework emphasizes psychological processes—namely intent—as a determinant of a student’s decision to persist. In their study (1987) of nontraditional (commuter, part-time) students at a Midwestern urban university, intent to leave and GPA were the best predictors of dropout. Intent to leave has been found
to be a strong predictor of persistence (Bean, 1980, 1982, 1985; Braxton, Milem, & Sullivan, 2000; Cabrera, Castaneda, Nora, & Hengstler, 1992; Pascarella, Duby, & Iverson, 1983; Pascarella, Smart, & Ethington, 1986), with its significance as a predictor of persistence of community college students supported by other researchers (Bers & Smith, 1991; Mulligan & Hennessy, 1990; Sorey & Duggan, 2008; Voorhees, 1987). The current study therefore used intent to leave as a predictor of persistence.

Bean and Metzner’s model had one major shortcoming as it related to this study—omission of veteran-specific variables. Because they did not study veteran students, certain variables, unique to veterans, were not included in their model. Their model was therefore amended to incorporate additional veteran-specific demographic variables, such as number of years in the military and number of deployments. The model also incorporated institutional support variables, based on insight provided by Philpott (2012).

**Social Support Theory**

Social support research (Astin, 1993; Dennis et al., 2005; Hurtado et al., 1996) has demonstrated that social support, particularly from peers, is important for the academic adjustment of college students. Procidano and Heller (1983) conducted three validation studies among university undergraduates and found that symptoms of distress were inversely related to perceived social support both from family and from friends. Robbins et al. (2004), in their meta-analysis, found that social support is a robust predictor of retention. Hefner and Eisenberg (2009) evaluated the relationship between social support and mental health of college students at a large public university. Their findings supported their hypothesis that
students who have characteristics that differentiate them from the remainder of the student body—such as veteran students—are at greater risk for social isolation. Additionally, they found that students who reported lower quality social support were more likely to experience mental health problems; in turn, research has found an association between mental disorders and academic success (Kessler, Foster, Saunders, & Stang, 1995).

Qualitative research has consistently reported that social support is an important factor in veteran students’ adjustment to higher education, however in these same studies veteran students indicated there is a definite lack of informational or emotional support from peers (DiRamio et al., 2008; Elliott et al., 2011; Livingston et al., 2011; Persky & Oliver, 2011; Rumann & Hamrick, 2010). Weber’s (2012) quantitative study of veteran students at Arizona State University reported that social support was a significant predictor of persistence decisions and participants who made use of more campus programs and services tended to indicate more positive persistence decisions. Although there have been numerous studies, there is a paucity of quantitative research investigating social support among this population (Whiteman et al., 2013), especially on community college campuses.

The Model for This Study

Based on the strengths and shortcomings of previous research, a model of veteran student attrition at community colleges was proposed (Figure 1.1), based on Bean and Metzner’s model of nontraditional student attrition and social support theory.
Figure 1.1. The model for this study.

**Dependent variable.**

The dependent variable in the model and the study is intent to leave. Pascarella, Duby, and Iverson (1983) introduced and validated the significance of intent as a predictor of persistence. Their model, developed specifically for nonresidential commuter institutions,
used Tinto’s major theoretical concepts and included background characteristics, social and academic integration, goal and institutional commitments, as well as the concept of intention—and found intention to be the strongest predictor in persistence decisions. Other research (Bean, 1980, 1982, 1985; Pascarella et al., 1986) has confirmed intent to leave as the strongest predictor of persistence. Metzner and Bean (1987) found intent to leave (along with GPA) to be the best predictor of dropout in their study of nontraditional (commuter, part-time) students at a Midwestern urban university. The significance of intent as a predictor of persistence of community college students has been supported by other researchers (Bers & Smith, 1991; Mulligan & Hennessy, 1990; Sorey & Duggan, 2008; Voorhees, 1987).

In this study’s model, intent to leave is influenced by four primary sets of variables—an academic variable, background variables, environmental variables, and institutional support variables. The academic variable is college GPA. Background variables include age, enrollment status, number of years between high school completion and community college enrollment, gender, ethnicity, and two veteran-specific variables—number of years in the military and number of deployments. Environmental variables are external, mediating factors over which the college has no control or influence, but may have significant and direct effects on intent to persist. Earlier research (Bean & Metzner, 1985) has emphasized the importance of environmental factors on the attrition of nontraditional students. These include hours of employment and family responsibilities, which represent competitive
entities for a student’s time (and consequently impact the degree of integration), as well as outside encouragement from family and friends.

Whereas Bean & Metzner (1985) posited that outside encouragement replaced normative institutional support (needed for social integration) as put forth in the models of Spady (1971) and Tinto (1975), the model for this study re-introduced the emphasis on institutional support for both social and academic integration. Research supports that both student and institutional characteristics influence a student’s persistence (Craig & Ward, 2008). This study looked at institutional support variables such as providing an on-campus veterans’ service center, a Student Veterans of America chapter, counseling and psychological services tailored to veterans, peer mentoring, veteran-specific website/portal, and acknowledgement ceremonies that facilitate social support and could therefore impact academic performance and intent to persist. These final variables are perhaps the most critical in that successful identification could greatly contribute to the alleviation of institutionally-induced stress. With the exception of the veteran-specific variables unique to this study, all of the independent variables were included based on findings from earlier research on community college persistence.

**Independent variables.**

**Academic variable.**

The academic variable, GPA, was included as a measure of academic performance; there is a large body of research (Adelman, 2006; Craig & Ward, 2008; Karlen, 2003;
Nakajima et al., 2012; Nippert, 2000-2001; Windham, 1994; Zhao, 1999) that supports the relationship between academic performance, as measured by GPA, and persistence.

**Background variables.**

There is extensive research on the relationship between student background variables and persistence (Summers, 2003). Studies (Byun, 2000; Greer, 1980; Hunter & Sheldon, 1980; Kostecki & Bers, 2008; Lanni, 1997; Nakajima et al., 2012) have found that age, either on its own or in conjunction with other variables, can be a predictor of persistence; even more relevant to this study of nontraditional students are studies that found older students are less likely to persist (Brooks-Leonard, 1991; Capps, 2012; Gorter, 1978; Windham, 1995).

Research (Brooks-Leonard, 1991; Byun, 2000; Crisp, 2010; Feldman, 1993; Lanni, 1997; Nakajima et al., 2012) has also found a correlation between enrollment status and persistence.

Craig and Ward (2008) found gender to be related to cumulative GPA (which, in turn, affected persistence); Boice (2007) and Lanni (1997) also found a relationship between gender and persistence. Both Pascarella and Terenzini (1983) and Pascarella et al. (1986) also suggested the influence of gender in factors affecting persistence (although the former study was conducted at a residential four-year university).

Some studies (Cofer and Somers, 2001; Kostecki & Bers, 2008; Lanni, 1997; Makuakane-Drechsel & Hagedorn, 2000; Mohammadi, 1994, 1996; Zhao, 1999) have found a correlation between ethnicity and persistence. Pascarella et al. (1986) found ethnicity to have a significant indirect effect in persistence decisions by significantly influencing
intervening variables that, in turn, directly influenced persistence. Barnhart (2011) found race to be a significant predictor of veteran students at two-year institutions.

Research has shown that the timing gap between high school and college may make the transition from the military to the college campus more difficult (Association of Private Sector Colleges and Universities, 2013). There has also been evidence (Barr, 2007; Craig and Ward, 2008; Nakajima et al., 2012) that there is a significant relationship between the high school-college interval and persistence. Adelman (2006) noted that the amount of lapsed time between high school graduation and college entry is important; those who delay entering college—by even one semester—run a greater chance of not persisting. In this current study, this variable was referred to as the interval between high school completion and community college enrollment to account for individuals who may not have completed high school on a traditional timeline. Some individuals may have taken a hiatus and completed their high school coursework later in life, potentially reducing the amount of time that had elapsed since they were last in “student mode.”

This study’s model also introduced two veteran-specific background variables that had not been included in previous studies—the number of years in the military and the number of deployments—to see if the amount of time in the military and the nature of that involvement have any impact on persistence decisions. Ackerman et al. (2009) cite research findings by the Department of Defense Mental Health Advisory Team that deployments of longer than six months and multiple deployments contribute to an increase in mental health issues—that could impact persistence.
**Environmental variables.**

Environmental variables included both constraints—hours of employment and family responsibilities—and support—encouragement from family and friends. Both hours of employment and familial obligations represent competitive forces for a student’s time, and can therefore potentially be detractors from their academic success.

Research (Lanni, 1997; Nakajima et al., 2012; Pascarella, Edison, Nora, Hagedorn, & Terenzini, 1998; Schmid & Abell, 2003; Swager, Campbell, & Orlowksi, 1995; Windham, 1995) has found that students who work full time are less likely to persist than those who work part time or not at all.

Researchers at Northern Virginia Community College (2000, 2001) reported that family demands were frequently cited as reasons for dropping out; similarly, Bers and Smith (1991) found that home responsibilities affected persistence of older students.

In terms of enabling persistence, researchers (Napoli & Wortman, 1998; Naretto, 1995; Sorey & Duggan, 2008) have found that encouragement and support contribute to persistence. In their phenomenological study, Cox and Ebbers (2010) found that support from family and friends was a major influencer in persistence decisions of adult, female, part-time students at a Midwestern community college.

**Institutional support variables.**

The model also introduced veteran-specific institutional support variables that had not been tested before: on-campus veterans’ service center, Student Veterans of America (SVA) chapter, counseling and psychological services tailored to veterans, peer mentoring, veteran-
specific website/portal, and acknowledgement activities. Inclusion of these variables was informed by the literature and other studies. Mikelson and Saunders (2013) and Summerlot et al. (2009) advocated that the establishment and maintenance of campus-based student organizations that enable veterans to connect with students who share similar experiences would facilitate veterans’ transitions to college and civilian life. Peer-to-peer support, provided by campus veterans groups such as Student Veterans of America (SVA), is the key to helping veterans attain success in higher education (Lanigan, 2008). The model incorporated institutional programs and resources that would facilitate peer-to-peer support.

On-campus veterans centers can provide veterans with a place to meet, obtain resources, and find solace (Chappell, 2010; Citrus College, 2013; Elliott et al., 2011; Philpott, 2012).

Membership in an SVA chapter provides the veteran student with beneficial connections—the association can help with questions about what to do on campus, work with administration on benefits, and help build a social network (Altus, 2013; Rumann et al., 2011).

As noted earlier, veteran students must often overcome physical, emotional, and mental challenges; campuses need to be prepared to address these needs with the provision of mental health support services (Ackerman et al., 2009; Bauman, 2009).

Crisp (2010) found that mentoring indirectly influenced intent to persist (via goal commitment); Abel, Bright, and Cooper (2013) also discussed the benefits of mentoring programs for veteran students. Although not veteran-specific, Barnett’s (2011) study
provided support for Rendon’s (1994, 2002) validation theory and the importance of mentoring and students being known and valued (as in acknowledgement ceremonies) in predicting persistence. Additional studies at four-year institutions (Pagan & Edwards-Wilson, 2003; Salinitri, 2005; Sorrentino, 2007) found student-mentoring programs to be of value in persistence decisions.

Community colleges enhance communication and build relationships with their veteran students through dedicated websites and pages, although institutions vary in the department(s) that have oversight for their maintenance— at Pierce College (California), (http://www.piercecollege.edu/offices/financial_aid/veterans.asp), the site is maintained by the Office of Financial Aid; at DeAnza College (California), the website (https://www.deanza.edu/veterans/resoursesandwebsites.html) is the jurisdiction of the Veterans Services Office; at Citrus College (California), the veteran web pages (http://www.citruscollege.edu/stdntsrv/veterans/Pages/default.aspx), fall under the auspices of Student Services.

Studies have also found evidence of the value of recognition and acknowledgement activities (Elliott Gonzalez, & Larsen, 2011). Abel et al. (2013) recommend several activities to build awareness of and respect for the contributions of veteran students. In addition to commemorating holidays such as Veterans Day, they suggest hosting an appreciation dinner or reception as well as the creation and awarding of a recognition coin. The bestowing of a commander’s coin in recognition of superior performance is part of military culture and practiced in all branches of the military; the transference of a familiar
and honored custom from the veteran’s former military world to his/her current student world, would carry multiple benefits—comfort, respect, and recognition.

**Purpose**

This study focused on an often overlooked, but increasingly significant, segment of the postsecondary education retention issue—veteran students at community colleges. The purpose of this study was to understand what institutional factors and attributes pose or contribute to persistence for veteran students at North Carolina community colleges. “Students perform better and are more satisfied at colleges that are committed to their success and cultivate positive working and social relationships among different groups on campus. Community college students also benefit from services targeted to assist them with academic and career planning, academic skill development, and other areas that may affect learning and retention” (Center for Community College Student Engagement, 2013). In essence, community colleges must become increasingly more responsive to veterans’ needs.

This study sought to investigate institutional responsiveness by the college’s willingness and capacity to create a welcoming, positive, supportive learning environment for veterans. This includes establishing supportive administrative and program policies for students, faculty, and staff; offering appropriate student support services; and making reasonable accommodations for physical and emotional needs. Institutional commitment and social integration must take on new meanings in persistence studies of veteran students. As Mikelson and Saunders (2013) noted, it is important for institutions to assess their programs,
policies, and practices to determine their impact on the experiences and persistence of veteran students. This study proposed to do just that.

**Research Questions**

The research questions that guided this study are:

1. What institutional facilities and policies (credit transferability, faculty/staff training, Veterans’ Service Office, veteran-specific orientation, veteran-specific courses) and institutional support services (on-campus veterans’ service center, Student Veterans of America chapter, counseling and psychological services tailored to veterans, peer mentoring, veteran-specific website/portal, and acknowledgement ceremonies) are provided by North Carolina community colleges to facilitate the educational experience of veteran students?

2. What is the predictive ability of academic variables (college GPA), background variables (age, enrollment status, gender, ethnicity, number of years between high school completion and community college enrollment, number of years in the military, number of deployments), environmental variables (hours of employment, family responsibilities, family and friends support), and institutional support variables (on-campus veterans’ service center, Student Veterans of America chapter, counseling and psychological services tailored to veterans, peer mentoring, veteran-specific website/portal, recognition activities) on veterans’ intent to persist at North Carolina community colleges?
3. How do veteran students’ ratings (in terms of importance and frequency of use) of 12 institutional support programs and services compare with college administrators’ perceptions of veteran students’ use of these programs and services?

**Significance of the Problem**

Over two million service men and women will be returning from the wars in Iraq and Afghanistan and will need to acquire new skills, knowledge, and credentials to facilitate their transition back to civilian life (American Council on Education, 2009; Cook & Kim, 2009; McBain et al., 2012). Many of these returning service men and women, taking advantage of the educational benefits of Post-9/11 GI Bill, will look to postsecondary institutions—and in particular, community colleges. The community college system, long regarded as a gateway to higher education for nontraditional students, is well positioned to meet the needs of veteran students.

However, while community colleges have done an exceptional job of ensuring access to education, they have paid much less attention to the success—or persistence—of their students. Despite the fact that nontraditional students have continued to comprise an increasingly larger percentage of undergraduate enrollments (Carnegie Council on Policy Studies in Higher Education, 1980; U.S. Department of Education, 1982), and have a higher rate of attrition than traditional students (Johnson, 1991), little research has been devoted exclusively to the attrition of nontraditional students, and even fewer studies have been dedicated to the attrition of veteran students.
The lack of research is at a time when there is increased interest in the experiences and outcomes of veteran students and calls for accountability. On April 27, 2012 President Obama signed an executive order mandating that any institution that receives veteran education benefits must provide outcomes data (Servicemembers Opportunity Colleges, 2012; The White House, 2012). However, databases that would facilitate the tracking of veteran student outcomes are not available. Further, there are no accurate counts on the number of veterans enrolled in U.S. postsecondary institutions, there is limited information on the success rates of veteran students, and there is a lack of knowledge of the factors that affect the success of veteran students and institutional practices likely to enhance their persistence (Servicemembers Opportunity Colleges, 2012; NASPA Research and Policy Institute & InsideTrack, 2013). In 2011, the American Council on Education noted:

While it can be difficult for colleges to obtain data on their student veteran population,…it is critical since the data will ensure programs and services that are being implemented are truly supporting veterans and helping them achieve their postsecondary goals. (p. 5)

The study filled a void in the literature by researching institutional mechanisms to support the persistence of veteran students at North Carolina community colleges. Findings will inform community college administrators to help them shape institutional policy and program decision-making in order to enhance persistence and completion rates of veteran students as well as institutional effectiveness. Additionally, this research will assist community colleges in answering calls for accountability and meeting their reporting requirements.
Definition of Terms

Outlined below are definitions of key terms used in this study. None of these terms are unique to this study; however due to the subjective, interpretive nature of many of them, definitions are supplied in order to clarify their meaning in the context of this research.

*Dropout* – withdraw from the institution resulting in non-completion of degree/certificate (can be a verb—the act of withdrawing—or a noun—someone who drops out).

*Intent* – a student’s intentions to remain at or leave their current institution.

*Persistence* – re-enrollment in the same institution the subsequent semester; progress towards degree/certificate completion.

*Social Support* – help in the form of tangible (physical or financial assistance) or intangible (information, feedback, or emotional back-up) assistance provided by an individual’s network, which can include family, friends, peers, or membership institutions or communities.

*Stop-out* – a temporary leave from matriculation, with the student re-enrolling at a later date (can be a verb—the act of temporarily leaving—or a noun—someone who stops out).

*Veteran* – retired military personnel, no longer involved in active duty; for purposes of this study, a veteran is also defined as someone who served post-9/11.
Conclusion

Chapter 1 laid the groundwork for this study, introducing the issue of persistence of veteran students, including an overview of the higher education-military connection and American community colleges. This initial chapter outlined the context of the problem, including persistence of nontraditional students and a special sub-population of nontraditional students—veteran students, and provided the study’s theoretical framework, purpose, significance, and research questions, as well as definitions of key terms to be used in the study. Chapter 2 will present a review of the literature, including a brief history of the evolution of persistence theory models, an overview of social support theory, and a discussion of persistence of veteran students, including recent studies and current policies and programs being instituted by community colleges. Chapter 3 will outline the methodology, including the research design, population and sample, survey instrument, data collection procedures, variables used, data analysis, and delimitations and limitations of this study. Chapter 4 will present the results of the research, including descriptive and statistical analysis of the data. Chapter 5 will present the researcher’s conclusions and recommendations for policy, practice, and future research.
CHAPTER 2: LITERATURE REVIEW

This chapter will explore the literature related to enabling the persistence of veteran students at community colleges through institutional support systems. The discussion will start with a review of persistence theories, which were primarily developed to describe attrition of traditional students at four-year institutions; relatively little research has been devoted to investigating the attrition of community college students or the advancement of a dedicated community college outcome model (Bailey & Alfonso, 2005). Four models will be presented all of which were developed for four-year institutions but show the progression of models to reflect the changing demographics of student bodies—Spady’s (1970) Model of the Undergraduate Dropout Process; Tinto’s (1975) Longitudinal Model of Institutional Departure; Pascarella, Duby, and Iverson’s (1983) Model for Nonresidential Institutions; and Bean and Metzner’s (1985) Model of Nontraditional Student Attrition.

There will then be an examination of more recent studies of community college persistence and the different frameworks that were used. The concept of social support, and its significance to persistence, will be addressed. These concepts will be tied together in a discussion of the persistence of veteran students.

After presenting the limited number of research studies on veteran student persistence, this chapter will outline programs and services designed to enhance veteran student persistence, including national programs, national studies, statewide efforts, and individual community college initiatives.
The Evolution of Persistence Theories

There has been growing concern over the attrition rate for U.S. colleges and universities (Braxton, 2002; Pascarella & Terenzini, 2005; Stahl & Pavel, 1992), as large numbers of students drop out during their first year and a significant proportion leave before earning their degree or other certification (Barr, 2007; Horn & Berger, 2004). The national attrition rate of students from U.S. colleges and universities has remained constant at 45-50 percent for over 100 years (Johnson, 1991; Summers, 2003; Tinto, 1982), with community colleges having higher rates than those of four-year institutions (Bradburn, 2002; Johnson, 1991; Mohammadi, 1994, 1996; Nakajima et al., 2012; Provasnik & Planyt, 2008; Sorey & Duggan, 2008; Tinto, Love, & Russo, 1994). Horn and Premo (1995) identified seven factors that put students at risk for not persisting: delayed enrollment, part-time attendance, financial independence, having dependents, being a single parent, working full-time while enrolled, and did not graduate from high school. Students with the highest proportion of risk factors attend community colleges.

Persistence and Community Colleges

The dropout rates for community college students are significantly higher than those of students at four-year institutions (Johnson, 1991; Mohammadi, 1994, 1996; Nakajima et al., 2012; Provasnik & Planty, 2008; Sorey & Duggan, 2008; Tinto et al., 1994). Almost 50 percent of community college students who enter in the fall term drop out before the start of the next fall term (ACT, Inc., 2010; Schuetz, 2005); only 46 percent of students who enter community colleges with the intention of earning a degree or certificate have attained that
goal, transferred to a four-year institution, or are enrolled six years later (Radford, Berkner, Wheeless, & Shepherd, 2010). Contributing to this high attrition rate is documentation that community college students are a high-risk population, three to four times more likely to exhibit “at risk” factors that threaten persistence, including being older, enrolled part-time, a member of a racial or ethnic minority, from lower family income (Cohen, Brawer, & Kisker, 2014; Sorey & Duggan, 2008), and less academically prepared (Parsad & Lewis, 2003). A high percentage of students with the highest proportion of risk factors attend community colleges (American Association of Community Colleges, 2012; Mohammadi, 1994).

Today’s 1,132 community colleges (American Association of Community Colleges, 2014) enroll close to 50 percent of all the first-time degree/certificate-seeking students in degree-granting institutions (American Association of Community Colleges, 2013; Cohen et al., 2014; National Center for Education Statistics, 2011) and almost 35 percent of the total enrollments in degree-granting institutions (National Center for Education Statistics, 2014). Over the period 2000-2012, community colleges experienced enrollment expansion of over 1.2 million students (National Center for Education Statistics, 2014) so that by fall 2012, more than 12.8 million students were enrolled annually in credit and noncredit courses offered by community colleges (American Association of Community Colleges, 2014). However, while community colleges have done an exceptional job of ensuring access, they have paid much less attention to the success—or persistence—of their students (American Association of Community Colleges, 2012).
Researchers have sought to explain student attrition for decades. Although the last three decades have witnessed an increase in both the quantity and quality of attrition research, the majority of research has focused on traditional students—individuals who are younger than 25, enrolled full time, and reside at their institution—at four-year institutions (Bean & Metzner, 1985; Braxton, 2002; Halpin, 1990; Metzner & Bean, 1987). However, changing institutional, curricular, political, economic, and social factors have resulted in—and continue to impact—student demographics (Bean & Metzner, 1985), making the one-size-fits-all explanation of student attrition no longer valid. Relatively little research has been devoted to investigating the attrition of community college students or the advancement of a dedicated community college outcome model (Bailey & Alfonso, 2005).

Three primary attrition models—developed for students at four-year institutions—have typically been the foundation of community college persistence research (Summers, 2003). The first two models, developed by Spady (1970, 1971) and Tinto (1975), focused on traditional students at residential institutions; the third model, by Bean and Metzner (1985), was designed for nontraditional students. A fourth model, proposed by Pascarella, Duby, and Iverson (1983) for nonresidential institutions will also be discussed as it segued between Tinto and Bean and Metzner’s work.

**Spady’s Model of the Undergraduate Dropout Process**

One of the earliest models of student attrition is attributed to Spady (1970, 1971), who based his model on Durkheim’s (1951) Suicide Theory. Durkheim found that suicidal tendencies (or the decision not to persist in society) increased in individuals who were not
integrated socially and normatively into their social system. Spady transferred the social integration concept to college students—those who did not share the same values and orientations as others in their social system (college environment) were less socially integrated, and therefore were less likely to persist.

Four independent variables—grade performance, intellectual development, normative congruence, and friendship support—influence the fifth independent variable, social integration; these five variables are linked indirectly to the dependent variable, dropout decision, through two intervening variables, satisfaction and institutional commitment. The interplay between academic and social integration is central to his model.

Spady tested his model in a four-year longitudinal study at the University of Chicago; he found that overall, social integration, grade performance, and intellectual development were directly related to attrition, with formal academic performance the dominant factor. Based on his findings, he revised his model to include a separate component of structural relations and friendship support, and also reorganized the relationships among his components.

While contributing to the understanding of attrition in postsecondary institutions, Spady’s model is limited in applicability and transferability because his study examined traditional students at a highly selective four-year institution. Additionally, while Spady’s model accounts for a student’s commitment to an institution, it does not include any representations of how institutional factors, or an institution’s commitment to its students, affect a student’s persistence decision. Comprehensive models of student attrition must
incorporate consideration of an institution’s “student commitment” as represented by administrative and programmatic efforts and offerings (Johnson, 1991). Despite these shortcomings, Spady does provide an explanatory model that demonstrates the importance of both intrinsic rewards (interpersonal relationships and intellectual development) and extrinsic rewards (grades), as well as performance criteria, on persistence decisions. His model was subsequently enhanced through the work of Vincent Tinto (1975).

Tinto’s Longitudinal Model of Institutional Departure

Tinto (1975), finding a lack of theoretical formulations in the existing literature, developed an interactionalist theory of college student departure with pivotal constructs of academic and social integration (Figure 2.1), which was also based on Durkheim’s (1951) Suicide Theory and extended Spady’s (1970, 1971) earlier work.
Figure 2.1. Tinto’s Longitudinal Model of Institutional Departure. From Leaving College: Rethinking the Causes and Cures of Student Attrition (p. 114), by V. Tinto, 1993, Chicago: University of Chicago Press. Reprinted with permission.

Students enter college with various individual characteristics—family background factors (SES, parents’ education level, parents’ expectations), individual attributes (academic ability, race, gender), and precollege schooling experience (characteristics of secondary school, high school academic achievement)—that play roles in the departure process. These student entry characteristics influence a student’s initial commitment to the institution and goal of graduation, and persistence decision.

During their interactions with the institution’s academic and social systems, the student’s initial institutional and goal commitments affect their degree of academic and social
integration. Academic and social integration, in turn, affect subsequent levels of institutional and commitment. The greater the student’s level of subsequent institutional commitment, the greater the likelihood that he/she will persist. This series of interactions among the five variables—individual characteristics, initial goal and institutional commitments, academic integration, social integration, and subsequent goal and institutional commitments—comprise a longitudinal process that impacts departure decisions. Tinto’s identification of an institution’s academic and social domains, and their interaction, is the main differentiator between his model and earlier theories.

Tests of Tinto’s model.

Pascarella and Terenzini (1980) found the model to be valid for a large, private, selective, residential university; Terenzini, Lorang, and Pascarella (1981) came to a similar conclusion when the model was applied to a large, public, selective, residential university. Pascarella and Chapman (1983) tested the model with three types of institutions—four-year residential, four-year commuter, and two-year commuter; they found the model had predictive capabilities for all three types of institutions, but at commuter institutions academic integration had the strongest influence while at residential institutions social integration had a stronger effect. Other studies (Pascarella, Duby, Miller, & Rasher, 1981; Pascarella, Duby, & Iverson, 1983) reported similar findings for commuting students in general.

As Pascarella et al. (1986) noted, there are two major shortcomings of the existing studies guided by Tinto’s model—nearly all research had been conducted at four-year, largely
residential institutions and for the most part, at single institutions over a relatively short period of time (one or two years); there is a lack of research on the applicability of the model to students at nonresidential, public community colleges (Halpin, 1990). Consequently, Pascarella et al. (1986) conducted a long-term (nine-year) study in multiple (85) two-year colleges of 825 students who aspired to a bachelor’s degree or above; they found that academic and social integration were the two variables with the most consistent positive effects on persistence.

Halpin (1990) also found Tinto’s model, especially the academic integration aspect, to be predictive of persistence at a nonresidential, public community college. It should be noted, however, that Halpin’s study included only full-time students. This is an important point given that part-time students currently comprise 60 percent of community college enrollments (American Association of Community Colleges, 2014). Therefore, Halpin’s study is not truly representative of the current community college student population.

Contradictory to Halpin’s findings, Webb (1988) reviewed Tinto’s model (among other models “descended” from Tinto’s model) and found that none of the models were applicable for students at two-year colleges.

**Tinto’s updating of his model (1993).**

Tinto’s re-review of the literature resulted in a reconceptualization of his model to reflect the different needs of students in commuter and two-year institutions (compared to his earlier work with residential students at four-year institutions). The more current literature led him to update his model to indicate that commuter students were more influenced by
academic and external factors than by social and on-campus factors. Despite the more influential role of academic integration, Tinto did find that informal contact with faculty, staff, and other students was important for nontraditional students’ social integration. Tinto’s (1993) updating of his model resulted in the creation of 13 testable propositions (Braxton, 2002; Braxton & Lien, 2002); he, however, did not empirically test his model.

**Tests of Tinto’s updated model.**

Braxton, Sullivan, and Johnson (1997) reviewed the 13 propositions of Tinto’s revised model, using both multi-institutional and single-institutional tests. Their multi-institutional tests provided strong support for four propositions; their single-institutional tests provided strong affirmation for five propositions.

Multi-institutional and single-institutional tests of relationship between academic integration and subsequent institutional commitment yielded different results. Multi-institutional tests provided strong support (75 percent of the tests showed statistically significant relationship between academic integration and subsequent institutional commitment); single-institutional tests provided modest support (64 percent of tests showed a statistically significant relationship between academic integration and subsequent institutional commitment).

Multi-institutional and single-institutional tests of relationship between academic integration and departure also yielded different results. Multi-institutional tests provided strong support (75 percent of the tests showed statistically significant relationship between academic integration and departure); single-institutional tests provided modest support (51
percent of tests showed a statistically significant relationship between academic integration and departure).

In looking at support by institution type, multi-institutional tests conducted in community colleges yielded modest support (50 percent were statistically significant). Their findings indicated that the magnitude of support for influence of academic integration on subsequent institutional commitment and persistence varied among multi-institutional and single-institutional tests of these relationships.

Given the mixed empirical support—with multi-institutional tests showing strong support of effect of academic integration on both subsequent commitment and persistence, and single-institutional tests providing only modest support—the authors concluded that Tinto’s theory was only partially supported and lacked internal consistency, and that academic integration had only a modest positive influence on commitment to goal of graduation (Braxton, 2002; Braxton & Lien, 2002).

Pascarella and Terenzini (2005), using the criteria and terms applied by Braxton et al. (1997), found at least moderate support for Tinto’s propositions. Ten multi-institutional studies produced moderate or strong support for the 15 propositions, and single-institution studies produced moderate or strong support for 11 of the 15 propositions, leading them to conclude that students’ institutional commitments have an important and positive influence on persistence decisions, both in urban commuter and residential settings. In concurrence with Braxton et al. (1997) and Astin (1993), Pascarella and Terenzini believed that a student’s involvement and integration in any of the components of an institution’s academic
and social systems can be a critical factor in their persistence decisions; student involvement is related to persistence.

While Tinto’s model explained the longitudinal process of student withdrawal from a particular institution, it was not a systems model of departure (Braxton & Lien, 2002). In addition, it focused on explaining attrition of traditional-aged students within a community college setting. Although some support was found for attrition at community colleges, the model did not address older nontraditional students who have comprised an increasingly larger percentage of undergraduate enrollments (Carnegie Council on Policy Studies in Higher Education, 1980). The development of a more explanatory model was taken up by Pascarella, Duby, and Iverson (1983).

**Pascarella, Duby, and Iverson’s Model for Nonresidential Institutions**

Pascarella, Duby, and Iverson (1983) contributed to the existing literature on postsecondary attrition by applying Tinto’s model to a nonresidential, commuter institution. Given that commuter students are less likely than residential students to become involved in the institution’s cultural and social environments, Pascarella et al. theorized that the influential attrition factors validated in Tinto’s model at residential institutions would not be generalizable to nonresidential commuter institutions. They believed that pre-enrollment traits, which were not tested with a nonresidential sample by Tinto or earlier models, would exert a stronger influence on attrition in nonresidential settings. Using Tinto’s major theoretical concepts, their model included background characteristics, social and academic
integration, and goal and institutional commitments, and also introduced the concept of intention.

In their model, academic integration exerted a direct and positive effect on persistence (as in Tinto’s model), however, social integration played a much less significant role. This model was developed specifically to represent nonresidential institutions where students commute; the defining characteristics of this population introduce intervening variables not present in other models developed for residential populations. For example, nonresidential students must spend time commuting to school, leaving less time—and consequently, less interest—to engage in the social systems of the institution. Social integration is therefore a lower priority. Additionally, nonresidential students typically have commitments external to the campus environment; these external responsibilities further tax students’ limited time, further reducing the student’s availability and interest in social engagement.

The model put forth by Pascarella, Duby, and Iverson indicated that for nonresidential commuter institutions, intention was the strongest predictor in persistence decisions; academic integration was more important than social integration; and background traits played a more influential role than at residential institutions. While this model addressed attrition at commuter institutions, and introduced and validated the significance of intent as a predictor of persistence, it did not address attrition of nontraditional students at these institutions. Their research was expanded upon by Bean and Metzner (1985).
Bean and Metzner’s Model of Nontraditional Student Attrition

As student demographics changed in response to changing institutional, curricular, political, economic, and social factors (Bean & Metzner, 1985), the one-size-fits-all explanation of student attrition was no longer valid; new models needed to be developed and tested. Noting that the theoretical models of Spady (1970, 1971) and Tinto (1975) relied heavily on socialization and that nontraditional students, based on their defining characteristics, have limited opportunities for socialization, Bean and Metzner (1985) conducted an extensive literature review of several hundred studies. Their search found that only four studies specifically addressed attrition of part-time commuter students, and only five studies included separate analyses of older commuter students. In addition, the few existing multivariate studies of nontraditional students that were guided by theory, used theory that was developed for traditional students and compared nontraditional students with traditional students. Given the lack of dedicated nontraditional student attrition research that utilized theory developed for that purpose, Bean and Metzner proposed a theoretical model for nontraditional student attrition (Metzner & Bean, 1987) (Figure 2.2).
Key:
- » Direct effects
— * Direct effects presumed most important
*...* Compensatory interaction effects
< T Possible effects

Figure 2.2. Bean and Metzner’s Model of Nontraditional Student Attrition. From “A Conceptual Model of Nontraditional Undergraduate Student Attrition,” by J. P. Bean and B. S. Metzner, 1985, Review of Educational Research, 55, p. 491. Reprinted with permission.
The foundation for Bean and Metzner’s (1985) model was Bean’s (1979, 1980) causal model of student attrition that itself was derived from Price’s (1977) model of turnover in work organizations. A fundamental assumption of Bean’s research was that student attrition is analogous to employee turnover, with individuals choosing to leave their respective institutions for comparable reasons. Organizational factors affect an individual’s satisfaction, which in turn influences the individual’s decision to leave the organization. Bean also incorporated background variables to reflect the influence of an individual’s characteristics on the interaction dynamics. His model indicated the influence of background characteristics and organizational determinants on satisfaction; the influence of satisfaction on an individual’s commitment to the institution; and the influence of commitment level on the decision to drop out. He found that institutional commitment was the most important variable in explaining dropout. Although his study involved a homogenous sample of freshmen at a university, he recognized the need for this model of student attrition to be tested at different types of postsecondary institutions. His model of background variables, organizational variables, and intervening variables laid the groundwork for his subsequent work with Metzner in understanding nontraditional student attrition.

Bean and Metzner (1985) defined a nontraditional student as an individual with at least one of the following three traits: older than 24, attends part-time, and/or commutes to school. It is this last criteria—residence—that is the most critical in terms of differentiating nontraditional from traditional students (Stahl & Pavel, 1992). Whereas the most prominent traditional attrition research (Pascarella, 1980; Spady, 1970; Tinto, 1975) emphasized
socialization factors, Bean and Metzner, in their review of the literature found a lack of support for any positive, significant relationship between social integration and persistence for nontraditional students. Commuters spend very little time on campus outside of the classroom, and are therefore afforded fewer opportunities for social integration, the foundation of Spady’s and Tinto’s models. Bean and Metzner believed that lessened socialization opportunities, in terms of both duration and intensity, with faculty and peers meant that nontraditional students were not heavily influenced by the social environment but were more greatly concerned with the academic offerings of the institution. Their theory of nontraditional student attrition differs from models of traditional student attrition (such as those put forth by Spady, Tinto, and Pascarella) in that they believe nontraditional students are more affected by their external environment than social integration variables.

To reflect the differences in influential factors, Bean and Metzner’s model omits social integration as a primary component but incorporates two environmental variable categories—college environment and external environment. Based on Bean’s (1982) findings that intent to leave was the most powerful predictor of dropout at a Midwestern land grant university, their model emphasizes psychological processes—namely intent—as a determinant of a student’s decision to persist. Dropout decisions (failure to enroll the following semester and lack of completion of program of study) are based on four sets of variables—academic performance (measured by grade point average), intent to leave (influenced primarily by psychological outcomes and academic variables), background and defining variables (primarily high school performance and educational goals), and
environmental variables (finances, hours of employment, outside encouragement, family responsibilities, opportunity to transfer)—which have substantial direct effects on persistence decisions). In addition, there are two sets of interaction effects—the first is between academic variables and environmental variables; the second is between academic outcomes and psychological outcomes. In both instances, the academic considerations are the less influential factors. A nontraditional student who has low values for their academic variables will continue to persist if the values of their environmental variables are positive. Similarly, a nontraditional student with poor academic outcomes will continue to persist if their psychological outcomes are positive. Strong environmental variables and psychological outcomes will compensate for deficiencies in academic support, but strong academic support will not compensate for weak environmental variables or psychological outcomes. The inclusion of environmental variables, which, according to the model, exert a stronger influence than academic variables, makes this an attractive model for community colleges who must consider such factors when seeking to improve persistence.

Bean and Metzner’s model was validated when they conducted a study (1987), the first such study to be guided by a conceptual model dedicated to explaining attrition of nontraditional students, using data from 624 nontraditional (part-time, commuter) freshmen at a primarily commuter university. Results showed that nontraditional students dropped out due to poor academic integration—inferior academic performance or a lack of commitment to the educational process at the institution; the decision to drop out was not related to social factors at the school. The best predictors of dropout were GPA, intent to leave, and credit
hours enrolled; with utility of education for future employment, satisfaction with student role, transfer opportunity, and age also having an impact through intent to leave. Their findings also indicated that absence from class, age, high school performance, and ethnic background had indirect effects on dropout through GPA. The lack of statistical significance of social integration variables was contradictory to findings in attrition studies of traditional students, suggesting that Tinto’s (1975) theoretical model, with its emphasis on social integration, is not relevant for attrition of nontraditional students. Although their model proved valid for nontraditional students, data were collected from part-time commuter students at a four-year institution; the model was not assessed with data from a community college or older nontraditional students.

Summary

Tinto (1975, 1993), long considered the stalwart of persistence, focused on persistence of traditional college students. For this population, he found that both academic and social integration were significant predictors of persistence. Bean and Metzner (1985) expanded the research on college persistence to nontraditional students. While their findings extended Tinto’s findings that academic integration is significant to the persistence of nontraditional students, they disagreed with the role of social integration. According to Bean and Metzner’s model, the most important discriminating factor between traditional and nontraditional students is the factor of residence. As commuters, nontraditional students are not heavily influenced by social integration factors.
Since its introduction, Bean and Metzner’s (1985) model has served as the foundation of persistence research of nontraditional students (Barnhart, 2011). Researchers of community college persistence (Boice, 2007; Butters, 2003; Byun, 2000; Hoyt, 1989; Jones-Ford, 2002; McMillen, 1995; Nippert, 2000-2001; Wade, 1995) have especially found the model attractive (and more applicable than Tinto’s (1975) model) given its focus on students who are older, part-time, and commuters.

**Social Support**

Any change causes some degree of stress (Schlossberg, 1981). A key to coping with transitions and handling stress is social support (Elliott et al., 2011; Goodman, Schlossberg, & Anderson, 2006; Heller & Swindle, 1983; Schlossberg, 1984; Schlossberg, Waters, & Goodman, 1995; Thoits, 1995). Robert Kahn noted that “…the adequacy and stability of social support is a determinant of objective and subjective well-being, of performance in the major social roles, and of success in managing changes in those roles” (as cited in Schlossberg, 1981, p. 10).

However, social support is not one-size-fits-all—it can come in many forms and from many sources. It is both situation- and individual-specific. Support can take a tangible form (physical or financial assistance) or be intangible (as in the provision of information or emotional support). Researchers have identified support needs to include self-esteem (Goodman & Hoppin, 1990; Thoits, 1995; Waters & Samson, 1993), acceptance, love and physical intimacy, personal and work connections, peers, stimulation and challenge, role models, guidance (mentors and sponsors), comfort and assistance (Waters & Samson, 1993),
encouragement, information, referrals, door openers, and practical help (Goodman & Hoppin, 1990). Sources of social support include intimate relationships, family members, friends, and membership institutions and communities (Goodman et al., 2006; House, Umberson, & Landis, 1988; Procidano & Heller, 1983; Schlossberg, 1981, 1984; Schlossberg et al., 1995).

**Social Support and College Students**

Research (Astin, 1993; Dennis et al., 2005; Hurtado et al., 1996) has demonstrated that social support, particularly from peers, is important for the academic adjustment of college students. Procidano and Heller (1983) conducted three validation studies among university undergraduates and found that symptoms of distress were inversely related to perceived social support both from family and from friends. Robbins et al. (2004), in their meta-analysis, found that social support is a robust predictor of retention. Hefner and Eisenberg (2009) evaluated the relationship between social support and mental health of college students at a large public university. Their findings supported the hypothesis that students who have characteristics that differentiate them from the remainder of the student body—such as veteran students—are at greater risk for social isolation. Additionally, they found that students who reported lower quality social support were more likely to experience mental health problems; in turn, research has found an association between mental health and academic success (Kessler et al., 1995).
Social Support and Veterans

Social support among military personnel is considerable both during and after active service (Barber, Rosenheck, Armstrong, & Resnick, 2008; Laffaye, Cavella, Drescher, & Rosen, 2008). Qualitative research has consistently reported that social support is an important factor that influences veteran students’ adjustment to higher education, but has also reported that veteran students consider there to be a lack of informational or emotional support from peers (DiRamio et al., 2008; Elliott et al., 2011; Livingston et al., 2011; Persky & Oliver, 2011; Rumann & Hamrick, 2010). While qualitative research has revealed the significance of social support for veteran students, there is a paucity of quantitative studies investigating social support among this population (Whiteman et al., 2013), especially on community college campuses. Veteran students may make use of any combination of all four sources of support (intimate relationships, family members, friends, and membership institutions and communities), however this study focused on the last category—membership institutions and communities—seeing it is this category over which community colleges have influence and control.

One line of research has positively linked social support with the well-being of college students. Another line of research has demonstrated the importance of social support to members of the military, both before and after their service. It therefore seemed to be a natural extension to combine these research areas to study the impact of social support on the persistence of veteran students. Tinto (2002), one of the stalwarts of persistence research, has noted that students are more likely to persist in settings that provide social support.
Recognizing the unique characteristics of community colleges and their students, along with the outdated mindset of one-size-fits-all to explain persistence, recent researchers have utilized other frameworks to examine community college student persistence.

**Johnson (1991)**

Johnson (1991) formulated a conceptual model of nontraditional student attrition in postsecondary vocational programs. His model, based on the work of Bean and Metzner (1985), Pascarella, Duby, and Iverson (1983), Spady (1970, 1971), and Tinto (1975), contained four primary sets of variables—background characteristics, social/psychological integration, academic/institutional integration, and environmental mediating factors—with expanded variables of interest to accommodate the new subgroups and educational settings under consideration. Normative congruence (correspondence) between students’ satisfaction and satisfactoriness directly affects educational adjustment and subsequent dropout decisions. This was only an initial conceptualization and lacked empirical evidence; Johnson did not test the model to verify the importance and statistical quality of the included variables.

**Stahl and Pavel (1992)**

Stahl and Pavel (1992), finding a lack of studies to validate Bean and Metzner’s model, used structural equation modeling to assess the model with data from an urban community college. They found the model to be a weak fit and used exploratory factor analysis to identify a new model, the Community College Retention Model, with 22 measurement variables (Figure 2.3).
Stahl and Pavel’s model retained many of the variables proposed by Bean and Metzner, but in different associations or groupings. They chose to focus on variables that would help explain the dropout decision but could also be influenced by the college in efforts to increase persistence. As such, three background variables—age, ethnicity/race, and gender—were omitted as they were considered attributes that cannot be affected by interaction with the college environment. Additional constructs were incorporated—academic advisement, absenteeism, course availability, outside encouragement, utility, goal commitment, and stress. Their computer program (LISREL, Linear Structural
RELationships) helped to identify ten additional relationships whose incorporation improved the chi square/degrees of freedom (df) ratio. This model was tested with their community college data, as well as two gender-specific student subgroups. While their overall goodness-of-fit measures indicated that the model was plausible for explaining retention for both genders, it appeared to be stronger for male students.

Although the model is comprehensive with 22 measurement variables, not all were significant or indicated reasonable influence; the researchers therefore noted that a more “parsimonious” (p. 36) model could be developed seeing not all of the 22 variables in their model were significant or indicated reasonable influence. Boyles (2000) noted some fallacies in Stahl and Pavel’s analyses: citing Kelloway (1998), the use of the chi square/df ratio in evaluating Bean and Metzner’s model was unwise due to the subjective nature of the statistic’s interpretation (based on the researcher’s experience). Additionally, Stahl and Pavel used their existing data set to not only develop their model, but to test it as well; structural equation modeling (SEM) literature (Kelloway, 1998; Maruyama, 1998; Mueller, 1997) recommends that when a model is substantially altered, a new data set—not the one used to generate the model—should be used for cross-validation purposes. Their model, despite its shortcomings, did advance the work of Bean and Metzner by recognizing the need to not only explain the attrition of nontraditional students, but to address nontraditional students within a community college setting. Theirs seems to be the only research in which a model was developed specifically for community colleges.
Sandiford and Jackson (2003)

Sandiford and Jackson (2003) used a theoretical framework that combined Tinto’s (1975) Student Integration Model, Bean’s Student Attrition Model, Bean and Metzner’s Nontraditional Undergraduate Model, and Stahl and Pavel’s (1992) Community College Retention Model to examine the relationship among academic, socioeconomic, and motivational variables to attrition of 190 first-semester students in a community college nursing program where attrition rates are as high as 29-35 percent. Their correlational study used a discriminant analysis procedure and five independent variables—pre-semester GPA, English proficiency level, achievement tendency, hours planned to work, and difficulty in educational financing—to predict the dependent variable, the final course outcome of pass or no pass. They found that college language level assessment and pre-semester GPA were significant predictors and inversely related to final course outcome (pass or no pass) and that the three nonacademic variables of hours planned to work, financial difficulty attending college, and achievement tendency were not significant predictors. Despite the fact that the researchers’ framework included four persistence models, three of which emphasize the significance of intent as a predictor of persistence, this study looked at persistence only from an academic success perspective; its variables measured the likelihood of academic success (passing) which in turn would determine persistence.

Museus and Quaye (2009)

Museus and Quaye (2009) used Kuh and Love’s (2000) eight cultural propositions to examine the persistence of ethnic minority students at a community college. Although they
did not examine nontraditional students per se, one can posit that nontraditional students are a subset of minority students; a larger limitation of their study is that their findings were based on students who persisted. Highlighting the connection between student-perceived campus climate and persistence, they found that the efforts of individual agents can be more important than student organizations.

**Karp, Hughes, and O’Gara (2010/2011)**

The qualitative research of Karp et al. (2010/2011) of 44 students at two community colleges not only found similar support for Tinto’s framework in a community college setting, but also found an interconnection between academic and social integration. As with Deil-Amen (2011), the researchers found that academic experiences led to academic relationships and integration, which in turn led to social relationships and integration.

**Deil-Amen (2011)**

In her mixed methods study of 125 students at 15 community colleges (7 public and 8 private), Deil-Amen (2011) validated the significance of Tinto’s constructs of academic and social integration to persistence within a community college setting. Additionally, she found that the two forms of integration were interconnected and indistinguishable, with in-classroom experiences and interactions providing the foundation for both forms of integration. Her study also brought to light the significant role of institutional agents—faculty, staff, and advisors—in the socioacademic integrative process.

The studies of Deil-Amen (2011) and Karp et al. (2010/2011) demonstrate the applicability of Tinto’s student departure theory, developed for traditional students at four-
year institutions, to nontraditional students at two-year institutions—with some adaptation to accommodate the characteristics and situations that differentiate nontraditional students from traditional students. Whereas academic and social integration are central tenets to persistence in both types of institutions, the source of social integration differs—provided by social activities and interactions at four-year institutions compared with academic experiences at two-year institutions.

**Barnett (2011)**

To examine the impact of community college students’ interactions with faculty on persistence decisions, Barnett (2011) tested two of Tinto’s propositions utilizing Rendón’s (1994, 2002) validation construct as her framework. Rendón posited that validation—feelings of self-worth and the ability to succeed that are generated through interactions that demonstrate recognition, respect, and appreciation—is more important than integration in the persistence of nontraditional and community college students. Barnett’s study, the first to use correlational methods to examine students’ experiences with validation, sought to understand the relationships among validating experiences, academic integration, and intent to persist. Barnett found that both faculty validation and academic integration predicted intent to persist; however, academic integration had a direct effect while faculty validation had an indirect effect that was mediated by academic integration.

Significant to the current study is Barnett’s finding empirical support of the importance of validation by faculty and others in the community college community in student persistence. Equally relevant are the four subconstructs she uncovered—that students
are known and cared for, caring instruction, appreciation for diversity, and mentoring—all of which can be designated as institutional support variables. A major shortcoming of Barnett’s study, however, was the sample’s lack of representation of the studied population (or the overall community college population) in terms of enrollment status—whereas 63 percent of the campus enrollments were part-time students, only 36 percent of the sample respondents were enrolled part-time.

**Capps (2012)**

Capps (2012) affirmed the influence of campus climate on students and their persistence decisions (although not necessarily in obvious, recognizable ways) in her qualitative study of nontraditional student persistence at a community college. Although the interviewed students credited themselves and their families for their persistence, they made frequent mention of the impact of teachers and advisors on their institutional outlooks and decision-making, demonstrating the influence of institutional representatives.

**Nakajima, Dembo, and Mossler (2012)**

Another development in community college persistence research has been the advancement of multivariate studies (compared to studies that made use of single variables in their analyses). Nakajima et al. (2012) conducted a study that simultaneously investigated psychosocial variables, environmental variables, and demographic variables. They found that when all variables were considered, cumulative GPA was the strongest predictor of persistence, suggesting that post-enrollment occurrences are more influential than pre-college variables. Contrary to expectations and previous research, neither academic integration nor
psychosocial variables predicted persistence. Their findings also revealed that almost all of
the variables were interrelated, implying that persistence decisions are not simple univariate
decisions—they are most likely the result of a combination of factors.

**Veteran Students’ Persistence**

“Veterans are adult at-risk students with life experiences that far transcend those of
typical university students” (Julia Odell, president of the National Association of Veterans
Upward Bound Project Personnel, as quoted in Chappell, 2010). Despite the fact that they
are an at-risk population, the federal government doesn’t track the completion or retention
rates of veteran students in postsecondary education (O’Herrin, 2011).

The challenge of improving veteran student persistence is compounded by the
diversity of policies and practices employed by different institutions to assess persistence and
completion. Lack of universal standards and requirements have made the collection and
reporting of data, and the subsequent ability to benchmark, impossible (Mikelson &
Saunders, 2013). The persistence tracking methodology used by IPEDS (the Integrated
Postsecondary Education Data System, the federal reporting system required to be used by all
institutions that receive federal student financial aid)—the cohort tracking approach—is not
appropriate for nontraditional, and in particular veteran, student populations seeing it tracks
only first-time, full-time freshmen.

In response to the growing interest in monitoring veteran student persistence and the
shortcomings of IPEDS to do so accurately, the National Center for Education Statistics
(NCES, which is responsible for IPEDS) convened a technical review panel in November
2001 called “Collecting Data on Veterans.” While the panel recommended (among other suggestions) that IPEDS should be used to collect data from each institution on the number of veteran students, veteran-serving programs being offered, and the amount of Post-9/11 GI Bill benefits awarded, it also acknowledged that IPEDS currently did not capture any data on veteran students and that “collecting additional data on completions, persistence, and graduation rates of veterans…in IPEDS is not feasible at this time and needs further study due to the limitations in data systems and available data” (Servicemembers Opportunity Colleges, 2012, p.6).

The increased interest in the experiences and outcomes of veteran students, along with calls for accountability, reach as far as the Executive Office. On April 27, 2012 President Obama signed an executive order mandating (among other stipulations) that any institution that receives veteran education benefits must provide outcomes data (Servicemembers Opportunity Colleges, 2012; The White House, 2012). However, databases that would facilitate the tracking of veteran student outcomes are not available—there are no accurate counts on the number of veterans enrolled in U.S. postsecondary institutions, there is limited information on the success rates of veteran students, there is a lack of knowledge of the factors that affect the success of veteran students and institutional practices likely to enhance their persistence (Servicemembers Opportunity Colleges, 2012; NASPA Research and Policy Institute & InsideTrack, 2013).

A report produced by Radford, Wun, et al. (2009) for the U.S. Department of Education provides a profile of military service members and veterans enrolled in
postsecondary education in 2007-2008, just prior to the passage of the New GI Bill. This report does not focus exclusively on community colleges (43.3 percent of its military undergraduates were enrolled in public two-year institutions), nor does it address how to enable persistence, but it does provide baseline data to compare enrollments and student characteristics in future studies.

Operation College Promise (OCP) and the Pat Tillman Foundation are working together to develop the nation’s first multi-state, cross-institutional veterans’ Graduation Probability indices (GPI)TM to track student veterans utilizing educational benefits under the Post-9/11 GI Bill. Utilizing factors commonly used to track a traditional cohort (i.e., GPA, percent of students earning all credits pursued, retention rate) as well as a veteran-specific factor, campus service utilization rate, the GPI™ will provide continuous assessment of veteran students’ progress while taking into account their unique needs as nontraditional students. A pilot study, conducted in the summer and fall of 2011, followed a cohort of 160 veteran students attending seven four-year public colleges and universities (where total veteran and active duty enrollment was approximately 6,000). The initial findings revealed that the veteran students are progressing towards degree completion consistently or more rapidly than their traditional peers in the categories that comprise the GPI™—on average, veterans had comparable course loads and had higher GPAs and retention rates; the results also showed that the veterans were making use of the support services established to facilitate their success (Lang & Powers, 2011). The GPI™ is a much-needed step forward in tracking veteran student persistence and the use of institutional support services; however, there are a
number of shortcomings of the pilot study and its relevance to understanding how to enable persistence of veteran students at North Carolina community colleges. Firstly, all seven participating institutions were public four-year colleges and universities; the study did not include any community colleges. Secondly, all of the participating institutions had robust veteran support services which is not representative of all institutions. Lastly, while the findings reported that veteran students utilized the support services at an average rate of 60 percent and a median rate of 86 percent, examination of each institution’s usage rate revealed a wide range of almost 5 percent to 100 percent. It would be insightful to know if there is a correlation between individual usage and retention rates, as well as relationships between usage rate and other variables.

An increasing number of articles explores the experiences of veterans from the wars in Iraq and Afghanistan, however they predominantly provide growing coverage of the unique needs of veterans with disabilities in general, not necessarily in an educational context (Burnett & Segoria, 2009; O'Herrin, 2011; Ostovary & Dapprich, 2011; Smith-Osborne, 2009). There have been studies of returning veterans in educational settings, however there is still a paucity of research dedicated to the persistence of “contemporary” veteran students—military personnel who have served since 9/11 in Iraq and Afghanistan; even rarer are quantitative studies and those of community college students. Some studies sought to ascertain the needs of returning veterans in order to assist educational institutions develop policies and programs, however they looked primarily at experiences at four-year institutions (DiRamio et al., 2008; Elliott et al., 2011; Livingston et al., 2011; Rumann & Hamrick, 2010;
Whiteman, Barry, Mroczek, & MacDermid Wadsworth, 2013); only a handful focused on community college students (Persky & Oliver, 2011; Savage & Smith, 2008; Wheeler, 2012; Zinger & Cohen, 2010). Ackerman et al. (2009) looked at the transition made by combat veterans when they became college students. Their study involved 25 participants, all at four-year universities and all were enrolled full-time; in addition, nine had attended college prior to serving on active duty, so their first identity was as a student rather than a veteran.

Despite being limited, there have been investigations into the persistence of veteran students at community colleges. Persky and Oliver’s (2011) mixed methods examination of the needs of veterans who are community college students was framed by human capital theory of education and Rendon’s theory of validation. Their research resulted in the emergence of five themes—credit streamlining; streamlining of programs and services; faculty, advisor, and counselor training; difficulties encountered by veterans; and factors that constitute a veteran-friendly campus. While they sought to uncover the perceived areas in need of improvement, they did not specifically examine persistence. However, their findings are useful for guiding future attrition-dedicated studies by highlighting areas of importance and concern for veterans that, if addressed, could aid community colleges in increasing enrollments, improving retention, and enhancing completion rates.

Savage and Smith (2008) conducted a quantitative study that specifically examined persistence of military students at Community College of the Air Force (CCAF). Using Snyder’s hope theory, they focused on the psychological orientations that could possibly explain student success. They found that goal orientation was the strongest predictor of
degree attainment for their sample. Only two other variables, ASVAB (Armed Services Vocational Aptitude Battery test) scores and shift worked, were significant predictors of CCAF graduation. This is one of the few studies that specifically looked at veteran persistence. However, they studied a unique population (active duty Air Force master sergeants) enrolled in a unique institution (CCAF does not have a campus of its own—students attend civilian institutions located in or near the communities where they are stationed). Their population members were still active military personnel who may not face the same challenges as non-active duty veterans returning to school. Their findings, while insightful in guiding future research, may not reveal all the variables that may come into play at institutions that are not dedicated exclusively to military students.

Wheeler (2012) studied the transition process experienced by veterans leaving military service and attending community college for the first time. She sought to understand the process that Iraq and Afghanistan veterans experience as they leave overseas deployment and negotiate the changes involved in transitioning to being a student. Her qualitative research at an upstate New York community college was guided by Schlossberg’s (1984) theory of adult transitions and resulted in the emergence of three themes that capture the elements of the transition process—academic experience (including preparation for college and perceptions of the learning environment), personal connections and interactions (including family/significant others, pre-military friends, military friends, and peers), and benefit bureaucracy. Similarly, Zinger and Cohen (2010) used qualitative research to
examine the challenges faced by veteran students at a New York community college when they return to the classroom.

National Studies of Veteran Student Persistence

**American Council on Education.**

The American Council on Education sponsored two studies (Cook & Kim, 2009; McBain et al., 2012) to gauge the preparedness of American higher education to serve veteran students. The initial research (Cook & Kim, 2009) was the first national effort to gather information on institutional programs, policies, and services that were in place and planned; the follow-up research (McBain et al., 2012) was a collaborative effort with the American Association of State Colleges and Universities (AASCU), NASPA: Student Affairs Administrators in Higher Education, and National Association of Veteran’s Program Administrators (NAVPA), and when compared with the original findings, provided a portrait of the impact of the influx of returning veterans and how postsecondary institutions are responding.

Of the 690 responding institutions 238, or 34 percent, were public two-year institutions. Overall, they found that the average enrollment of veteran students increased significantly, from 156 in 2009 to 370 in 2012, and that institutions with larger veteran populations were more likely to have in place veteran-specific programs and services (especially services such as staff training, a dedicated office, and targeted recruiting efforts). The presence of veteran-specific programs and services was also related to whether veteran students were included in the institution’s strategic plan. In 2012, 70 percent of the
responding public two-year institutions included veterans in their strategic plan (compared to 68 percent in 2009); despite this 2 percent increase, the percentage of two-year institutions with veteran-specific initiatives declined 8 percent from 67 percent in 2009 to 59 percent in 2012. In 2012, community colleges explored private funding for campus programs (27.8 percent), established a department (33.5 percent), increased budgets for programs and services (27.8 percent), provided professional development for faculty (43.6 percent) and staff (54.6 percent), trained counseling staff (43.2 percent), increased staff (40.5 percent), and increased the number of programs and services (49.3 percent).

**2010 National Survey of Veterans.**

The 2010 National Survey of Veterans, conducted by the Department of Veterans Affairs, was not designed specifically to gauge postsecondary persistence, however it did include a measure of goal attainment. Westat (2010) surveyed VA beneficiaries regarding VA programs and services, including education benefits. Although 63 percent of survey respondents indicated they had completed their postsecondary educational goal, that figure is deceptive. The study included veterans from a 45-year period that dates back to the end of the Korean War. When one examines the responses from veterans who served after 9/11, the completion rate drops to 51.1 percent; however, as Cate (2014) points out, that figure will most likely increase with the passage of time as additional “contemporary veterans” complete their degrees or programs. More important than the drop in completion rate is the significant drop in sample size when one considers only contemporary veterans; the extremely small sample size results in weak conclusions. The survey design also included some
shortcomings—it relied on self-reported data, measured completion with a single question, contained questions that could have been misinterpreted, and featured non-exhaustive answer options—which could contribute to response errors and imprecise findings.

**NASPA and InsideTrack.**

In November 2012, NASPA and InsideTrack combined an online survey with interviews to gauge what efforts were being undertaken by institutions to track veteran student progress and outcomes, as well what they were providing in the way of student support and their perceived effectiveness of these practices. Of the responding 239 institutions (of 1,162 invited), 33 of the respondents were public two-year colleges. Nearly 75 percent had dedicated offices and/or personnel specifically for veteran and active duty students; nearly 67 percent offered professional development to faculty and staff to address the unique needs of this population; and most had various initiatives to promote success. However, only 25 percent claimed to understand the causes of attrition (either stop-out or dropout) of veteran and active duty student; and 33 percent had disaggregated veteran student retention and/or completion rates (1 percent tracked retention only, 6 percent tracked degree completion only, and 26 percent tracked both retention and completion). Of the 67 percent who tracked neither retention nor completion, 38 percent indicated they had institutional goals to improve retention and completion rates for veteran students over the next two years. While most listed various initiatives under way to improve retention and completion, only 5 percent indicated their initiatives were effective and had the data to prove it. The results of this study showed that while it has been recognized that there is a need to enhance the
experiences and improve the retention and completion rates of veteran students, and increased fiscal and human resources are being dedicated to that ends, there is limited data to support the decisions on how to do so (NASPA Research and Policy Institute & InsideTrack, 2013).

**Summerlot, Green, and Parker (2009).**

Noting that involvement in campus organizations—something that is lacking on community college campuses—can be important to student success, Summerlot et al. (2009) discussed the role that student veterans organizations (SVOs) can play in the development of a sense of community, and therefore connection, among veteran students. Based on their personal experiences as veterans, along with conversations with veteran students around the country, the researchers categorized campus climates as either supportive, ambivalent, or challenging towards veteran students. Community colleges, as commuter campuses with large nontraditional student populations, were characterized as ambivalent—settings where veteran students lack a connection to the campus and find little or no recognition or campus-based support services. It is in this type of setting that SVOs can play a crucial role—providing much-needed support services and programs in the form of networking, peer mentoring, and advocacy efforts that enable veterans to connect with fellow veteran students and facilitate the transition to and success in the academic environment.

**Million Records Project.**

The Million Records Project, a national study that sought to rectify the lack of accurate data on the academic outcomes of veteran students at postsecondary institutions,
was a collaboration among Student Veterans of America (SVA), the National Student Clearinghouse (NSC), and the Department of Veterans Affairs’ Veterans Benefits Administration (VA). The VA provided the records of one million veterans—500,000 of whom used Montgomery GI Bill benefits from 2002-2010 and 500,000 of whom used Post-9/11 GI Bill benefits from 2009-2010; these were matched with data contained within NSC’s Signature Reports, which focus on postsecondary completion rates of U.S. college students. Performing secondary data analysis, the researchers examined the veterans’ completion rate, time to completion, level of education, and field of study/degree pursued; they found that student veterans exhibited strong postsecondary academic outcomes, with 51.7 percent earning a postsecondary degree or certificate. Three of the military branches had higher completion rates than the sample average of 51.7 percent—Navy (51.9 percent), Coast Guard (53.5 percent), and Air Force (66.9 percent); the Marine Corps had a completion rate of 44.9 percent and the Army had a completion rate of 47.0 percent. The average time to completion for an associate’s degree was 5.1 years, the median length of time was 4 years, and the mode was 2 years. Many veteran students continued on to achieve higher levels of postsecondary education—31.3 percent of those who initially earned a vocational certificate and 35.8 percent of those who initially earned an associate’s degree went on to earn a higher degree. Lastly, the study found the following degree fields to be the most popular among those pursuing an associate’s degree: liberal arts and sciences (33.5 percent), business (17.8 percent), homeland security, law enforcement, firefighting (9.7 percent), health professions (9.3 percent), and engineering technologies (7.6 percent).
The researchers’ methodology enabled them to overcome some of the shortcomings of other studies. The sample size was more inclusive—the VA can identify almost every single veteran (unlike the Department of Education) and the NSC’s Signature Reports contain data of students often overlooked by other databases such as IPEDS (i.e., students who transfer). In addition, the data contained in the Signature Reports are institutional records, rather than self-reported. The findings of this study are therefore more accurate and, with reduced response error and survey-related biases, more valid. This study represented not only one of the most comprehensive examination of veteran student outcomes, but also provided a national benchmark—something that had been lacking (Cate, 2014).

**Programs and Services to Enhance Veteran Student Persistence**

Increased attention to the needs of this growing student population has resulted in expanded efforts to gather information and promote best practices for the benefit of veteran students and the institutions that serve them. Initiatives are underway at both the national and local levels.

**National Programs to Enhance Veteran Student Persistence**

**Yellow Ribbon Program.**

The Yellow Ribbon GI Education Enhancement Program (Yellow Ribbon Program), part of the Post-9/11 GI Bill, provides veterans with additional tuition funds; to compensate for any shortfalls in Post-9/11 GI Bill funding, the federal government will match tuition contributions made by the institution dollar-for-dollar. By providing additional tuition dollars, this program provides veterans with more flexibility on where they choose to go to
school (Redden, 2009; U.S. Department of Veterans Affairs, 2013). Over 700 institutions initially signed up for the program; five of the 58 North Carolina community colleges are participants in the Yellow Ribbon Program (U.S. Department of Veterans Affairs, 2013).

**Veterans Upward Bound.**

The Veterans Upward Bound (VUB) Program, sponsored by the U.S. Department of Education and part of the Federal TRIO Programs, is a free-to-the-veteran education program developed to assist low-income and first-generation college-bound veterans prepare for and complete postsecondary education (National Association of Veterans Upward Bound, 2013; U.S. Department of Education, 2013). Of the veterans who participate in VUB programs, 72 percent are both low-income and first-generation college students, 67 percent are unemployed, and 39 percent are disabled (Chappell, 2010). VUB programs help veterans prepare for college-level work through assessment of academic skills and academic refresher courses. They also provide additional services such as assistance with completion of college admission forms, personal academic advising and career counseling, help with GI Bill applications, assistance with completion of financial aid applications and finding scholarships, career guidance and planning, campus visits, tutoring and mentoring, and referrals to other community agencies that serve veterans (National Association of Veterans Upward Bound, 2013; U.S. Department of Education, 2013). In fiscal year 2012, $14 million was appropriated for VUB programs, which served 6,831 veterans across the country; on average, each of the (then) 51 funded projects—located mainly at community colleges—received about $250,000 (Dembicki, 2013). There are currently 47 VUB programs
throughout the U.S. and Puerto Rico (Aud, Wilkinson-Flicker, Kristapovich, Rathbun, Wang, & Zhang, 2013; National Association of Veterans Upward Bound, 2013); Central Carolina Community College hosts the only VUB program in the state of North Carolina.

**VetSuccess on Campus.**

The VetSuccess on Campus (VSOC) program, sponsored by the U.S. Department of Veterans Affairs, provides on-campus support to help veterans transition to student life and achieve their educational and career goals. Experienced VA Vocational Rehabilitation Counselors (VRCs), called VSOC Counselors, are placed on college campuses to assist veteran students with access to VA benefits and provide counseling services. VSOC was launched in June 2009 as a pilot program at the University of South Florida; six months later the program was expanded to San Diego State University and Cleveland State. Five locations were added in 2011 and an additional 24 colleges—including Salt Lake Community College (Utah), the Community College of Rhode Island, Kellogg Community College (Michigan), Washtenaw Community College (Michigan), Kalamazoo Valley Community College (Michigan), Tidewater Community College (Virginia), and Central New Mexico Community College—joined in 2012. By fall 2013, the program had expanded to another 62 colleges (including a dozen community colleges), bringing the nationwide total to 94 VSOC campuses in 30 states and the District of Columbia. North Carolina has one VSOC site, East Carolina University; none of the 58 North Carolina community colleges is a VSOC school (U.S. Department of Veterans Affairs, Office of Public and Intergovernmental Affairs, 2013).
Servicemembers Opportunity Colleges.

Servicemembers Opportunity Colleges (SOC) was established in 1972 to assist service members complete their postsecondary education. Funded by the Department of Defense, SOC works in conjunction with 15 higher education associations and the Active and Reserve Components of the Military Services. The SOC Consortium has approximately 1,900 institutional members who have agreed to flexible policies to eliminate roadblocks and encourage completion of postsecondary education; such policies include reasonable transfer of credit, reduced academic residency requirements (the number of credit hours that must earned at that institution awarding the degree), and awarding academic credit for military training and experience and nationally-recognized tests (where applicable). Thirty-nine of the 58 North Carolina community colleges are members of the SOC Consortium (Servicemembers Opportunity Colleges, 2013).

Student Veterans Association.

The national organization Student Veterans Association (SVA) was started in 2008. Since its founding, 900 chapters—both on-campus and virtual—have been established, with total membership exceeding 26,000. SVA provides veterans with the resources, support, and advocacy needed to find success in postsecondary education and the civilian workplace. Its Washington DC-based advocacy group supports local chapters, invests in research, and connects alumni and advocates on veterans’ behalf. More than 900,000 users of VA benefits are supported through the SVA; 302,000 have access to an SVA chapter at their school (Altus, 2013).
Statewide Efforts towards Enhancing Veteran Student Persistence

Minnesota.

The state of Minnesota has undertaken various initiatives to ensure that all of its state-run postsecondary institutions meet the needs of their veteran students. In 2006, the legislature appropriated $600,000 for Minnesota Statute 197.585, the Higher Education Veterans Assistance Program. Among the legislation’s mandates are requirements that all state colleges and universities provide adequate space for a veterans center, and recognize coursework and award academic credit for a veteran’s military training and service (if it meets the American Council on Education’s requirements or equivalent) (Lokken, Pfeffer, McAuley, & Strong, 2009). That same year, Minnesota Statute 197.775, Higher Education Fairness, went into effect; under that legislation, all veterans—regardless of their state of origin or residency—are to be regarded as Minnesota residents for tuition purposes (pay in-state tuition). Additionally, institutions may not assess late fees if the veteran is waiting on receipt of benefits payment, nor may the institution prevent them from registering for upcoming terms (Lokken et al., 2009; Mikelson & Saunders, 2013). In 2007, the Minnesota GI Bill ensured that all Minnesota veterans who served on or after September 11, 2001 are eligible for tuition assistance if the cost of tuition exceeds the amount received from federal student aid and federal military benefits (Lokken et al., 2009).
Individual Community College Initiatives towards Enhancing Veteran Student Persistence

Lee College (Texas).

Lee College in Texas is committed to helping its veteran students successfully transition from military service to classroom to workforce. The Veterans Center at Lee College was established in 2011 in part through the College Credit for Heroes grant. The Veterans Center strives to provide support and up-to-date information on VA benefits and other important events such as job fairs, job openings, and internship opportunities. In addition to providing a friendly environment where veterans can interact with each other, the Veterans Center provides services such as academic support (Individual Education Plan, placement tests, academic advising/referrals, transfer assistance, academic success workshops, computer and Internet access, veterans library for school books, evaluation of military transcripts to provide maximum credit through Lee College and College Credit for Heroes program), veterans educational benefits advising/certification, and moral/mental health support (mentoring, career guidance, peer-to-peer individual/group tutoring, basic individualized counseling and referral for PTSD, TBI, etc.) (Lee College, 2013).

The center’s popularity and success are reflected in the statistics. During its first month of operation in September 2011, 47 veterans and family members visited the center; in January 2013, 399 veterans and family members visited the center. Since its opening, veteran student GPA has increased (on average) by 0.21, veteran student retention rate has
increased 10 percent, drop rate has decreased by 55 percent, and credit hour completion rate has increased by 7 percent (personal communication, E. Mustafa, April 29, 2013).

One of Lee College’s newest initiatives is the formation of the Lee College Veteran Honors Society. The Honors Society is organized according to a four-tier grade-point-average system, with students achieving certain ranks according to their GPA. As a student’s grades improve, they can move up to the next tier in the organization where they have increased opportunities for scholarship money and certificates. This system helps students excel not only through its incentives for financial rewards and recognition, but also through the sense of comfort it bestows by imparting a familiar military structure to the unfamiliar education environment (Lee College, 2013).

Green River Community College (Washington).

Green River Community College (GRCC) in Auburn, Washington created a Veterans Coordinating Council to bring college stakeholders together to address academic and support services for veterans on campus in order to facilitate veterans’ introduction to, engagement with, and progression from the campus. To acclimate students to the college experience, GRCC provides assistance with financial aid, Veterans Services-GI Bill paperwork, enrollment services, advising; campus orientation; and vet-friendly posters and training sessions. To foster a sense of belonging, GRCC offers academic initiatives (VCC program), counseling and disability support resources, symbolic events such as celebrations on Veterans Day and Memorial Day and a coin ceremony to honor veterans, and statewide and national presentations (student panels). GRCC helps veterans conclude their educational
experience by providing assistance in their transition from college to the workforce or a four-year institution, as well as family readjustment and support (Green River Community College, 2013).

**Cape Fear Community College (North Carolina).**

In fall 2012, Cape Fear Community College (CFCC) in North Carolina enrolled 570 veteran students who received educational benefits and an additional 200 veteran students who did not receive educational benefits. CFCC provides a number of programs and services to help ensure the smooth transition and success of its veteran students. CFCC’s Bob Philpott Veterans Center provides a place for veteran students to meet, study, get assistance with registration and advising, and be with other veteran students. By facilitating peer support, the Veterans Center helps engender a sense of camaraderie and community through peer support, all of which helps build confidence.

Additional campus programs include a Summer Institute for Returning Veterans, held in May, to help veterans make a connection to the college; veteran-to-veteran mentoring and tutoring programs whereby veterans volunteer to mentor and tutor each other; the holding of a Veterans Day celebration; and the displaying of “Veteran Friendly” stickers on faculty and staff doors. Dedicated staff members—such as the Veteran Coordinator, Veterans Affairs office, and Student Development office with counselors trained in different areas of expertise—further enhance veteran students’ experiences at CFCC (Philpott, 2012).
Citrus College (California).

Citrus College in California is designated as a Military Friendly School® by G.I. Jobs. Military Friendly Schools® are the top 20 percent of schools nationwide that deliver the best experience for military students (G.I. Jobs, 2013).

Citrus College established its Veterans Center in May 2009 with funding from a Wal-Mart grant and the U.S. Department of Education FIPSE. The Veterans Center offers veteran students a place to meet, receive the latest veteran benefits information, coordinate with their Veterans Network (club), have workshops, and meet with veterans service organizations.

Citrus College is also the first college in the nation to offer a transition course for veteran students to assist them in their military-to-civilian-life transition. “Boots to Books,” a veterans-teaching-veterans program, provides interpersonal skills and helps veteran students manage military stress, combat reaction stress, and post-traumatic stress. The course not only provides college credit, but it also offers a $200 incentive for enrolling.

Citrus also provides the following programs and services in support of its veteran student population: Academic Battle Buddies (ABB) Mentors Program; a three-credit course, Counseling 161: Higher Education Transitional Skills for Veterans and Families; a veteran-specific orientation; acknowledgement events such as Saluting Our Veterans; support counseling for PTSD, TBI and military sexual assault, as well as marriage counseling; dedicated veteran tutoring services; a Veteran Student Ambassador; Veterans Book Fund, sustained by donations and employee payroll deductions, to help veteran students pay for
their textbooks; and Veterans Network for social networking and community service (Chappell, 2010; Citrus College, 2013).

**Collin College (Texas).**

In 2009, Collin College (Texas) launched a program of veteran-only classes to ease the transition from battlefields and bases to classrooms and civilian life. The four core classes—in government, history, psychology, and speech—have the same learning outcomes as the sections offered to non-veteran students, but the restricted sections also include content of interest to veterans. In addition, the instructors teaching the classes have military ties and the physical classrooms are arranged in such a way as to ease any anxieties and facilitate learning (i.e., furniture arranged in a rectangle so no one has their back to another student). Veterans also are eligible for priority advising and registration. In addition, the college acknowledges veterans’ service with a Veterans Week of activities (Chappell, 2010; Collin College, 2013).

**Western Nebraska Community College (Nebraska).**

Western Nebraska Community College (WNCC), in addition to serving its veteran students through a VUB program, held a ceremony in 2010 to dedicate its new veterans’ service center, the first of its kind among Nebraska colleges and universities. The center offers meeting space, as well as a study area and wireless Internet (Chappell, 2010).

**Clackamas Community College (Oregon).**

Clackamas Community College opened a Veterans Education and Training Center in December 2009 to provide guidance on service-earned health and education benefits,
workshops, and dedicated space for socializing and studying. The center is also the meeting place twice a month for the campus’ veterans’ club, a source for fellowship and support (Chappell, 2010).

In today’s environment of increasing budget cuts and calls for accountability, student retention, a significant measure of institutional effectiveness, is a critical concern for community college administration (Summers, 2003; Wild & Ebbers, 2002). Community colleges are increasingly being judged not by the number of entering students but by how many of those students graduate or transfer to four-year institutions (Scurry, 2006). Efforts such as those exhibited by the colleges discussed above demonstrate institutions’ commitment to ensuring the success of their veteran students.

Conclusion

The challenge for today’s community colleges is how to not only provide access to life-bettering education, but to also ensure success in educational goal attainment, given the high attrition rates associated with community college enrollments. Early models of persistence were developed with a focus on traditional students enrolled at four-year residential institutions. More contemporary models, evolving with the changing landscape of higher education, focused on nontraditional students—those who are either aged 24 or older, enrolled part-time, and/or commute to school—typically found enrolled at community colleges. However, there is a paucity of research on developing a community-college specific model. Studies investigating community college student attrition have typically focused on student characteristics, environmental factors, and academic variables. Findings
suggest that factors that contribute/lead to community college attrition include working full-time, registering late, lack of clear educational goals, poor class performance, and lack of engagement in various student support services (Summers, 2003). Veteran students face the same challenges to persistence as other nontraditional students, as well as additional issues that arise due to their military experience. While there have been increasing qualitative studies that examine veterans’ college experiences, there have been a limited number of quantitative studies to understand the variables that affect persistence. Furthermore, there is a void in the literature to address veteran persistence using a lens of institutional social support systems. While institutions cannot change veteran students’ demographic characteristics or the issues they bring with them as a result of their military history, they can implement programs, policies, and services to address those challenges and facilitate persistence. The next chapter will present the methodology—including the research design, population and sample, instrumentation, data collection, data analysis, delimitations and limitations, and validity and reliability—of the current study to understand and quantify the influence of institutional support systems.
CHAPTER 3 - METHODOLOGY

This chapter will provide an overview of the methodology used to address the two research questions that guided this study of enabling persistence of veteran students at North Carolina community colleges through institutional support mechanisms. The three research questions that guided this study were:

1. What institutional facilities and policies (credit transferability, faculty/staff training, Veterans’ Service Office, veteran-specific orientation, veteran-specific courses) and institutional support services (on-campus veterans’ service center, Student Veterans of America chapter, counseling and psychological services tailored to veterans, peer mentoring, veteran-specific website/portal, and acknowledgement ceremonies) are provided by North Carolina community colleges to facilitate the educational experience of veteran students?

2. What is the predictive ability of academic variables (college GPA), background variables (age, enrollment status, gender, ethnicity, number of years between high school completion and community college enrollment, number of years in the military, number of deployments), environmental variables (hours of employment, family responsibilities, family and friends support), and institutional support variables (on-campus veterans’ service center, Student Veterans of America chapter, counseling and psychological services tailored to veterans, peer mentoring, veteran-specific website/portal, recognition activities) on veterans’ intent to persist at North Carolina community colleges?
3. How do veteran students’ ratings (in terms of importance and frequency of use) of 12 institutional support programs and services compare with college administrators’ perceptions of veteran students’ use of these programs and services?

Following a brief description of the research design, the chapter will present the population and sample that were studied, the instrumentation that was used, the data collection process, data analysis protocol, and limitations of the study.

**Research Design**

The research design for this study was non-experimental since there was a lack of manipulation of independent variables and it was not be possible to randomly assign participants. According to Johnson (2001), non-experimental research design can also be categorized based on the study’s time dimension and research objective. Using Johnson’s framework, this study was considered cross-sectional predictive since: data were collected from research participants during a single, relatively brief time period (with comparisons made across the variables of interest), and the primary purpose of this study was to predict the behavior of a population by drawing generalizations from a sample, without regard for cause and effect. The research explored relationships rather than explained causality.

The first and third research questions were descriptive in nature, and provided a backdrop of information against which to interpret the data from the second research question, which was predictive. The three research questions, when considered in unison, contribute to understanding the relationship between institutional support mechanisms at North Carolina community colleges and the persistence of veteran students.
As with any relationship, the relationship between persistence and institutional support mechanisms is two-sided—influenced by the institution in terms of the programs, policies, and services it makes available, and by the student in terms of what programs and services they utilize and find valuable. The first research question addressed the issue from the institution’s perspective; the second research question examined the issue from the student’s perspective; the third research question compared the two viewpoints on institutional support programs. Each population received its own dedicated survey. The three research questions, along with the two surveys, complemented each other, each yielding information that together provide a richer, more detailed picture of enabling persistence of veteran students through institutional support mechanisms.

**Research Question 1**

The survey to address the first research question was descriptive, seeking to describe the institutional support mechanisms, both existing and planned, of North Carolina’s community colleges—from the perspective of the community colleges. Data were collected via online self-administered surveys, which enabled time and cost savings. The data collected from this set of surveys provided a backdrop against which to interpret the data from the other set of surveys used to address the second research question.

**Research Question 2**

The survey to address the second research question was predictive, seeking to determine the relationship between institutional support mechanisms and veteran student persistence. Data were collected via online self-administered surveys, which not only
enabled time and cost savings, but afforded the ability to reach a large number of diverse respondents over a vast geographic area.

**Research Question 3**

The third research question was descriptive, comparing the perspectives of community college administrators and veteran students on the usage of institutional support mechanisms; data from both the college administrators’ and veteran students’ surveys (used for research questions 1 and 2, respectively) were analyzed and compared.

**Population and Sample**

**Research Question 1**

The population of interest for the first research question was comprised of the directors of institutional research from the 58 North Carolina community colleges. Given it was a small universe of 58 individuals, responses were sought from every member of the population.

Before the survey was sent to the directors of institutional research, a personalized, hand-signed letter on NC State College of Education letterhead was mailed first class on May 30, 2014 to each of the 58 community college presidents to solicit their institution’s participation (Appendix A); included in the solicitation was a request for the president’s permission for the researcher to contact the institution’s director of institutional research to complete the survey. A stamped, addressed envelope, for the president to return his/her indicated permission, was included to facilitate and encourage response.
A contact list of the 58 community college presidents, including physical mailing and email addresses, was compiled by visiting each community college’s web page. A contact list of directors of institutional research of consenting community colleges was compiled in a similar fashion (the North Carolina Community College System Office was contacted to obtain a list of directors of institutional research, but the researcher was informed that such a list did not exist).

**Research Question 2**

The population of interest for the second research question included non-active duty, “contemporary” veteran students who are utilizing Post-9/11 GI Bill benefits to enroll in either a degree or certificate program at one of the 58 North Carolina community colleges. For purposes of this study, individuals were deemed non-active duty if they were neither in the reserves nor on active duty, and a “contemporary” veteran was someone who served in the all-volunteer forces during some period of time following September 11, 2001. In most instances, these individuals can be classified as nontraditional students. Researchers have defined a nontraditional student as one who possesses at least one of the following three attributes: older than 24, attends part-time, and/or commutes to school (Bean & Metzner, 1985; Metzner & Bean, 1987; Stahl & Pavel, 1992). Similarly, Horn (1996) used seven characteristics—delayed enrollment, part-time enrollment, financial independence, full-time employment, has dependents, single parent, and did not obtain a standard high school diploma—and a sliding scale to classify a nontraditional student. A student with one characteristic would be categorized as minimally nontraditional; a student with two or three
characteristics would be categorized as moderately nontraditional; and a student with four or more characteristics would be categorized as highly nontraditional. Given that 84.5 percent of veteran students are older than traditional college students, 47.3 percent are married, 47 percent have children (including 14.5 percent who are single parents), and 76 percent do not attend school full time (Kelley et al., 2012), many veteran students can be classified as not only nontraditional, but also as highly nontraditional. Horn (1996) found that nontraditional students were less likely than traditional students to complete their degree within five years and were also more likely to withdraw from higher education, which has serious implications for veteran students, the institutions that they attend, and the organizations that support them.

According to M. Wells, Department of Veterans Affairs, Office of Policy & Planning, National Center for Veterans Analysis & Statistics (personal communication, November 16, 2012), from August 1, 2009 through January 23, 2012 a total of 8,255 trainees (veterans, active duty, and dependents) utilized Post-9/11 GI Bill educational benefits at 55 of the 58 North Carolina community colleges; the number of enrollments varied from 1,538 (Fayetteville Technical Community College) to 10 (Roanoke-Chowan Community College). All 58 community North Carolina community colleges enroll veteran students, however three of the colleges—Martin Community College, Maryland Community College, and Pamlico Community College—had fewer than 10 enrollments each; for privacy protection, their exact figures were not indicated.

It is almost impossible and impractical to survey all “contemporary” veteran students who are enrolled in a degree or certificate program in all 58 North Carolina community
colleges; therefore, a random sampling design was to be employed. With random sampling, every member of the sampling frame has an equal chance of being selected (Creswell, 2009; Dillman, Smyth, & Christian, 2009), thereby ensuring that the sample will be representative of the population (Creswell, 2009). However, the response rate of colleges that agreed to participate in the study (initially 27 of the 58 colleges, however two of the colleges subsequently withdrew their participation), compounded by the fact that not all participatory colleges submitted lists of veteran students (14 colleges submitted lists of their veteran students and three additional colleges agreed to send the survey on the researcher’s behalf), necessitated the decision to use all the names in the sampling frame.

The sampling frame was compiled by requesting a list of enrolled contemporary veteran students, including their physical mailing and email addresses, from the financial aid office or campus veteran official (if one existed) at each of the participating North Carolina community colleges. When the letter of invitation was sent to the 58 community college presidents, it included a request for permission for the researcher to contact the institution’s financial aid office to obtain a list of veteran students. Only those students with both physical mailing and email addresses were included in the sampling frame.

Sample size was of paramount importance since the method of analysis, logistic regression, used maximum likelihood estimates to fit the model to the data (Savage & Smith, 2008). The necessary sample size is dependent on the desired precision and confidence (the likelihood that the confidence interval will contain the parameter), as well as the population’s variability (Agresti & Finlay, 2009; Dillman et al., 2009). Because it is the size of the
sample, not the proportion of the population that it represents, that affects precision, the proportion that must be sampled varies depending on population size and is much higher for smaller populations (Dillman et al., 2009). Table 3.1 presents Dillman et al.’s (2009) recommended sample sizes for a population the size of veteran students at North Carolina community colleges.

Table 3.1

*Recommended Completed Sample Sizes for a 95% Confidence Level*

<table>
<thead>
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<th>+/- 10%</th>
<th>+/- 5%</th>
<th>+/- 3%</th>
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<tr>
<td>50/50 Split</td>
<td>95</td>
<td>367</td>
<td>942</td>
</tr>
<tr>
<td>80/20 Split</td>
<td>61</td>
<td>239</td>
<td>629</td>
</tr>
</tbody>
</table>

Alternatively, Austin, Yaffee, and Hinkle (1992) recommend 30 cases per independent variable when using regression analysis. Given that 19 independent variables were in the model, 570 complete responses were needed. To attain that number, 1,710 participants were sought.

**Instrumentation**

**Research Question 1**

Directors of institutional research of consenting colleges were sent a questionnaire (Appendix B) to gather information about the programs, policies, and services that are being offered and/or planned on the community college campuses across North Carolina. The
instrument used to gather institutional information from the directors of institutional research was a modification of the instrument used by Cook and Kim (2009) in their analysis of programs and services for veterans on postsecondary campuses across the U.S.

**Cook and Kim’s (2009) instrument.**

Cook and Kim’s (2009) study was conducted on behalf of the American Council on Education (ACE), in partnership with Servicemembers Opportunity Colleges (SOC), the American Association of State Colleges and Universities (AASCU), NASPA-Student Affairs Administrators in Higher Education, National Association of Veterans’ Program Administrators (NAVPA). The researcher received permission from Cook and Kim to use their instrument provided that the researcher’s instrument indicated that the original version of the survey was created by the American Council on Education (Appendix C). The original survey, sent to 2,647 college and university presidents, contained 32 questions that solicited information on campus characteristics, institutional climate in terms of priority of veterans and military student services/programs, academic support services, student support services, administrative and physical infrastructure, enrollment management/financial assistance, as well as comments and contact information. The question format was predominantly multiple-choice.

To generalize the responses from the 723 respondents (212 of whom, or 30 percent of survey respondents, represented public two-year institutions) to the population of U.S. colleges and universities, participating institutions were compared with the distribution of four higher education sectors: public two-year, public four-year, private not-for-profit four-
year, and private for-profit. Private not-for-profit four-year institutions were proportionally represented, public two-year and public four-year institutions were overrepresented, and private for-profit institutions were underrepresented. Due to the low response rate from private for-profit and private not-for-profit two-year institutions, weighting techniques to make the data representative of all degree-granting institutions could not be undertaken. The authors admitted the possibility of response bias due to the relatively low response rate of 28 percent and the overrepresentation of public institutions (which enroll the majority of veterans). They also noted that this survey was the first of its kind, making it impossible to compare the results with others to determine if they are typical. This raised the question whether institutions that serve veterans were more likely to respond to the survey than those who do not serve veterans. As such, the findings should be viewed as indicative of the kinds of programs and services offered by institutions that serve veteran students but they do not present a reliable estimate of the percentage of institutions that serve veterans.

**The current study’s instrument.**

There were eight sections of the instrument—the first section collected information on campus characteristics; the second section asked about institutional climate and the priority of services and programs for veteran students; the third section addressed academic support services; the fourth section requested information on student support services; the fifth section inquired about the administrative and physical infrastructure; the sixth section gathered information on enrollment management and financial assistance; the seventh section asked about veterans students’ usage of the offered programs and services; the eighth section
inquired about challenges faced with programs and services for veterans. The survey concluded with a request for the survey completer’s contact information.

**Section 1 – campus characteristics.**

The first section of the survey used eight questions to collect information on campus characteristics. Questions requesting the distance in miles from the nearest military facility, the estimated enrollment of veteran students, and veteran students as a percentage of total enrollments were open-ended, fill-in-the-blank questions. For each question, results were reported as descriptive statistics, including a distribution of responses, the mean, and standard error.

Multiple choice questions were used to find out if programs and services for veteran students were part of the institution’s long-term strategic plan; what administrative initiatives (i.e., funding, training, budgeting, staffing) the institution has undertaken to serve veteran students and what initiatives they anticipated accomplishing in five years’ time; if the institution’s admissions/financial aid staff was aware of the amendments to the Post-9/11 GI Bill; and if the institution currently had programs and services specifically designed for veteran students. For each question, the responses were reported in a bar chart depicting frequency of each answer option.

**Section 2 – colleges’ priority of veteran students’ services and programs.**

Section 2 used four multiple choice questions to ask about the institutional climate created through the prioritization of programs and services for veteran students. Questions gathered information on veteran-related student and institutional issues that had been
identified as priorities; whether the institution had increased emphasis on veteran-related programs and services since September 11, 2001 and, if so, what programmatic changes demonstrated this increased emphasis; and what veteran-specific programs and services currently existed at that institution. For each question, the responses were reported in a bar chart that depicted frequency of each answer option.

Section 3 – academic support services.

Section 3 used four questions to address the extent of academic support services for veteran students. Questions gathered information on whether the institution offered tutorial services or academic assistance for veterans beyond what was available to other enrolled students; types of prior learning where college credit was awarded; alternative type(s) of curriculum delivery; and the availability of professional development training in the transitional needs of veteran students for faculty and staff. For each question, the responses were reported in a bar chart depicting frequency of each answer option.

Section 4 – student support services.

Section 4 used three multiple choice questions to request information on student support services. Questions asked what veteran-specific programs and services the institution offered; what health-related issues the institution provided counseling for; and what services the counseling center offered. For each question, the responses were reported in a bar chart depicting frequency of each answer option.
Section 5 – administrative and physical infrastructure.

Section 5 used five multiple choice questions to inquire about the administrative and physical infrastructure for meeting veteran students’ needs. Questions asked about the existence of a veteran-dedicated office or department and whether this office or department served veterans’ family members; the campus structure responsible for offering veteran-specific programs and services; the primary point of contact for information about veteran-specific programs and services; and the campus unit responsible for administering veterans’ education benefits counseling. For each question, the responses were reported in a bar chart depicting frequency of each answer option.

Section 6 – enrollment management and financial assistance.

Section 6 used four multiple choice questions to gather information on the enrollment management and financial assistance services available to veteran students. Questions asked about the sources of financial assistance; communication methods to inform about veteran-specific programs and services; and admissions and recruitment efforts targeted at veterans. For each question, the responses were reported in a bar chart depicting frequency of each answer option.

Section 7 – veteran students’ usage of offered services and programs.

Section 7 used one multi-part question to learn the institution’s perception of veteran students’ use of academic advising, academic support and tutoring, campus social and/or cultural events, career planning and career services, employment assistance, financial aid and tuition assistance counseling, transition assistance, VA education benefits counseling, veteran
student lounge or designated gathering place, and orientation. For each service or program, respondents were asked to rate usage with a five-point Likert scale (Often, Sometimes, Rarely, Never, Not Applicable). For each question, the responses were reported in a bar chart depicting frequency of each answer option.

**Section 8 – challenges with programs and services for veterans.**

Section 8 employed three questions to learn about any challenges the institution is experiencing with veteran-specific programs and services. Multiple choice questions asked about administrative challenges (i.e., funding, space, and tracking) and the most pressing issues facing veteran students’ educational progress. An open-ended, fill-in-the-blank question gave an opportunity for the institution to list any unique issues affecting veteran students. For each question, the responses were reported in a bar chart depicting frequency of each answer option.

The survey concluded with a request for the completer’s contact information, including name, institution name, phone number, and email.

**Research Question 2**

Veteran students were sent a questionnaire (Appendix D) to gather information about their utilization of various institutional programs and services as well as their perceptions of the usefulness of these programs and services.

The instrument to gather student information was influenced by the literature on veteran students as well as earlier persistence studies, including the Community College
Student Report (CCSR), developed by the Community College Survey on Student Engagement (CCSSE) at The University of Texas at Austin.

**CCSR and CCSSE.**

The CCSR focuses on institutional practices and student behaviors that promote student engagement. The 38-question survey asks students about their college experiences—how they spend their time; what they feel they have gained from their classes; how they assess their relationships and interactions with faculty, counselors, and peers; what kinds of work they are challenged to do; how the college supports their learning; as well as demographic information. The majority of questions are Likert-type questions using a four-point response scale.

CCSSE has conducted assessment surveys since 2001. Upon completion of the spring 2007 survey administration, CCSSE had surveyed more than 700,000 students from 550 community colleges in 48 states, plus British Columbia, Palau, and the Marshall Islands. In 2006, CCSSE conducted three separate validation studies using three external, student-level data sets that were established for purposes of the project. These data sets included Florida community colleges, the CCSSE Hispanic Student Success consortium, and 24 of the 27 initial colleges participating in the Achieving the Dream initiative. Their three-pronged collection of studies validated the relationships between student engagement and a variety of student outcomes in community colleges, including persistence; their benchmarks consistently demonstrated a positive relationship with outcome measures (McClenny, Marti, & Adkins, 2007).
The current study’s instrument.

There were five sections of the instrument with a total of 26 questions. The first section collected information on academic variables; the second section asked about environmental variables, including both environmental constraints and environmental supports; the third section addressed institutional variables in the form of institutional support services; the fourth section inquired about re-enrollment plans; and the fifth section requested information on background variables. Not all of the questions addressed components of the current study’s model—some questions and answer options were included based on their inclusion in CCSR’s original instrument; the researcher elected to retain the questions in order to provide a more detailed picture of the respondents’ academic experience.

Section 1 – academic variable.

The first section of the survey collected information on the respondent’s GPA. GPA was measured by a multiple choice question that asked for the respondent’s overall college GPA. This was a single item measure with six response categories using an ordinal scale (1 to 6); individuals who responded that they did not have a GPA at the school or were taking classes Pass/Fail only, were not including in the regression analysis.

Additional questions that were not correlated to the study’s model asked respondents how many hours in a typical seven-day week they spend preparing for class, their reasons/goals for attending their current college (complete a certificate program, obtain an associate degree, transfer to a four-year institution, obtain or update job-related skills), and how many total credit hours they have earned at their current college.
Section 2 – environmental variables.

The second section of the survey asked about environmental variables, including both constraints and supports. Environmental constraints include activities and responsibilities that consume a respondent’s time and attention, and therefore detract from their academic pursuits. Environmental supports include individuals who provide emotional, financial, and logistical support of a veteran student’s academic pursuits.

Environmental constraints.

The instrument collected information on the environmental constraints of employment and family responsibilities. Hours of work was measured by an open-ended question that asked how many hours they spend in a typical week working for pay. This was a single item measure with a continuous variable. The value of the response was inserted into the regression analysis. Responses were also reported as descriptive statistics with the mean, standard error, and range.

Family responsibilities were measured with three questions that determine if the respondent is married, has children who live with them, and has time commitments for care of dependents. A multiple choice question asked if the respondent is married; for regression analysis, 0 indicated they are married and 1 indicated they are not married. A multiple choice question asked if the respondent has children who live with them; for regression analysis, 0 indicated they have children and 1 indicated they do not have children. An open-ended question asked how many hours they spend in a typical week providing care for dependents living with them. This was a continuous variable; its value was inserted into the
regression analysis. Responses were also reported as descriptive statistics with the mean, standard error, and range.

An additional question whose responses were not factored into the analysis, asked respondents to rank, on a four-point scale, the likelihood that five different issues (working full-time, caring for dependents, academically unprepared, lack of finances, and transfer to another institution) would cause them to withdraw from class or their current college.

*Environmental supports.*

Environmental supports were measured with four questions on perceived support of family and friends. A question with a Likert-type measure measured the supportiveness of the respondent’s close friends in their attending the college. A four-item scale (from Not Very to Extremely) was used in the regression analysis.

A multiple choice question asked if close friends encouraged the respondent to attend the college; for regression analysis, 0 indicated the friends did not provide encouragement and 1 indicated they did provide encouragement.

A question with a Likert-type measure measured the supportiveness of the respondent’s family in their attending the college. A four-item scale (from Not Very to Extremely) was used in the regression analysis.

A multiple choice question asked if the respondent’s family approved of their attending the college; for regression analysis, 0 indicated the family did not approve and 1 indicated they did approve.
A multiple choice question asked if the respondent’s family encouraged them to continue attending the college; for regression analysis, 0 indicated the family did not encourage their attendance and 1 indicated they did encourage their attendance.

Section 3 – institutional variables.

The third section used one multi-part question to gather feedback on institutional support services. Respondents were asked to rate how often they used each of those services (using a four-point Likert-type scale ranging from Don’t know/N.A. to Often, with codes 1 through 4 used in the regression analysis) and how important each service was (using a three-point Likert-type scale ranging from Not at all to Very, with codes 1 through 3 used in the regression analysis). Six of the answer options—on-campus veterans’ service center, Student Veterans of America chapter, counseling and psychological services tailored to veterans, peer mentoring, veteran-specific website/portal, and acknowledgement activities—were part of the study’s model and included in the regression analysis; eight additional institutional support services—academic advising/planning for veterans, career planning/counseling for veterans, child care, financial aid/tuition assistance counseling for veterans, job placement assistance, orientation specifically for veterans, peer or other tutoring for veterans, and VA education benefits counseling—were also included in the question but not part of the study’s model.

Section 4 – re-enrollment plans.

The fourth section contained two questions on re-enrollment plans, including whether the respondent planned to re-enroll the following semester and when they planned to again
take classes at the same college. The response from if they planned to re-enroll again supplied the data for the dependent variable, Intent to Persist.

A multiple choice question asked if it was likely that the respondent would re-enroll at the same college the following semester; for regression analysis, 0 indicated that it was not likely they would re-enroll and 1 indicated that it was likely they would re-enroll. Responses were also reported in a frequency table.

A multiple choice question with five response categories asked when the respondent planned to again take classes at the same college. Students who indicated they would be accomplishing their goal(s) during the current term were not included in the analysis.

Section 5 – background variables.

The fifth section used eight questions to gather information on background variables including age, enrollment status, gender, ethnicity, lapsed time between high school/GED completion and college enrollment, and military service.

Age was measured by an open-ended question that asked the respondent’s age. This was a single item measure with a continuous variable. The value of the response was inserted into the regression analysis. Results from all responses were also reported as descriptive statistics with the group mean, standard error, and range.

Enrollment status was measured with a multiple choice question that asked the respondent to characterize their enrollment status with the current term in mind. This single measure item was coded 0 for part-time and 1 for full-time. Responses were also reported in a frequency table.
Gender was measured with a multiple choice question that asked for the respondent’s gender. This single measure item was coded 0 for female and 1 for male. Responses were also reported in a frequency table.

Ethnicity was measured with a multiple choice question that asked the respondent what race they identified with. Six of the responses were coded 0 for minority; the seventh response option was coded 1 for majority/White, non-Hispanic. Responses were also reported in a frequency table.

An open-ended question asked how much time had lapsed between the respondent’s high school graduation/receipt of GED and their enrollment in their current institution. They were asked to supply the number of years and the number of months. This single item was a continuous variable. Each response was calculated as number of months and the value was inserted into the regression analysis. Results from all responses were also reported as descriptive statistics with the group mean, standard error, and range.

There were three questions addressing military service. An open-ended question asked how long the respondent was active in the military. They were asked to supply the number of years and the number of months. This single item was a continuous variable. Each response was calculated as number of months and the value was inserted into the regression analysis. Results from all responses were also reported as descriptive statistics with the group mean, standard error, and range.

A multiple choice question collected information on how many times the respondent was deployed. The seven answer options ranged from 0 to more than five, with the last
option (more than five) including a text box for the respondent to indicate the number of deployments. The value of the response was entered into the regression analysis. Results from all responses were also reported as descriptive statistics with the group mean, standard error, and range.

Two additional background questions were included but did not factor into the model. The first question asked respondents if they began college at their current college or elsewhere; the second question asked respondents to identify their military branch.

Table 3.2 provides a summary of all the variables that were used in research question 2 of the current study, along with the questions and measures associated with them.
Table 3.2

Summary of Variables and Measures

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<td>Independent Variables</td>
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<td>5</td>
<td>At this college, in what range is your overall college grade average? Ordinal (1-6)</td>
<td>1=A- to A+, 2=B- to B+, 3=C- to C+, 4=Lower than C-, 5=Do not have a GPA at this school, 6=Pass/fail classes only</td>
</tr>
<tr>
<td>Background Variables</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td>19</td>
<td>What is your age? Response = value #</td>
<td>Value #</td>
</tr>
<tr>
<td>Enrollment Status</td>
<td></td>
<td>21</td>
<td>Thinking about this current academic term, how would you characterize your enrollment at this college? Categorical (0, 1)</td>
<td>0=Part-time, 1=Full-time</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td>22</td>
<td>Your gender Categorical (0, 1)</td>
<td>0=Female, 1=Male</td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
<td>23</td>
<td>What is your racial identification? Categorical (0, 1)</td>
<td>0=American Indian or other Native American; Asian, Asian American or Pacific Islander; Native Hawaiian; Black or African American, Non-Hispanic; Hispanic, Latino or Spanish; Other 1=White, Non-Hispanic</td>
</tr>
</tbody>
</table>
Table 3.2 Continued

<table>
<thead>
<tr>
<th># of Years between High School Completion and Community College Enrollment</th>
<th>24</th>
<th>How much time had lapsed between your high school graduation/receiving your GED and enrolling in this college? Response = # of years and # of months</th>
<th>Value #</th>
</tr>
</thead>
<tbody>
<tr>
<td># of Years in Military</td>
<td>25</td>
<td>How long were you active in the military? Response = # of years and # of months</td>
<td>Value #</td>
</tr>
<tr>
<td># of Deployments</td>
<td>26</td>
<td>How many times were you deployed? Response = value #</td>
<td>Value #</td>
</tr>
<tr>
<td><strong>Environmental Variables</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hours of Employment</td>
<td>6</td>
<td>Approximately how many hours in a typical 7-day week do you spend working for pay? Response = value #</td>
<td>Value #</td>
</tr>
<tr>
<td>Family Responsibilities</td>
<td>7</td>
<td>Are you married? Categorical (0, 1)</td>
<td>0=Yes, 1=No</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>Do you have children who live with you? Categorical (0, 1)</td>
<td>0=Yes, 1=No</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>Approximately how many hours in a typical 7-day week do you spend providing care for dependents living with you (parents, children, spouse, etc.)? Response = value #</td>
<td>Value #</td>
</tr>
<tr>
<td>Family and Friends Encouragement</td>
<td>11</td>
<td>How supportive are your friends of your attending this college? 4-point Likert-type measure</td>
<td>1=Extremely, 2=Quite a bit, 3=Somewhat, 4=Not very</td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>My close friends encourage me to continue attending this college. Categorical (0, 1)</td>
<td>0=No, 1=Yes</td>
</tr>
<tr>
<td></td>
<td>13</td>
<td>How supportive is your immediate family of your attending this college? 4-point Likert-type measure</td>
<td>1=Extremely, 2=Quite a bit, 3=Somewhat, 4=Not very</td>
</tr>
<tr>
<td></td>
<td>14</td>
<td>My family approves of my attending this college. Categorical (0, 1)</td>
<td>0=No, 1=Yes</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>My family encourages me to continue attending this college. Categorical (0, 1)</td>
<td>0=No, 1=Yes</td>
</tr>
</tbody>
</table>
Table 3.2 Continued

| Institutional Variables                                      | 16   | How important is this services to you at this college?  | 1=Very,  
|                                                             |      | 3-point Likert-type measure                              | 2=Somewhat,  
| On-campus veterans service center                          |      |                                                        | 3=Not at all  
| Student Veterans of America chapter                       | 16   |                                                        | 1=Very,  
|                                                             |      |                                                        | 2=Somewhat,  
|                                                             |      |                                                        | 3=Not at all  
| Counseling and psychological services tailored to veterans | 16   |                                                        | 1=Very,  
|                                                             |      |                                                        | 2=Somewhat,  
|                                                             |      |                                                        | 3=Not at all  
| Peer mentoring                                             | 16   |                                                        | 1=Very,  
|                                                             |      |                                                        | 2=Somewhat,  
|                                                             |      |                                                        | 3=Not at all  
| Veteran-specific website/portal                            | 16   |                                                        | 1=Very,  
|                                                             |      |                                                        | 2=Somewhat,  
|                                                             |      |                                                        | 3=Not at all  
| Veteran recognition activities                             | 16   |                                                        | 1=Very,  
|                                                             |      |                                                        | 2=Somewhat,  
|                                                             |      |                                                        | 3=Not at all  
| Dependent Variable                                         | 17   | It is likely I will re-enroll at this college next fall. Categorical (0, 1) | 0=No, 1=Yes  

Validity and reliability.

Two concerns associated with addressing question 3 relate to validity and reliability. Validity is accuracy in measurement and the ability to draw meaningful and useful inferences from the findings; reliability is consistency in responses (Angresti & Finlay, 2009; Creswell, 2009).
Validity.

There are a number of steps that can be taken to assure validity. Respondents can be compared to the population through statistical analysis. If similarities exist, the findings can be generalized to the sample. However, if differences exist, then the findings must be limited to the respondents.

Respondents can also be compared to nonrespondents. If no significant differences are evident, then the respondents’ results can be generalized to the sample and the population. If differences are evident then generalizations would have to be limited to the respondents.

A comparison can also be made among early and late respondents. Studies have found that late respondents are similar to nonrespondents. If early respondents are found to be similar to late respondents, then the findings can be generalized to the sample.

Additionally, a random sample of 10-20 percent of nonrespondents can be selected for follow-up analysis. These individuals will be contacted and asked the same survey questions by telephone or in person. Their responses will be compared to those received by respondents and, if the responses are similar, the two sets of data can be pooled and the findings can be generalized to the sample and population (Miller & Smith, 1983).

Reliability.

Cronbach’s coefficient alpha was used as a measure of internal consistency. The use of a statistical procedure (rather than repeated administration of the instrument to the same respondents) to measure internal consistency is appropriate when, as with this current study,
an instrument has been designed to measure an attribute that is expected to exhibit a high degree of internal consistency (Mertens, 2005).

**Data Collection**

The data collection process drew on social exchange concepts. According to social exchange, people are motivated to act based on the benefits they expect to receive; a researcher can encourage response by designing and administering their survey with three goals in mind: increasing the perceived rewards of responding, decreasing the perceived costs of responding, and building trust so that people believe the rewards outweigh the costs of responding (Dillman et al., 2009).

The communication vehicles were all designed and administered utilizing recommendations by Dillman et al. (2009) to motivate individuals to participate. To increase the perceived benefits of participation, the communication vehicles: provided information about the survey and how the results would benefit respondents and other veteran students; asked recipients for their help and advice; showed positive regard and respect for recipients; demonstrated appreciation for respondents’ participation; appealed to values shared by veteran students; and were interesting in terms of wording, design, and layout. To decrease the perceived costs of participation, the communication vehicles: made it convenient to respond, avoided subordinating language, and were short and easy to complete. To establish trust that the promised rewards would be delivered, the communication vehicles: made each contact appear important, and ensured the confidentiality and security of information provided by respondents (Dillman et al., 2009).
The study commenced with the researcher sending a personalized, hand-signed letter on NC State College of Education letterhead to each of the 58 community college presidents to solicit their institution’s participation (Appendix A). A contact list of the 58 community college presidents, including physical mailing and email addresses, was compiled by visiting each community college’s web page. The letter of solicitation outlined the study and explained that agreeing to participation would grant the researcher permission to contact the institution’s director of institutional research to complete a survey as well as the institution’s financial aid office to obtain a list of veteran students. A stamped, addressed envelope, for the president to return his/her indicated permission, was included to facilitate and encourage response. Responses were received from 30, or approximately 52 percent, of the community college presidents; 3 indicated that they did not wish to participate and 27 agreed to participate. However, of the 27 institutions that initially agreed, two subsequently reversed their decision, leaving 25 colleges, or approximately 43 percent of the North Carolina community colleges, agreeing to participate in the study.

**Research Question 1**

Research question 1 was addressed by a survey sent to the director of institutional research at each of the participating community colleges. A list of the directors of institutional research was compiled by visiting the website for each of the participating colleges.
Email invitation with survey link.

An email invitation to participate in the study (Appendix E) was sent on July 10, 2014 to the director of institutional research at each of the North Carolina community colleges that agreed to participate in the study. The subject line identified the survey title. The invitation outlined what they were being asked to do, why they were selected to participate, what the survey was about, how they could contact the survey sponsor, and the confidentiality of their responses. The invitation included a personalized link (associated with the recipient’s email address) to the survey, created in Qualtrics. Upon clicking on the link (or copying and pasting it into a browser), the respondent was taken to the first of the survey screens.

The welcome screen let the respondent know they were in the right place and oriented them to the survey: it included the title, brief description of the survey’s purpose, instructions, and “expiration date.” Subsequent screens contained the questions (and response fields), with each page grouped by subject area. The final closing screen confirmed completion of the survey, gave respondents the opportunity to provide any additional comments, and expressed appreciation once again for the respondents’ time and input.

Follow-up postcard.

A thank you/remind postcard (Appendix F) was mailed first-class one week after the invitation email, on August 4, 2014, to the directors of institutional research. The postcard reminded the respondent that a survey invitation was recently sent to them, thanked them if they had already responded, and requested that if they have not yet done so to please respond.
Final reminder email.

A final reminder email (Appendix G) was sent two weeks after the thank you/reminder postcard, on August 18, 2014, only to non-respondents (Qualtrics can track who has responded). As a final attempt to elicit a response, the tone of this piece was more urgent, emphasizing the importance of their response.

Research Question 2

Research question 2 was addressed by a survey sent to veteran students who are utilizing Post-9/11 GI Bill benefits to pursue a certificate or degree at each of the participating community colleges. A list of veteran students was compiled by contacting either the veteran certifying official (if such a position existed) or financial aid office at each of the participating institutions; a list of these contacts was compiled by visiting the website for each of the participating colleges.

An email explaining the study and requesting a list of veteran students (Appendix X) was sent on September 14-15, 2014 to the veteran certifying official/financial aid contact at the 25 participating colleges. A follow-up email (Appendix Y) was sent on September 25-26, 2014 to those contacts that had neither provided the requested list nor responded. This follow-up email included as an attachment a scanned copy of the participatory letter received from that institution’s president. Of the 25 colleges whose presidents had agreed to participate in the study, 13 (or 52%) provided a list of veteran students at their institution and an additional 3 (or 12%) did not wish to share their list of students but offered to send out the survey on behalf of the researcher.
Email invitation with survey link.

An email invitation to participate in the study (Appendix H) was sent on October 6, 2014 by the researcher to 1,644 veteran students at 13 community colleges; three community colleges sent the email invitation on the researcher’s behalf to an additional 119+ veteran students. The subject line identified the survey title. The invitation outlined what they were being asked to do, why they were selected to participate, what the survey was about, how they could contact the survey sponsor, and the confidentiality of their responses. The invitation included a link to the survey, created in Qualtrics. The email invitation sent by the researcher contained a personalized link (unique to the recipient’s email address); the email invitation sent by the colleges on the researcher’s behalf contained a generic link (seeing the email was being sent by a party other than the researcher). Upon clicking on the link (or copying and pasting it into a browser), the respondent was taken to the first of the survey screens (Appendix D).

The welcome screen let the respondents know they were in the right place and oriented them to the survey; it included the title, brief description of the survey’s purpose, instructions, and “expiration date.” The second screen contained the Informed Consent Form with a button at the bottom for the respondent to click to indicate that they had read the form and agreed to participate in the study. Subsequent screens contained the questions (and response fields), with each page grouped by subject area. The final closing screen confirmed completion of the survey, gave respondents the opportunity to provide any additional comments, and expressed appreciation once again for the respondents’ time and input.
Follow-up postcard.

A thank you/reminder postcard (Appendix F) was mailed first-class one week after the invitation email, on October 13, 2014, to the veteran students. The researcher mailed the postcard to the 1,644 veteran students originally contacted by the researcher and sent an appropriate quantity of pre-printed, pre-stamped postcards to each of the three community colleges that contacted the students on the researcher’s behalf; the three community colleges affixed mailing labels to the postcards and sent them on the researcher’s behalf. The postcard reminded the respondent that a survey invitation was recently sent to them, thanked them if they have already responded, and requested that if they had not yet done so to please respond.

Final reminder email.

A final reminder email (Appendix I) was sent only to non-respondents two weeks after the thank you/reminder postcard (Qualtrics can track who has responded). As a final attempt to elicit a response, the tone of this piece was more urgent, emphasizing the importance of their response.

Data Analysis

The three research questions that guided this study were:

1. What institutional facilities and policies (credit transferability, faculty/staff training, Veterans’ Service Office, veteran-specific orientation, veteran-specific courses) and institutional support services (on-campus veterans’ service center, Student Veterans of America chapter, counseling and psychological services tailored to veterans, peer
mentoring, veteran-specific website/portal, and acknowledgement ceremonies) are provided by North Carolina community colleges to facilitate the educational experience of veteran students?

2. What is the predictive ability of academic variables (college GPA), background variables (age, enrollment status, gender, ethnicity, number of years between high school completion and community college enrollment, number of years in the military, number of deployments), environmental variables (hours of employment, family responsibilities, family and friends support), and institutional support variables (on-campus veterans’ service center, Student Veterans of America chapter, counseling and psychological services tailored to veterans, peer mentoring, veteran-specific website/portal, recognition activities) on veterans’ intent to persist at North Carolina community colleges?

3. How do veteran students’ ratings (in terms of importance and frequency of use) of institutional support programs and services compare with college administrators’ perceptions of veteran students’ use of these programs and services?

**Research Question 1**

Research question 1 is a descriptive question that sought to provide information on what veteran-specific programs and services are offered by each of the community colleges. In addition to identifying the programs and services, the data provided insight into the variation in offerings across community college campuses.

Data from each of the three open-ended descriptive questions that addressed campus characteristics (distance in miles from the nearest military facility, institutional enrollment of
veteran students, and veteran students at a percentage of total enrollments) were analyzed by calculating the distribution of responses, mean, and standard error.

Data for each of the remaining close-ended, multiple choice questions were analyzed by tabulating the frequency of each response. Findings are reported in a bar chart that depicts frequency of each answer option.

**Research Question 2**

Data from the veteran student surveys were analyzed using logistic regression. Logistic regression allows the prediction of a discrete outcome (intent to persist/not persist) from variables that can be continuous (such as college GPA), discrete (such as ethnicity), or dichotomous (such as gender). Logistic regression is suitable for dichotomous dependent variables and is able to discriminate using a minimum set of variables while still providing a high percentage of accuracy (Abbott, 2004). Logistic regression enabled the researcher to determine whether the proposed model was significant (whether the dependent variable, intent to persist, was affected by the independent variables), which independent variable(s) influenced the change in the dependent variable, and the degree and direction of each variable’s influence (based on the size and sign of the variable’s coefficient) (Agresti & Finlay, 2009).

The appropriateness of the use of logistic regression for this study is evidenced by Tinto’s (1997) use of logistic regression in his study of participation in a Coordinated Studies Program on persistence at a community college. In his study involving a similar dichotomous dependent variable, persistence/non-persistence; logistic regression yielded five
significant predictors of persistence. For the current study, the survey logistic procedure statement in SAS was used to perform the logistic regression analysis.

**Logistic regression.**

Regression analysis provides an indication of the net effect of each independent variable (regressors) in the regression equation on the independent variable. By showing the comparative impact of an independent variable on the dependent variable, while other independent variables are held constant, regression analysis illustrated the relative importance of each independent variable in explaining the variation in the dependent variable. In addition, regression analysis provides an assessment of the overall influence of the independent variables over the dependent variable—how much variation in the dependent variable can be explained by the independent variables.

The logistic regression model for a dichotomous dependent variable Y (intent to persist) with multiple regressors (X) is

\[ Pr(Y=1|X_1, X_2, \ldots, X_k) = F(\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \ldots + \beta_k X_k) \]

where F is the cumulative standard logistic distribution function. The coefficient \( \beta_i \) is the estimated effect on the predicted probability that Y=1 given a one unit change in \( X_i \), holding all other Xs constant. A coefficient of 0 indicates that the independent variable has no effect on the dependent variable. The larger the coefficient (regardless of sign), the greater the influence of the independent variable on the dependent variable. A positive sign indicates that as the independent variable increases, so does the dependent variable; a negative sign indicates that as the independent variable increases, the dependent variable decreases.
The β coefficients are best interpreted by calculating predicted probabilities for different values of the regressors and then taking the difference in predicted probabilities. The β coefficients can be estimated by maximum likelihood, which produces efficient (minimum variance) estimators. The maximum likelihood estimator is consistent and normally distributed in large samples (Stock & Watson, 2011).

A goodness-of-fit test was conducted in order to determine whether the model truly held in the population of interest. A chi-squared statistic, the likelihood-ratio statistic ($G^2$),

$$G^2= 2 \sum f_o \log \left( \frac{f_o}{f_e} \right),$$

compared the observed frequencies ($f_o$) with the expected frequencies ($f_e$) and was calculated by the SAS software. Larger differences between the expected frequencies and the observed frequencies result in a larger value of the test statistics and stronger evidence that the model is inadequate. $G^2$ will equal 0 when there is a perfect fit (Angresti & Finlay, 2009).

**Research Question 3**

Research question 3 is a descriptive question that sought to compare the perspectives of veteran students and community college administrators regarding the usage of veteran-specific programs and services. Frequency responses from close-ended, multiple choice questions on both the administrators’ and students’ surveys are compared.

**Delimitations**

This study was delimited to veteran students who are using Post-9/11 GI Bill educational benefits for enrollment in a certificate or degree program at North Carolina
community colleges during the fall 2014 term. Whereas there are multiple factors and conditions that could potentially influence an individual’s intent to persist, this study examined the influence of institutional programs and services on veteran students’ decisions to persist; the impact of student demographic factors—age, gender, race/ethnicity, interval between high school completion and community college enrollment, number of deployments, length of time in military—and cumulative grade point average were also considered as intervening variables. Additionally, the selection of intent to persist—rather than a model and study design where actual persistence was measured—as the dependent variable limited the conclusions that can be drawn about the influence of the independent variables on actual persistence. Lastly, because this study was quantitative in nature, it was not be able to investigate in-depth reasons for decisions to persist or not persist.

**Limitations**

There were four potential error types associated with this study: sampling error, coverage error, measurement error, and nonresponse error. Sampling error, resulting from surveying only a portion of a population rather than all of the population members, affects the precision of the survey, or how much the sample statistic differs from the population parameter it is meant to measure (Agresti & Finlay, 2009; Dillman et al., 2009). It is the size of the sample, not the proportion of the population being sampled, that impacts precision. If the sample size is too small, the margin of error will be larger than anticipated. For example, budget cuts have the potential to reduce your scope (in terms of number sampled and ability to follow-up) and consequently reduce the number of responses upon which your analysis is
based; your margin of error will therefore be higher than planned and your analysis/conclusions less precise. This can be addressed by selecting a large enough random sample to help compensate for this error (Dillman et al., 2009). Additionally, cluster sampling requires a larger sample in order to obtain as much inferential precision as simple random sampling (Angresti & Finlay, 2009; Mertens, 2005). The larger sample size also helps compensate for the tendency for observations within clusters to be similar (Angresti & Finlay, 2009).

Coverage error occurs when all members of a population don’t have a known, non-zero chance of being included in the sample and those who are excluded are different from those who are included (Dillman et al., 2009). This type of error can affect precision and can lead to inaccurate assessment and conclusions. This type of error originates from two sources—the survey mode selected may not provide adequate coverage of the population and/or the sampling frame may not include everyone in the population. A mixed-mode survey can be used to improve coverage when a single mode cannot adequately cover the entire population and/or contact information is not available for the preferred survey mode. For instance, if a researcher wants to conduct a web-based survey but not everyone in the population/sampling frame has a computer/Internet access, a paper survey could be mailed as well. In addition, those who have Internet access could differ—in ways that are relevant to the study—from those who do not have Internet access. A mixed-mode contact strategy can also be effective in reducing coverage error by using one mode to contact respondents and using a different mode to encourage response. To address the second source of error, careful
consideration must be given when evaluating and selecting the list(s) to develop your sampling frame. When considering a list source one must verify if the list contains everyone in the survey population, if the list contains individuals who are not part of the population, how the list is maintained and updated, presence of duplicates, and the availability of other contact information for possible multi-mode contact strategy (in the event the individual is not reachable or nonresponsive via the “main” mode) and/or nonresponse analysis.

Measurement error occurs when a respondent’s answers are inaccurate and/or imprecise and usually results from poor question (and answer) wording and design (Dillman et al., 2009). It can also be caused by respondent behavior (either intentional or unintentional). Forced response questions could increase measurement error by people selecting any answer (one that is not necessarily indicative of their beliefs/attitudes/behaviors) just so they can move on. Dillman et al. (2009) also note that completion of multiple surveys by a respondent can result in conditioning effects (inconsistency in answers). This type of error can affect precision. To avoid such occurrences, special attention will be paid to survey design to enable respondents to provide accurate answers. Design elements will be standardized and consistent to ensure all options have an equal chance of being selected (e.g., answer options will not stand out due to positioning, point size or font treatment). Full labeling of all answer scales so as not to leave anything open for interpretation and consistency in scaling methods (inconsistent scaling methods can cause confusion and the inadvertent selection of unintended answers) will also help minimize measurement error.
Nonresponse error, originating when not everyone who was sampled responds, raises the question of whether non-respondents are different from the respondents in a way that is significant to the study (i.e., in terms of attitudes, beliefs, behaviors, characteristics in regard to the item(s) of interest in the study) (Dillman et al., 2009). This could result in the findings being non-representative of the population and may inhibit the ability to generalize the findings. This type of error is usually a motivational issue—survey length, sensitive subject matter, lack of familiarity with a question topic, non-exhaustive list of answer options, and forced response questions (people opting to quit the survey rather than answer) can all drive nonresponse. The survey will be designed and implemented to encourage people to respond. The contact strategy—use of a pre-survey announcement and follow-up contacts—and its timing help in the collection of as many responses as possible. A subset of this issue is item non-response where questions are skipped (for the same reasons stated above). Elimination of nonresponse error will allow the results to be generalized to the sample. If the sample was randomly chosen from an accurate sampling frame, then the results can be generalized to the population.

**Conclusion**

This chapter presented an overview of the methodology that was used to answer the three research questions guiding the study of enabling persistence of veteran students at North Carolina community colleges. Discussion addressed the research design, population and sample that were studied, and instrumentation that was used; it also outlined the data
collection process, data analysis protocol, and limitations of the study. The subsequent chapter will present the study’s findings.
CHAPTER 4 - RESULTS

This chapter will present and analyze the results of the research described in the previous chapter. The study was designed to answer the following three research questions:

1. What institutional facilities and policies (credit transferability, faculty/staff training, Veterans’ Service Office, veteran-specific orientation, veteran-specific courses) and institutional support services (on-campus veterans’ service center, Student Veterans of America chapter, counseling and psychological services tailored to veterans, peer mentoring, veteran-specific website/portal, and acknowledgement ceremonies) are provided by North Carolina community colleges to facilitate the educational experience of veteran students?

2. What is the predictive ability of academic variables (college GPA), background variables (age, enrollment status, gender, ethnicity, number of years between high school completion and community college enrollment, number of years in the military, number of deployments), environmental variables (hours of employment, family responsibilities, family and friends support), and institutional support variables (on-campus veterans’ service center, Student Veterans of America chapter, counseling and psychological services tailored to veterans, peer mentoring, veteran-specific website/portal, recognition activities) on veterans’ intent to persist at North Carolina community colleges?
3. How do veteran students’ ratings (in terms of importance and frequency of use) of 12 institutional support programs and services compare with college administrators’ perceptions of veteran students’ use of these programs and services?

After a brief overview, the discussion will contain three sections for each of research questions 1 and 2—the response rate, demographic and descriptive information, and results of the data analysis—and descriptive information for research question 3.

**Overview**

At the beginning of the study, a letter was sent to each of the 58 community college presidents explaining the purpose of the research and requesting the participation of their institutions. Of the 58 presidents, 30 (51.7 percent) responded to the invitation; of the respondents, 27 (46.6 percent) initially agreed to have their colleges participate, however two subsequently reversed their decision, leaving a total of 25 (43.1 percent) consenting institutions. Three of the participating community colleges required the researcher to complete the college’s institutional review board (IRB) application, in addition to the IRB application submitted to and approved by the researcher’s own institution.

The first research question was answered by surveying the director of institutional research at each of the participating community colleges. The second research question was answered by surveying veteran students at each of the participating community colleges. The third research question was answered by comparing responses from the college administrators’ and students’ surveys.
Research Question 1

The following sections will discuss the responses provided by administrators at the participating North Carolina community colleges concerning their institutions’ programs, policies, and services for their veteran student populations.

Response Rate

Of the 25 consenting colleges, 13 college administrators (52 percent of consenting colleges and 22 percent of all North Carolina community colleges) completed and submitted usable surveys. Analysis was therefore based on data from 13 sets of survey responses. One factor that may have impacted the response rate is the inability to forward personalized survey links in Qualtrics, the survey software. This shortcoming became evident once the study was underway, when some survey recipients contacted the researcher indicating that they were either not the appropriate person to complete the survey or were experiencing problems accessing the survey (if the email invitation with link had been forwarded). Additional email invitations with links were subsequently sent, however there may have been additional recipients who experienced difficulties but didn’t contact the researcher.

Campus Characteristics

Table 4.1 presents a summary of the campus characteristics of the 13 responding colleges, including demographics, distance, and veteran student enrollment.
Table 4.1

Each College’s Demographics, Distance to Nearest Military Facility, and Veteran Student Enrollment

<table>
<thead>
<tr>
<th>Institution</th>
<th>Total Enrollment (Curriculum)</th>
<th>Locale (Degree of Urbanization)</th>
<th>Distance (miles) to Nearest Military Facility</th>
<th>Number of Veteran Students</th>
<th>Veteran Students as % of Total Enrollment</th>
</tr>
</thead>
<tbody>
<tr>
<td>College 1</td>
<td>3,048</td>
<td>City: Small</td>
<td>1</td>
<td>1,049</td>
<td>-</td>
</tr>
<tr>
<td>College 2</td>
<td>12,337</td>
<td>City: Midsize</td>
<td>9</td>
<td>3,094</td>
<td>25</td>
</tr>
<tr>
<td>College 3</td>
<td>4,018</td>
<td>Rural: Fringe</td>
<td>30</td>
<td>400</td>
<td>10</td>
</tr>
<tr>
<td>College 4</td>
<td>1,357</td>
<td>Rural: Distant</td>
<td>35</td>
<td>80</td>
<td>18</td>
</tr>
<tr>
<td>College 5</td>
<td>1,223</td>
<td>Rural: Distant</td>
<td>40</td>
<td>100</td>
<td>10</td>
</tr>
<tr>
<td>College 6</td>
<td>21,582</td>
<td>Suburbs: Large</td>
<td>49</td>
<td>2,065</td>
<td>6</td>
</tr>
<tr>
<td>College 7</td>
<td>2,031</td>
<td>Rural: Fringe</td>
<td>52</td>
<td>100</td>
<td>4</td>
</tr>
<tr>
<td>College 8</td>
<td>4,627</td>
<td>Rural: Fringe</td>
<td>74</td>
<td>131</td>
<td>2</td>
</tr>
<tr>
<td>College 9</td>
<td>3,618</td>
<td>Town: Distant</td>
<td>113</td>
<td>80</td>
<td>2</td>
</tr>
<tr>
<td>College 10</td>
<td>1,186</td>
<td>Town: Distant</td>
<td>240</td>
<td>16</td>
<td>1</td>
</tr>
<tr>
<td>College 11</td>
<td>7,558</td>
<td>City: Small</td>
<td>250</td>
<td>100</td>
<td>17</td>
</tr>
<tr>
<td>College 12</td>
<td>3,303</td>
<td>Rural: Distant</td>
<td>250</td>
<td>500</td>
<td>7</td>
</tr>
<tr>
<td>College 13</td>
<td>2,463</td>
<td>Town: Distant</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Note. Total curriculum enrollments obtained from North Carolina Community College System, Curriculum/Continuing Education Information System. Locale classifications obtained from U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, IPEDS Data Center. A dash represents non-reported data. Number of veteran students and veteran students as a percentage of total enrollment are listed as reported by responding community college administrators.

Demographics.

Total curriculum enrollments (associate degrees, diplomas, certificates, and pathway and transitional programs) for fall 2014, obtained from the North Carolina Community College System’s Curriculum/Continuing Education Information System, ranged from 1,186 to 21,582 (Table 4.1).
Using the National Center for Education Statistics’ IPEDS Data Center, the 13 responding colleges’ locales (degree of urbanization) can be classified as follows: two colleges (15.4 percent) are considered City: Small, one college (7.7 percent) is City: Midsize, three colleges (23.1 percent) are Rural: Distant, three colleges (23.1 percent) are Rural: Fringe, one college (7.7 percent) is Suburb: Large, and three colleges (23.1 percent) are Town: Distant.

Table 4.2 presents a side-by-side comparison of the locales for all 58 North Carolina community colleges versus the 13 colleges that participated in the study.

Table 4.2

<table>
<thead>
<tr>
<th>Locale (Degree of Urbanization) of North Carolina Community Colleges</th>
</tr>
</thead>
<tbody>
<tr>
<td>Locale</td>
</tr>
<tr>
<td>City: Large</td>
</tr>
<tr>
<td>City: Midsize</td>
</tr>
<tr>
<td>City: Small</td>
</tr>
<tr>
<td>Suburb: Large</td>
</tr>
<tr>
<td>Suburb: Midsize</td>
</tr>
<tr>
<td>Suburb: Small</td>
</tr>
<tr>
<td>Town: Fringe</td>
</tr>
<tr>
<td>Town: Distant</td>
</tr>
<tr>
<td>Town: Remote</td>
</tr>
<tr>
<td>Rural: Fringe</td>
</tr>
<tr>
<td>Rural: Distant</td>
</tr>
<tr>
<td>Rural: Remote</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

*Note. Total percent does not equal 100 due to rounding.
Study respondents provided a reasonable representation of the overall North Carolina community college system in terms of City: Midsize, Suburb: Large, Town: Distant, and Rural: Fringe campuses; however there is an underrepresentation of City: Large, Suburb: Midsize, Town: Fringe, and Rural: Remote campuses, and an overrepresentation of City: Small and Rural: Distant campuses.

**Distance.**

Respondents were asked to report their college’s distance in miles to the nearest military facility. Thirteen college administrators responded; colleges’ distance to the nearest military facility ranged from 1 to 250 miles, with the average distance being approximately 95 miles and the standard error equal to approximately 27.65 miles. However, the distribution of responses was asymmetrical, with eight colleges below the average and four colleges above the average; two colleges were within one standard deviation of the average, five colleges were within two standard deviations, seven colleges were within three standard deviations, and five colleges were more than three standard deviations from the average (Table 4.1).

**Veteran student enrollment.**

Respondents were asked to provide an estimate of veteran student enrollment at their institutions, both in terms of the number of veteran students and veteran students as a percentage of total enrollments. The number of enrolled veteran students ranged from 16 to 3,094 students, with the average equal to 643 students, the standard error equal to approximately 281 students, and the mode equal to 100 students (Table 4.1). As was the case
with distance, the distribution of student enrollments was asymmetrical, with nine colleges’
veteran student enrollment below the average and three colleges’ veteran student enrollment
above the average; two colleges were within one standard deviation of the average (both
below), nine colleges were within two standard deviations, ten colleges were within three
standard deviations, and two colleges were more than three standard deviations from the
average. Veteran students comprised from 1 to 25 percent of responding colleges’ total
enrollments, with an average of approximately 9.3 percent and a standard error of
approximately 2.3 percent. Three colleges were within one standard deviation of the
average, four colleges were within two standard deviations, five colleges were within three
standard deviations, and six colleges were more than three standard deviations from the
average (Table 4.1).

Not surprisingly, the two colleges that were closest to a military facility—each less
than 10 miles away—had the first and third highest number of veteran enrollments; and the
college with the highest number of veteran student enrollments also had the highest
percentage of veteran students as a percentage of total enrollments. Surprising was that the
two colleges that were furthest away from a military installation—each 250 miles away—did
not have the smallest enrollments (one college had the fourth highest number of enrollments
with 500 veteran students) nor did they have the smallest percentage of veteran students
relative to the total student population (the other college had the third highest veteran student
percentage) (Table 4.1). The findings dispel the idea that an inverse relationship would exist
between a college’s distance to the nearest military facility and its veteran student
enrollment—namely that colleges closer to a military installation would have a higher veteran student population and those further away would have a smaller veteran student population (Cook & Kim, 2009).

**Colleges’ Priority of Veteran Students’ Programs and Services**

The survey asked college administrators if programs and services for veteran students were part of the institution’s long-term strategic plan; five respondents indicated “yes,” three indicated “no,” three indicated “not at present, but in progress,” and one indicated that they were uncertain. Although fewer than half include programs and services for veteran students as part of their long-term strategic plan, all 13 responding administrators indicated that their admissions/financial aid staff were aware of the amendments to the Post-9/11 GI Bill.

The survey also asked administrators what initiatives their colleges had already undertaken and what they anticipated accomplishing within the next five years in order to serve veteran students. The findings demonstrate that the colleges recognized the importance of offering programs and services for veteran students and having trained faculty and staff to interact with these students. However, while their responses indicated they were undertaking initiatives to support veteran students, only three colleges had sought and four colleges planned to seek funding for these programs. Of the three colleges that had already sought funding, two did so from both private and federal sources; the third college sought funding from federal sources alone. Of the four colleges that planned to seek funding within the next five years, one had not sought funding in the past but planned to seek private funding in the future; of the three other colleges that had sought funding in the past, one planned to seek
private funding only, one planned to seek federal funding only, and one planned to seek federal funding from private, state, and federal sources. Because these are state institutions, it is interesting that almost all those that have or will seek funding plan to do so from private or federal sources—none of the responding colleges sought state funding in the past and only one college planned to seek state funding in the future (Table 4.3).

Table 4.3

*Colleges’ Initiatives to Serve Veteran Students*

<table>
<thead>
<tr>
<th>Initiative</th>
<th># of Colleges that Have Already Undertaken</th>
<th>% of Colleges that Have Already Undertaken</th>
<th># of Colleges that Plan to Accomplish within the Next 5 Years</th>
<th>% of Colleges that Plan to Accomplish within the Next 5 Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Establish dept for svcs and programs</td>
<td>7</td>
<td>54%</td>
<td>2</td>
<td>15%</td>
</tr>
<tr>
<td>Professional development for staff</td>
<td>6</td>
<td>46%</td>
<td>6</td>
<td>46%</td>
</tr>
<tr>
<td>Increase number of vet student svcs and programs</td>
<td>5</td>
<td>38%</td>
<td>6</td>
<td>46%</td>
</tr>
<tr>
<td>Establish a center for vet students</td>
<td>5</td>
<td>38%</td>
<td>3</td>
<td>23%</td>
</tr>
<tr>
<td>Professional development for faculty</td>
<td>4</td>
<td>31%</td>
<td>6</td>
<td>46%</td>
</tr>
<tr>
<td>Incr budget for svcs and programs</td>
<td>4</td>
<td>31%</td>
<td>5</td>
<td>38%</td>
</tr>
<tr>
<td>Train counseling staff in health issues</td>
<td>4</td>
<td>31%</td>
<td>4</td>
<td>31%</td>
</tr>
<tr>
<td>Increase staff for vet student svcs and programs</td>
<td>3</td>
<td>23%</td>
<td>6</td>
<td>46%</td>
</tr>
<tr>
<td>Seek fed funding for programs for vet students</td>
<td>3</td>
<td>23%</td>
<td>2</td>
<td>15%</td>
</tr>
<tr>
<td>Seek private funding for programs for vet students</td>
<td>2</td>
<td>15%</td>
<td>3</td>
<td>23%</td>
</tr>
<tr>
<td>None</td>
<td>1</td>
<td>8%</td>
<td>1</td>
<td>8%</td>
</tr>
<tr>
<td>Seek state funding for programs for vet students</td>
<td>0</td>
<td>0%</td>
<td>1</td>
<td>8%</td>
</tr>
<tr>
<td>Other</td>
<td>0</td>
<td>0%</td>
<td>0</td>
<td>0%</td>
</tr>
</tbody>
</table>
When asked what student-related issues specific to veteran students had been identified by their institution as priorities, respondents indicated that the two most pressing issues were financial aid and student retention/degree or certificate completion, with health care (PTSD, traumatic brain injury, etc.), and student acculturation receiving lesser concern (Table 4.4).

Table 4.4

<table>
<thead>
<tr>
<th>Veteran Student-related Issue</th>
<th># of Colleges</th>
<th>% of Colleges</th>
</tr>
</thead>
<tbody>
<tr>
<td>Financial aid</td>
<td>8</td>
<td>62%</td>
</tr>
<tr>
<td>Student retention/degree or certificate completion</td>
<td>7</td>
<td>54%</td>
</tr>
<tr>
<td>Health care (PTSD, TBI, etc.)</td>
<td>4</td>
<td>31%</td>
</tr>
<tr>
<td>Student acculturation</td>
<td>2</td>
<td>15%</td>
</tr>
<tr>
<td>Student protests</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>None</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Other</td>
<td>0</td>
<td>0%</td>
</tr>
</tbody>
</table>

When asked what institution-related issues associated with veteran students had been identified by their institution as priorities, the responses were more evenly distributed although the top two priorities dealt with staffing. The areas of concern, in descending order, were qualified staff trained to address veteran students’ needs, faculty/staff sensitivity to issues related to veteran students, locating funding sources for added campus programs and services, no issues related to veteran students, campus accessibility, and security needs for campus protests. It is interesting to note that while one college indicated that security for
campus protests was an institution-related priority, none of the colleges indicated that student protests were a student-related priority (Table 4.5).

Table 4.5

*Institution-related Issues Identified by the Colleges as Priorities for Veteran Students*

<table>
<thead>
<tr>
<th>Institution-related Issue</th>
<th># of Colleges</th>
<th>% of Colleges</th>
</tr>
</thead>
<tbody>
<tr>
<td>Qualified staff to address veteran students’ needs</td>
<td>5</td>
<td>38%</td>
</tr>
<tr>
<td>Faculty/staff sensitivity</td>
<td>4</td>
<td>31%</td>
</tr>
<tr>
<td>Locating funding sources for added programs and services</td>
<td>4</td>
<td>31%</td>
</tr>
<tr>
<td>None</td>
<td>3</td>
<td>23%</td>
</tr>
<tr>
<td>Campus accessibility</td>
<td>2</td>
<td>15%</td>
</tr>
<tr>
<td>Security for campus protests</td>
<td>1</td>
<td>8%</td>
</tr>
<tr>
<td>Inadequate expense coverage by Post-9/11 GI Bill</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Other</td>
<td>0</td>
<td>0%</td>
</tr>
</tbody>
</table>

Since September 11, 2001, seven colleges have increased their emphasis on services and programs specifically for veteran students, one college has not, and one respondent was unsure. This increase in emphasis is evidenced by service and programmatic changes, predominantly by the establishment of new programs and services for veteran students. One respondent also indicated that their college refers veteran students who are unable to immediately pay their tuition and fees to the college’s Foundation Office that assists veterans with scholarships (Table 4.6).
Table 4.6

*Campus Services and Programmatic Changes that Demonstrate Colleges’ Increased Emphasis on Veteran Students*

<table>
<thead>
<tr>
<th>Campus Services or Programmatic Changes</th>
<th># of Colleges</th>
<th>% of Colleges</th>
</tr>
</thead>
<tbody>
<tr>
<td>Established new programs/services for vet students</td>
<td>6</td>
<td>46%</td>
</tr>
<tr>
<td>Established mktg/outreach strategies to attract vet students</td>
<td>4</td>
<td>31%</td>
</tr>
<tr>
<td>Increased counseling services/off-campus referral procedures</td>
<td>4</td>
<td>31%</td>
</tr>
<tr>
<td>Increased institutional funding for vets’ programs &amp; svcs</td>
<td>4</td>
<td>31%</td>
</tr>
<tr>
<td>Institutional policy changes to accept evaluated credit for military service</td>
<td>3</td>
<td>23%</td>
</tr>
<tr>
<td>Web page/linked to non-federal website for vet students</td>
<td>3</td>
<td>23%</td>
</tr>
<tr>
<td>Increased staff in existing programs and svcs for vet students</td>
<td>2</td>
<td>15%</td>
</tr>
<tr>
<td>Added or expanded faculty/staff training on vets’ issues</td>
<td>2</td>
<td>15%</td>
</tr>
<tr>
<td>Other</td>
<td>1</td>
<td>8%</td>
</tr>
<tr>
<td>Committee to develop a campus responsiveness action plan</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Established tuition waivers and/or reduced tuition rates</td>
<td>0</td>
<td>0%</td>
</tr>
</tbody>
</table>

Ten administrators indicated their colleges currently have programs and services specifically designed for veteran students, while three administrators indicated they did not currently have veteran-specific programs and services. Of those colleges that had veteran-specific programs and services, the two most offered programs and services were VA education benefits counseling and veteran recognition activities, followed by academic services such as advising and support/tutoring. In addition, two colleges partnered with community organizations to provide additional health and employment assistance—one college partnered with the local Medical System to provide referrals for students who needed personal counseling, and another college hosted a job fair in partnership with the Employment Security Commission and the local Office of Veteran Services (Table 4.7).
Table 4.7

*Services and Programs Specifically for Veteran Students*

<table>
<thead>
<tr>
<th>Programs and Services</th>
<th># of Colleges</th>
<th>% of Colleges</th>
</tr>
</thead>
<tbody>
<tr>
<td>VA education benefits counseling</td>
<td>7</td>
<td>54%</td>
</tr>
<tr>
<td>Veteran recognition activities</td>
<td>6</td>
<td>46%</td>
</tr>
<tr>
<td>Academic advising</td>
<td>4</td>
<td>31%</td>
</tr>
<tr>
<td>Academic support/tutoring</td>
<td>4</td>
<td>31%</td>
</tr>
<tr>
<td>Financial aid counseling</td>
<td>3</td>
<td>23%</td>
</tr>
<tr>
<td>Campus social and/or cultural events</td>
<td>2</td>
<td>15%</td>
</tr>
<tr>
<td>Career planning/career services</td>
<td>2</td>
<td>15%</td>
</tr>
<tr>
<td>Employment assistance</td>
<td>2</td>
<td>15%</td>
</tr>
<tr>
<td>Website/portal</td>
<td>2</td>
<td>15%</td>
</tr>
<tr>
<td>Other</td>
<td>2</td>
<td>15%</td>
</tr>
<tr>
<td>Transition assistance</td>
<td>1</td>
<td>8%</td>
</tr>
<tr>
<td>Veteran student lounge or gathering place</td>
<td>1</td>
<td>8%</td>
</tr>
<tr>
<td>Orientation</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>None</td>
<td>0</td>
<td>0%</td>
</tr>
</tbody>
</table>

The college with the largest veteran student population in terms of number of enrollments and veteran enrollment as a percentage of total enrollment (College 2), offered the most services and programs (10) specifically for veterans; the colleges with the second-largest and third-largest veteran student populations in terms of enrollments (Colleges 6 and 1, respectively) offered the second- and third-highest number of services and programs (6 and 4, respectively) (Table 4.8).
Table 4.8

Services and Programs Specifically for Veteran Students by College

<table>
<thead>
<tr>
<th>Programs and Services</th>
<th>College Number and Veteran Student Enrollment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>1049</td>
</tr>
<tr>
<td>VA educ benefits counseling</td>
<td>x</td>
</tr>
<tr>
<td>Vet recognition activities</td>
<td>x</td>
</tr>
<tr>
<td>Academic advising</td>
<td>x</td>
</tr>
<tr>
<td>Academic tutoring</td>
<td>x</td>
</tr>
<tr>
<td>Financial aid counseling</td>
<td>x</td>
</tr>
<tr>
<td>Campus social/cultural events</td>
<td>x</td>
</tr>
<tr>
<td>Career planning/services</td>
<td>x</td>
</tr>
<tr>
<td>Employment assistance</td>
<td>x</td>
</tr>
<tr>
<td>Website/portal</td>
<td>x</td>
</tr>
<tr>
<td>Other</td>
<td>x</td>
</tr>
<tr>
<td>Transition assistance</td>
<td>x</td>
</tr>
<tr>
<td>Vet student lounge</td>
<td>x</td>
</tr>
<tr>
<td>Orientation</td>
<td>x</td>
</tr>
<tr>
<td>None</td>
<td>x</td>
</tr>
</tbody>
</table>

Academic Support Services

Of the 10 reporting colleges, only one administrator indicated that their institution provided tutorial services or academic assistance specifically for veteran students (beyond what is available to other enrolled students), and they did so at no additional cost; the remaining nine colleges did not offer any such services, either with or without an associated cost (Table 4.9).
Table 4.9

*Availability of Tutorial Services or Academic Assistance Specifically for Veterans (N=10)*

<table>
<thead>
<tr>
<th>Veteran-specific Tutoring</th>
<th># of Colleges</th>
<th>% of Colleges</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes, offered at no cost</td>
<td>1</td>
<td>10%</td>
</tr>
<tr>
<td>Yes, offered at a reduced rate</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Yes, offered at a standard student rate</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>No, no veteran-specific tutoring or academic assistance</td>
<td>9</td>
<td>90%</td>
</tr>
</tbody>
</table>

Administrators were asked if their college awarded credit for prior learning experiences. The majority of colleges awarded credit for coursework at another institution, national testing programs (such as Advanced Placement CLEP, DANTES), and evaluated credit awards for military training (such as basic training and military training schools, as recommended by the *ACE Guide to the Evaluation of Educational Experiences in the Armed Services*); fewer colleges offered credit for challenge exams/test-out procedures, evaluated credit awards for military occupational training (such as MOS and rate/rating experiences, as recommended by the *ACE Guide to the Evaluation of Educational Experiences in the Armed Services*), and evaluated credit for corporate training programs (Table 4.10).
Table 4.10

*College Credit Awarded for Prior Learning Experiences*

<table>
<thead>
<tr>
<th>Prior Learning</th>
<th># of Colleges</th>
<th>% of Colleges</th>
</tr>
</thead>
<tbody>
<tr>
<td>College coursework at another institution</td>
<td>9</td>
<td>69%</td>
</tr>
<tr>
<td>National testing programs</td>
<td>9</td>
<td>69%</td>
</tr>
<tr>
<td>Evaluated credit awards for military training</td>
<td>8</td>
<td>62%</td>
</tr>
<tr>
<td>Challenge exams/test-out procedures</td>
<td>6</td>
<td>46%</td>
</tr>
<tr>
<td>Evaluated credit awards for military occupational training</td>
<td>5</td>
<td>38%</td>
</tr>
<tr>
<td>Evaluated credit for corporate training programs</td>
<td>1</td>
<td>8%</td>
</tr>
<tr>
<td>Portfolio review or assessment</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Other</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>None</td>
<td>0</td>
<td>0%</td>
</tr>
</tbody>
</table>

All of the responding administrators’ colleges offered alternative curriculum delivery formats. The majority of colleges offered online education, hybrid courses (combining face-to-face instruction and distance learning components), and evening/night courses; a smaller number offered accelerated courses (such as courses that complete in 6-8 weeks) and weekend courses (Table 4.11).

Table 4.11

*Alternative Curriculum Delivery Formats*

<table>
<thead>
<tr>
<th>Curriculum</th>
<th># of Colleges</th>
<th>% of Colleges</th>
</tr>
</thead>
<tbody>
<tr>
<td>Online</td>
<td>10</td>
<td>77%</td>
</tr>
<tr>
<td>Hybrid</td>
<td>10</td>
<td>77%</td>
</tr>
<tr>
<td>Evening</td>
<td>9</td>
<td>69%</td>
</tr>
<tr>
<td>Accelerated</td>
<td>6</td>
<td>46%</td>
</tr>
<tr>
<td>Weekend</td>
<td>4</td>
<td>31%</td>
</tr>
<tr>
<td>None</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Other</td>
<td>0</td>
<td>0%</td>
</tr>
</tbody>
</table>
Of the 10 responding administrators, only a few (30 percent) indicated that their institutions currently provided professional development training opportunities for faculty and administrators on the transitional needs of veteran students, while an additional three (30 percent) indicated that their colleges didn’t currently do so but that it was in progress, and four administrators (40 percent) indicated that such opportunities are neither in effect or in progress.

Social Support Services

While the respondents indicated that veteran student issues were a priority—and were undertaking initiatives and offering programs in support of this population—their institutions offered few social support services. Of the 13 responding colleges, only seven (54 percent) indicated they provided any type of social support services; the most attentive college offered three types of support service, three colleges offered two types of support service, and three colleges offered one type of support service. The service most commonly offered was staff specifically trained to assist with veteran students’ transition/orientation to college, followed by a staff member (such as a licensed counselor or psychologist) trained specifically to address the needs of veteran students with disabilities, student organizations for veteran students (excluding ROTC programs), support groups or mentoring programs specifically for veteran students, and a counselor/specialist qualified to support/assist veteran students with brain injuries. It is interesting to note that almost all of the support came in the form of providing trained staff; the number of opportunities for connecting with fellow veterans was very limited (Table 4.12).
Table 4.12

*Colleges’ Social Support Services for Veteran Students*

<table>
<thead>
<tr>
<th>Social Support Service</th>
<th># of Colleges</th>
<th>% of Colleges</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staff trained to assist with college transition/orientation</td>
<td>4</td>
<td>31%</td>
</tr>
<tr>
<td>Staff trained to deal with disabilities</td>
<td>3</td>
<td>23%</td>
</tr>
<tr>
<td>Student organizations</td>
<td>3</td>
<td>23%</td>
</tr>
<tr>
<td>None</td>
<td>3</td>
<td>23%</td>
</tr>
<tr>
<td>Support groups/mentoring programs</td>
<td>1</td>
<td>8%</td>
</tr>
<tr>
<td>Counselor/specialist to support/assist with brain injuries</td>
<td>1</td>
<td>8%</td>
</tr>
<tr>
<td>Support groups for veteran students with disabilities</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Veterans Upward Bound</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Civilian life skills training</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Veteran-specific orientation</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Other</td>
<td>0</td>
<td>0%</td>
</tr>
</tbody>
</table>

Three colleges provided counseling to address multiple combat-related issues: post-traumatic stress disorder (PTSD), depression, social adjustment, and stress/anxiety management; one college provided counseling only for depression, one college provided counseling only for social adjustment, and one college provided counseling only for stress and anxiety management; four colleges did not provide any type of counseling to assist veteran students with combat-related issues (Table 4.13).
Table 4.13

*Campus Counseling to Assist with Combat-related Issues*

<table>
<thead>
<tr>
<th>Counseling</th>
<th># of Colleges</th>
<th>% of Colleges</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depression</td>
<td>4</td>
<td>31%</td>
</tr>
<tr>
<td>Social adjustment</td>
<td>4</td>
<td>31%</td>
</tr>
<tr>
<td>Stress/anxiety management</td>
<td>4</td>
<td>31%</td>
</tr>
<tr>
<td>None</td>
<td>4</td>
<td>31%</td>
</tr>
<tr>
<td>PTSD</td>
<td>3</td>
<td>23%</td>
</tr>
</tbody>
</table>

One college counseling center offered coordination and referrals to off-campus support services, coordination and referrals to support services provided by the U.S. Department of Veteran Affairs, and site visits by or co-location of U.S. Department of Veteran Affairs personnel on campus. Four colleges offered both coordination and referrals to off-campus support services as well as coordination and referrals to support services provided by the U.S. Department of Veteran Affairs; two colleges offered coordination and referrals to off-campus support services; and two colleges offered coordination and referrals to support services provided by the U.S. Department of Veteran Affairs (Table 4.14).

Table 4.14

*Services Offered by Campus Counseling Center*

<table>
<thead>
<tr>
<th>Service</th>
<th># of Colleges</th>
<th>% of Colleges</th>
</tr>
</thead>
<tbody>
<tr>
<td>Referral to off-campus support services</td>
<td>7</td>
<td>54%</td>
</tr>
<tr>
<td>Referral to support services provided by VA</td>
<td>7</td>
<td>54%</td>
</tr>
<tr>
<td>Visit with VA personnel</td>
<td>1</td>
<td>8%</td>
</tr>
<tr>
<td>None</td>
<td>1</td>
<td>8%</td>
</tr>
<tr>
<td>Access to psychiatrist</td>
<td>0</td>
<td>0%</td>
</tr>
</tbody>
</table>
It is interesting that the counseling center that offered the most services is part of a college that is one of the furthest away from a military installation and has one of the smallest student veteran populations, both in real terms and as a percentage of total student enrollments.

**Administrative and Physical Infrastructure**

Of the 10 responding administrators, seven (70 percent) colleges had an office or department exclusively dedicated to serving veteran students and three (30 percent) colleges did not; of the seven that had a dedicated office or department, four (57 percent) provided services for family members of veteran students and three (43 percent) did not.

Seven colleges provided a description of their campus structure for offering veteran student services and programs: four colleges delegate the responsibility to an administrative office; one has a Veteran's Office, staffed by veterans that assist this population with enrollment and other needs; one has a veteran's education certifying official housed within the financial aid department; and at one college the registrar's office provides assistance with veteran educational benefits.

There was a good deal of variety in terms of the primary point of contact for enrolled students to receive information about institutional programs and services for veterans. Of the nine responding administrators, four colleges delegated that responsibility to Student Affairs, and individual colleges assigned this task to Admissions, the Registrar, Financial Aid, the Veteran Certifying Official, and the Veteran's Services Office (which was part of Student Services).
Similarly, veterans’ education benefits counseling was administered differently at each college. The most common unit to handle benefits counseling was Financial Aid at six colleges, followed by Student Affairs at three colleges; individual colleges also employed the Registrar, Military Affairs Center, and the Veteran’s Services Office (part of Student Services).

**Enrollment Management/Financial Assistance**

Of the nine responding administrators, four (44 percent) indicated that their colleges engaged in admissions or recruitment efforts specifically designed to attract veteran students, four (44 percent) indicated that their institutions did not engage in such efforts, and one (11 percent) indicated that they did not know.

When asked what outreach methods they employ to communicate with potential veteran students, responses were provided by the four administrators who indicated their colleges do engage in specifically designed admissions and recruitment efforts and one administrator whose college did not. A majority of the respondents used their college catalog, targeted Web-based advertising, and participation in special events on military installations (such as education fairs, transition assistance counseling, and community meetings) to reach out to potential veteran students; some of the colleges also utilized targeted print advertising, targeted on-campus admissions events (such as open houses or special tours specifically for veteran students), and blogs or social media (Table 4.1). Most of the colleges made use of multiple outreach methods; a single means of outreach was used by one of the colleges that actively recruited veteran students (special events on military
installations) as well one of the colleges that did not actively recruit veteran students (college catalog).

Table 4.15

*Colleges’ Outreach Methods to Potential Veteran Students (N=5)*

<table>
<thead>
<tr>
<th>Outreach Method</th>
<th># of Colleges</th>
<th>% of Colleges</th>
</tr>
</thead>
<tbody>
<tr>
<td>College catalog</td>
<td>4</td>
<td>80%</td>
</tr>
<tr>
<td>Web-based advertising</td>
<td>3</td>
<td>60%</td>
</tr>
<tr>
<td>Special events on military installations</td>
<td>3</td>
<td>60%</td>
</tr>
<tr>
<td>Print advertising</td>
<td>2</td>
<td>40%</td>
</tr>
<tr>
<td>On-campus admissions events</td>
<td>1</td>
<td>20%</td>
</tr>
<tr>
<td>Blogs/social media</td>
<td>1</td>
<td>20%</td>
</tr>
<tr>
<td>None</td>
<td>1</td>
<td>20%</td>
</tr>
<tr>
<td>Other</td>
<td>0</td>
<td>0%</td>
</tr>
</tbody>
</table>

The majority of the colleges relied on their institution’s catalog to inform currently enrolled veteran students about existing programs and services designed specifically for veterans; other vehicles, listed in descending order of use, included on-campus advisers, a dedicated campus Web page, targeted Web-based advertising, targeted email, targeted print advertising, targeted postal mailings, and blogs or social media (Table 4.16). Almost all of the responding colleges used multiple communication tools; only one college used just one communication tool, targeted Web-based advertising. That college, along with the college that didn’t employ any communication methods to communicate with enrolled veteran students, had veteran student populations that represented only two percent of their total student population, suggesting a possible correlation between the number of enrollments and the efforts and resources dedicated to communicating with this group.
Colleges’ Communication Methods to Inform Veteran Students about Programs and Services

<table>
<thead>
<tr>
<th>Communication</th>
<th># of Colleges</th>
<th>% of Colleges</th>
</tr>
</thead>
<tbody>
<tr>
<td>College catalog</td>
<td>8</td>
<td>62%</td>
</tr>
<tr>
<td>On-campus advisers</td>
<td>5</td>
<td>38%</td>
</tr>
<tr>
<td>Dedicated campus web page</td>
<td>5</td>
<td>38%</td>
</tr>
<tr>
<td>Web-based advertising</td>
<td>3</td>
<td>23%</td>
</tr>
<tr>
<td>Email</td>
<td>3</td>
<td>23%</td>
</tr>
<tr>
<td>Print advertising</td>
<td>2</td>
<td>15%</td>
</tr>
<tr>
<td>Postal mailings</td>
<td>1</td>
<td>8%</td>
</tr>
<tr>
<td>Blog/social media</td>
<td>1</td>
<td>8%</td>
</tr>
<tr>
<td>None</td>
<td>1</td>
<td>8%</td>
</tr>
<tr>
<td>Other</td>
<td>0</td>
<td>0%</td>
</tr>
</tbody>
</table>

At the time this study was undertaken, there was legislation pending within the North Carolina General Assembly that would allow all veterans to receive the in-state tuition benefit. Although it was not required at the time of this study, six respondents (46 percent) indicated that their colleges offer in-state tuition rates to veteran students; in addition, four colleges (31 percent) offer scholarships designed specifically for veterans. None of the administrators indicated that their colleges offered discounted tuition rates or tuition waivers for veteran students.

Colleges’ Perceptions of Veteran Students’ Usage of Programs and Services

Respondents were asked to estimate the frequency with which their veteran students utilized the programs and services offered by their institution. Various forms of counseling services were the most heavily utilized, in particular VA education benefits counseling, financial aid counseling, and academic advising. The responses also revealed that many
colleges do not provide programs and services that offer social support, such as transition assistance and provision of a veteran student lounge for veteran students to connect with each other (Table 4.17).

Table 4.17

*Colleges’ Estimates of Veteran Students’ Usage of Programs and Services*

<table>
<thead>
<tr>
<th>Program/Service</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Often</td>
</tr>
<tr>
<td>VA education benefits counsel (N=10)</td>
<td>10 (100%)</td>
</tr>
<tr>
<td>Finan aid counseling (N=8)</td>
<td>7 (88%)</td>
</tr>
<tr>
<td>Academic advising (N=7)</td>
<td>6 (86%)</td>
</tr>
<tr>
<td>Orientation (N=7)</td>
<td>4 (57%)</td>
</tr>
<tr>
<td>Acad support/tutoring (N=7)</td>
<td>2 (29%)</td>
</tr>
<tr>
<td>Career planning (N=7)</td>
<td>2 (29%)</td>
</tr>
<tr>
<td>Employment assistance (N=7)</td>
<td>1 (14%)</td>
</tr>
<tr>
<td>Veteran student lounge (N=7)</td>
<td>1 (14%)</td>
</tr>
<tr>
<td>Social/cultural events (N=7)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Transition assistance (N=7)</td>
<td>0 (0%)</td>
</tr>
</tbody>
</table>

When asked what challenges, if any, they were facing regarding their veterans’ programs, almost all of the colleges indicated identification and tracking of veteran students. Space availability on campus for veterans was a relatively minor concern; funding, at either the institutional, state, or private level, was the least of all concerns (Table 4.18).
Table 4.18

Challenges Faced by Colleges Concerning Veterans’ Programs

<table>
<thead>
<tr>
<th>Challenge</th>
<th># of Colleges</th>
<th>% of Colleges</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identification and tracking of veterans</td>
<td>5</td>
<td>38%</td>
</tr>
<tr>
<td>Space availability on campus</td>
<td>3</td>
<td>23%</td>
</tr>
<tr>
<td>Funding at institutional level</td>
<td>2</td>
<td>15%</td>
</tr>
<tr>
<td>Funding from private sources</td>
<td>2</td>
<td>15%</td>
</tr>
<tr>
<td>State funding levels</td>
<td>2</td>
<td>15%</td>
</tr>
<tr>
<td>Other</td>
<td>0</td>
<td>0%</td>
</tr>
</tbody>
</table>

Participants were asked to identify, to the best of their ability, the most pressing issues affecting veteran students’ educational progress (Table 4.19).

Table 4.19

Pressing Issues that Affect Veteran Students’ Educational Progress (N=10)

<table>
<thead>
<tr>
<th>Issue</th>
<th># of Colleges</th>
<th>% of Colleges</th>
</tr>
</thead>
<tbody>
<tr>
<td>Understanding of VA educational benefits</td>
<td>5</td>
<td>50%</td>
</tr>
<tr>
<td>Academic-related stress</td>
<td>4</td>
<td>40%</td>
</tr>
<tr>
<td>Financial issues - tuition and educational expenses</td>
<td>3</td>
<td>30%</td>
</tr>
<tr>
<td>Financial issues - housing and living allowances</td>
<td>3</td>
<td>30%</td>
</tr>
<tr>
<td>Health issues related to military service</td>
<td>3</td>
<td>30%</td>
</tr>
<tr>
<td>Timely issuance of VA benefits</td>
<td>3</td>
<td>30%</td>
</tr>
<tr>
<td>Job placement after graduation</td>
<td>2</td>
<td>20%</td>
</tr>
<tr>
<td>Child care/family issues</td>
<td>1</td>
<td>10%</td>
</tr>
<tr>
<td>Other</td>
<td>1</td>
<td>10%</td>
</tr>
<tr>
<td>Housing availability</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Inclusive campus climate</td>
<td>0</td>
<td>0%</td>
</tr>
</tbody>
</table>

Of the 10 colleges that responded, half said that a clear understanding of VA educational benefits posed a threat to veteran students’ progress. Other issues that were identified include (in descending order) academic-related stress, financial issues (both for
tuition/educational expenses as well as housing/living expenses), health issues related to military service or disability, timely issuance of VA education benefits, job placement after graduation, and child care or other family issues. One college noted that veterans often stop out due to personal issues but do not withdraw from the institution; this, in turn, affects their VA educational benefits. Another institution commented that with increasing numbers of military personnel retiring/leaving the military, the issue of residency for in-state tuition purposes is an issue; in addition, many of their veteran students need access to additional resources such as personal counseling, which requires additional funding from the North Carolina General Assembly.

**Research Question 2**

The following sections will discuss the responses provided by veteran students at the participating North Carolina community colleges concerning academic, background, environmental, and institutional support variables and how these variables potentially impact students’ intent to persist.

**Response Rate**

Of the 25 consenting colleges, 14 colleges supplied lists of veteran students at their institutions and an additional three colleges agreed to send out the survey invitation and follow-up materials on the researcher’s behalf. The 17 colleges that supplied a list of veteran students (either directly to the researcher or by sending the survey on the researcher’s behalf) represent 68 percent of the colleges that had agreed to participate in the study and approximately 29 percent of all North Carolina community colleges.
The 14 supplied lists contained 2,685 names of students; the three schools sent out an additional 175+ surveys (this is based on counts received from two of the colleges; the third college did not provide a count), for a total of 2,860. The researcher received a total of 517 submitted surveys (18 percent response rate); however the researcher omitted 169 sets of survey responses that were either blank or indicated that the respondent was not a part of the target population or exhibited a lack of integrity. This resulted in analysis based on 348 submissions for a response rate of approximately 12 percent.

**Use of Imputation**

SAS 9.3 software was used to analyze the survey data. One challenge to users of SAS software is that many statistical procedures consider only complete cases—incomplete observations are excluded. The omission of even one variable value will result in that individual’s data being completely dropped from the analysis and the researcher’s loss of that information. This exclusion of partial observations ignores the possible systematic difference between complete cases and incomplete cases (a form of nonresponse error), and any resulting inferences may not be generalizable to the entire population (Yuan, 2011). For the current study, over one-third of the observations were excluded from the initial analysis due to missing values. To overcome this shortcoming, the researcher used multiple imputation by chained equations (MICE).

Multiple imputation is a useful strategy for working with data sets that have missing values. In multiple imputation, multiple copies of the data set are generated and each missing value is replaced with a set of possible values that represent the uncertainty about the
appropriate value to impute. The multiple imputed data sets are analyzed as though they were complete data sets and the results are combined to produce likely estimates of the parameters (Osborne, 2015; Rubin, 1987). Multiple imputation does not attempt to estimate each missing value through simulated values; rather, through the use of multiple parallel data sets, multiple imputation compiles a random sample of the missing data and provides the researcher with a theoretical range of possible outcomes, thereby producing valid statistical inferences that reflect the uncertainty due to missing values (Beaumont & Demirtas, 2013; Osborne, 2015; Yuan, 2011).

MICE is a flexible and practical approach to handling missing data that uses a regression model to impute the missing values, as opposed to the standard multiple imputation that uses the normal distribution. MICE enables the researcher to specify a separate conditional regression for each variable with missing data. (Beaumont & Demirtas, 2013). MICE has the ability to handle multiple variable types—categorical (ordered and unordered), quantitative (binary and continuous), and skewed—because each variable is imputed using its own imputation model (White, Royston, & Wood, 2011). This feature was particularly appealing for the current study which included categorical, quantitative, and skewed variables.

Graham, Olchowski, & Gilreath (2007) recommend at least 20 imputations in order to minimize power loss; White et al. (2011) recommend that the number of imputations should at the very least equal the percentage of incomplete cases in the data set. For the current study, 37 percent of the cases were initially discarded by SAS for missing responses;
therefore, 40 imputed data sets were produced and combined for analysis. The PROC MI procedure was used in SAS 9.3 to create the 40 imputed data sets. The 40 complete data sets were analyzed using standard procedures, producing 40 different sets of the point and variance estimates for the parameters. The PROC MIANALYZE procedure was used to combine these 40 sets of results and generate valid statistical inferences about the parameters.

In data analysis, model selection is a fundamental task and central to good inference. There are four automatic model selection techniques in SAS logistic regression analysis—forward selection, backward elimination, stepwise selection, and best subset selection. Researchers often employ stepwise selection, a “trial and error” process, as their variable selection method; however, researchers (Shtatland, Cain, & Barton, 2001) have warned that stepwise regression can be a poor technique for both interpretation and prediction purposes. They propose that the problem can be resolved through the use of a hybrid method that combines Akaike Information Criterion (AIC) and Schwarz Information Criterion (SC) with Bayesian reasoning and capabilities of Output Delivery System (ODS).

AIC and SC, standard components in SAS logistic regression output reports, are two model fit statistics that factor in the number of covariates. AIC is calculated as

\[ AIC = -2 \log L + 2k \]

where \(-2 \log L\) is two times the maximized value of the logarithm of the likelihood function, and \(k\) is the number of parameters, including the intercept. SC, also known as the Bayesian Information Criterion (BIC), is calculated as

\[ SC = -2 \log L + k \log n \]
where \(-2 \log L\) is two times the maximized value of the logarithm of the likelihood function, 
k is the number of parameters (including the intercept), and \(n\) is the sample size. These two 
statistics, AIC and SC, in effect, penalize models that have more covariates (Allison, 2012; 
Shtatland et al., 2001).

The three-step combination procedure proposed by Shtatland et al. (2001) involves 
using stepwise regression and building the stepwise sequence; finding the optimal AIC and 
SC model for the stepwise sequence; and then applying the best subset selection to the 
sample sizes that correspond to the optimal AIC and SC model. The analysis that follows 
was based on the imputed data set using this combination method.

Appendix J contains the SAS programming code to clean the initial dataset; Appendix 
K contains the SAS code to create the multiple imputation dataset; Appendix L contains the 
SAS code for additional cleaning of the imputed dataset; Appendices M and N contain the 
SAS code for the combination method for variable selection (logistic regression); Appendix 
O contains the SAS code for the macros for variable selection; Appendix P contains the SAS 
code to calculate summary statistics (means and frequencies); Appendices Q and R contain 
the SAS code to generate the report of logistic regression for the study’s model and the 
resultant report; Appendices S and T contain the SAS code to generate the logistic regression 
report for the model with expanded variables and the resultant report.
Student Characteristics

Demographics.

Table 4.20 presents the means and distributions of the continuous student demographic variables.

Table 4.20

Student Demographic Variables: Means and Distributions

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>SD</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>35.3</td>
<td>10.4</td>
<td>20</td>
<td>64</td>
</tr>
<tr>
<td>Hours per Week Spent Studying</td>
<td>20.9</td>
<td>20.0</td>
<td>1</td>
<td>144</td>
</tr>
<tr>
<td>Hours per Week Spent Working</td>
<td>18.1</td>
<td>18.6</td>
<td>0</td>
<td>60</td>
</tr>
<tr>
<td>Hours per Week Spent Caring for Dependents</td>
<td>31.2</td>
<td>45.0</td>
<td>0</td>
<td>168</td>
</tr>
<tr>
<td>Time Between HS and College (yrs)</td>
<td>15.2</td>
<td>10.1</td>
<td>0.5</td>
<td>49.8</td>
</tr>
<tr>
<td>Active Duty (yrs)</td>
<td>8.4</td>
<td>6.4</td>
<td>0.4</td>
<td>30</td>
</tr>
<tr>
<td>Deployments</td>
<td>2.3</td>
<td>3.1</td>
<td>0</td>
<td>27</td>
</tr>
</tbody>
</table>

Responding students ranged in age from 20 to 64 years old, with a mean age of 35.3 years.

The study considered three areas that potentially competed for a student’s time—preparing for class, working for pay, and caring for dependents. Respondents spent anywhere from 1 hour to 144 hours per week studying, reading, writing, rehearsing, doing homework, and other activities related to their program, with the average amount of time equal to approximately 20.9 hours per week and the mode equal to 20 hours per week.

The number of hours worked per week ranged from 0 to 60, with the average equal to approximately 18.1 hours; the majority of respondents—57.7 percent—worked for pay while attending college; 42.3 percent of respondents did not work for pay while attending school.
Although respondents spent an average of 31.2 hours per week caring for dependents, the range varied greatly from 0 to 168 hours per week, and the mode was equal to 0 (indicated by 38.4 percent of respondents). A relatively small number of outliers skewed the distribution and falsely inflated the average (14 individuals indicated they provided 168 hours—or 24 hours per day for seven days per week—of care for dependents; an additional 28 individuals indicated 80 or more hours).

The amount of time that had lapsed between a respondent graduating from high school/receiving their GED and enrolling in their current college ranged from six months to 49.8 years, with the average equal to approximately 15 years and the mode equal to 10 years.

In terms of military service, the amount of time that respondents were active in the military ranged from 5 months to 30 years, with the average length of service equal to approximately 8 years 4 months and the mode equal to four years. Respondents experienced anywhere from 0 to 27 deployments, with the average number of deployments equal to approximately 2.3 and the mode equal to 1.

Table 4.21 presents a summary of the frequency of responses for the categorical student demographic variables.
Table 4.21

*Categorical Student Demographic Variables: Frequencies*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Category</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Male</td>
<td>70.5</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>29.5</td>
</tr>
<tr>
<td>Race</td>
<td>American Indian, Native American, or Alaska Native</td>
<td>0.3</td>
</tr>
<tr>
<td></td>
<td>Asian, Asian American, or Pacific Islander</td>
<td>1.6</td>
</tr>
<tr>
<td></td>
<td>Native Hawaiian</td>
<td>0.8</td>
</tr>
<tr>
<td></td>
<td>Black or African American, Non-Hispanic</td>
<td>23.5</td>
</tr>
<tr>
<td></td>
<td>White, Non-Hispanic</td>
<td>62.3</td>
</tr>
<tr>
<td></td>
<td>Hispanic, Latino, or Spanish</td>
<td>5.5</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>6.0</td>
</tr>
<tr>
<td>Married</td>
<td>Yes</td>
<td>56.1</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>43.9</td>
</tr>
<tr>
<td>Children Living at Home</td>
<td>Yes</td>
<td>48.0</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>52.1</td>
</tr>
<tr>
<td>Started College</td>
<td>Began at their current college</td>
<td>49.0</td>
</tr>
<tr>
<td></td>
<td>Began college elsewhere</td>
<td>51.0</td>
</tr>
<tr>
<td>Enrollment Status</td>
<td>Full-time</td>
<td>76.7</td>
</tr>
<tr>
<td></td>
<td>Part-time</td>
<td>23.3</td>
</tr>
<tr>
<td>Plan to Re-enroll</td>
<td>Next semester</td>
<td>83.6</td>
</tr>
<tr>
<td></td>
<td>Not next semester, but within the next 12 months</td>
<td>7.3</td>
</tr>
<tr>
<td></td>
<td>I have no current plan to return</td>
<td>2.8</td>
</tr>
<tr>
<td></td>
<td>Uncertain</td>
<td>6.3</td>
</tr>
<tr>
<td>Military Branch</td>
<td>Air Force</td>
<td>9.7</td>
</tr>
<tr>
<td></td>
<td>Army</td>
<td>59.5</td>
</tr>
<tr>
<td></td>
<td>Coast Guard</td>
<td>1.6</td>
</tr>
<tr>
<td></td>
<td>Marine Corps</td>
<td>18.7</td>
</tr>
<tr>
<td></td>
<td>Navy</td>
<td>10.6</td>
</tr>
</tbody>
</table>

Of those who reported gender, 70.5 percent were male and 29.5 percent were female.

The majority of respondents—62.3 percent—identified as White, Non-Hispanic; 23.5 percent identified as Black or African American, Non-Hispanic; 6.0 percent identified as
Other; 5.5 percent identified as Hispanic, Latino, or Spanish; 1.6 percent identified as Asian, Asian American, or Pacific Islander; 0.8 percent identified as Native Hawaiian; and 0.3 percent identified as American Indian, Native American, or Alaska Native.

Slightly more than half—56.1 percent—were married, while 43.9 percent were not married. Fewer than half—48.0 percent—had children living with them, while 52.0 percent did not have children living at home.

Less than half—49.0 percent—began college at the institution they were currently attending and 51.0 percent began college elsewhere. The number of full-time versus part-time students was more than three-to-one—76.7 percent were enrolled in college full-time and 23.3 percent were enrolled part-time.

Of those students who would not be accomplishing their goal during the survey term (and therefore not returning due to goal attainment), 83.6 percent planned to re-enroll the following semester, 7.3 percent indicated not the next semester but within 12 months’ time, 2.8 percent said they had no current plan to return, and 6.3 percent said they were uncertain.

In terms of branch of service, 9.7 percent of respondents served in the Air Force, 59.5 percent served in the Army, 1.6 percent served in the Coast Guard, 18.7 percent served in the Marine Corps, and 10.6 percent served in the Navy.

**Institutional support.**

Given a list of institutional support services, respondents were asked how frequently they used each service (Table 4.22) and how important they considered each service (Table 4.23).
Table 4.22

*Frequency of Use of Institutional Support Services (% of Responding Veteran Students)*

<table>
<thead>
<tr>
<th>Service</th>
<th>Often</th>
<th>Sometimes</th>
<th>Rarely/ Never</th>
<th>Don't Know/ NA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic advising/planning for vets</td>
<td>15.2</td>
<td>40.8</td>
<td>40.2</td>
<td>3.8</td>
</tr>
<tr>
<td>Career planning/counseling for vets</td>
<td>10.4</td>
<td>25.0</td>
<td>57.0</td>
<td>7.6</td>
</tr>
<tr>
<td>Child care</td>
<td>4.8</td>
<td>1.6</td>
<td>46.6</td>
<td>46.9</td>
</tr>
<tr>
<td>Counseling and psychological services</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>tailored to vets*</td>
<td>4.1</td>
<td>8.9</td>
<td>59.4</td>
<td>27.6</td>
</tr>
<tr>
<td>Dedicated Web pages/portal for vets*</td>
<td>9.9</td>
<td>28.0</td>
<td>48.0</td>
<td>14.3</td>
</tr>
<tr>
<td>Financial aid/tuition assistance</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>counseling for vets</td>
<td>36.2</td>
<td>31.4</td>
<td>28.2</td>
<td>4.1</td>
</tr>
<tr>
<td>Job placement assistance</td>
<td>7.3</td>
<td>15.9</td>
<td>56.5</td>
<td>20.3</td>
</tr>
<tr>
<td>On-campus veterans service center*</td>
<td>20.9</td>
<td>26.7</td>
<td>40.9</td>
<td>11.5</td>
</tr>
<tr>
<td>Orientation specifically for veterans</td>
<td>7.3</td>
<td>13.0</td>
<td>54.9</td>
<td>24.8</td>
</tr>
<tr>
<td>Peer mentoring*</td>
<td>3.0</td>
<td>11.3</td>
<td>59.3</td>
<td>26.5</td>
</tr>
<tr>
<td>Peer or other tutoring for veterans</td>
<td>4.5</td>
<td>10.0</td>
<td>60.3</td>
<td>25.2</td>
</tr>
<tr>
<td>Student Veterans of America chapter*</td>
<td>3.5</td>
<td>7.7</td>
<td>55.8</td>
<td>33.0</td>
</tr>
<tr>
<td>VA education benefits counseling</td>
<td>23.8</td>
<td>30.8</td>
<td>37.2</td>
<td>8.3</td>
</tr>
<tr>
<td>Veteran recognition activities*</td>
<td>9.2</td>
<td>14.3</td>
<td>54.6</td>
<td>21.9</td>
</tr>
</tbody>
</table>

*Institutional support variable in the original study model.*
Table 4.23

*Importance of Institutional Support Services (% of Responding Veteran Students)*

<table>
<thead>
<tr>
<th>Service</th>
<th>Very</th>
<th>Somewhat</th>
<th>Not at All</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic advising/planning for vets</td>
<td>61.9</td>
<td>30.0</td>
<td>8.1</td>
</tr>
<tr>
<td>Career planning/counseling for vets</td>
<td>51.9</td>
<td>34.7</td>
<td>13.4</td>
</tr>
<tr>
<td>Child care</td>
<td>30.2</td>
<td>14.5</td>
<td>55.4</td>
</tr>
<tr>
<td>Counseling and psychological services tailored to vets*</td>
<td>41.7</td>
<td>29.7</td>
<td>28.7</td>
</tr>
<tr>
<td>Dedicated Web pages/portal for veterans</td>
<td>42.9</td>
<td>36.4</td>
<td>20.7</td>
</tr>
<tr>
<td>Financial aid/tuition assistance counseling for vets*</td>
<td>74.6</td>
<td>18.2</td>
<td>7.3</td>
</tr>
<tr>
<td>Job placement assistance</td>
<td>60.6</td>
<td>23.6</td>
<td>15.8</td>
</tr>
<tr>
<td>On-campus veterans service center*</td>
<td>64.6</td>
<td>21.4</td>
<td>14.0</td>
</tr>
<tr>
<td>Orientation specifically for veterans</td>
<td>43.1</td>
<td>33.8</td>
<td>23.1</td>
</tr>
<tr>
<td>Peer mentoring*</td>
<td>32.0</td>
<td>38.6</td>
<td>29.4</td>
</tr>
<tr>
<td>Peer or other tutoring for veterans</td>
<td>38.8</td>
<td>34.5</td>
<td>26.8</td>
</tr>
<tr>
<td>Student Veterans of America chapter*</td>
<td>31.3</td>
<td>37.3</td>
<td>31.4</td>
</tr>
<tr>
<td>VA education benefits counseling</td>
<td>70.9</td>
<td>18.6</td>
<td>10.5</td>
</tr>
<tr>
<td>Veteran recognition activities*</td>
<td>46.1</td>
<td>28.1</td>
<td>25.8</td>
</tr>
</tbody>
</table>

*Institutional support variable in the original study model.

Not surprisingly, the three institutional support services that were used most frequently were also considered the most important—financial aid/tuition assistance counseling for veterans, VA education benefits counseling, and on-campus veterans service center. What is surprising is the disparity between the indicated perceived level of importance and actual frequency of use for all of the listed support services. For each of the services, a much higher percentage of respondents indicated that a service was “very important” than actually used the service. One possible explanation is that while respondents consider these services to be important, they are not offered at their institution and therefore they are unable to make use of them.
Regression Analysis

SAS 9.3 statistical software was used to perform logistic regression on the data set created through multiple imputation and to answer the research question. SAS used 316 observations. The dependent variable in the logistic equation was intent to persist (0 = does not intend to persist, 1 = intends to persist); of the 316 observations, 284 indicated that they intended to persist and 32 indicated that they did not intend to persist.

Original model.

Logistic regression analysis was first performed on the variables contained in the study’s original model. One of the shortcomings of odds ratios is that they are asymmetrical—odds ratios greater than 1.0 are unbounded whereas odds ratios less than 1.0 are bounded by 0 (Osborne, 2006). To overcome this problem and maintain consistency in reporting, Osborne recommends using the inverse of odds ratio that are less than 1.0 in order to report all results in unbounded terms. Following his advice, the researcher reversed the coding of the dependent variable (intent to persist) to obtain an odds ratio greater than 1.0 (and therefore unbounded) for all variables that had negative β coefficients. The results of the logistic regression model for predicting intent to persist are presented in Table 4.24.
Table 4.24

*Logistic Regression of Intent to Persist – Original Model*

<table>
<thead>
<tr>
<th>Predictor</th>
<th>$\beta$</th>
<th>Std Err</th>
<th>$p$</th>
<th>Odds Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>-2.3175</td>
<td>2.1963</td>
<td>0.2915</td>
<td></td>
</tr>
<tr>
<td>GPA</td>
<td>0.1657</td>
<td>0.3308</td>
<td>0.6164</td>
<td>1.182</td>
</tr>
<tr>
<td>Age</td>
<td>-0.0122</td>
<td>0.0553</td>
<td>0.8250</td>
<td>1.013**</td>
</tr>
<tr>
<td>Enrollment status</td>
<td>0.4200</td>
<td>0.5276</td>
<td>0.4261</td>
<td>1.545</td>
</tr>
<tr>
<td>Gender</td>
<td>0.4212</td>
<td>0.4878</td>
<td>0.3879</td>
<td>1.533</td>
</tr>
<tr>
<td>Race</td>
<td>0.0841</td>
<td>0.4816</td>
<td>0.8613</td>
<td>1.098</td>
</tr>
<tr>
<td>Time between HS and college</td>
<td>0.0260</td>
<td>0.0558</td>
<td>0.6420</td>
<td>1.027</td>
</tr>
<tr>
<td>Active duty</td>
<td>-0.0030</td>
<td>0.0489</td>
<td>0.9511</td>
<td>1.003*</td>
</tr>
<tr>
<td>Deployments</td>
<td>-0.0096</td>
<td>0.0836</td>
<td>0.9083</td>
<td>1.010*</td>
</tr>
<tr>
<td>Hours per week working</td>
<td>0.0020</td>
<td>0.0121</td>
<td>0.8677</td>
<td>1.002</td>
</tr>
<tr>
<td>Married</td>
<td>-0.2405</td>
<td>0.4740</td>
<td>0.6119</td>
<td>1.274a</td>
</tr>
<tr>
<td>Children living at home</td>
<td>0.3068</td>
<td>0.5309</td>
<td>0.5633</td>
<td>1.367</td>
</tr>
<tr>
<td>Hours per week caring for dependents</td>
<td>0.0030</td>
<td>0.0064</td>
<td>0.6355</td>
<td>1.003</td>
</tr>
<tr>
<td>Family and friends support</td>
<td>0.6067</td>
<td>0.2221</td>
<td><strong>0.0063</strong></td>
<td>1.837</td>
</tr>
<tr>
<td>On-campus veterans service center</td>
<td>1.0153</td>
<td>0.8907</td>
<td>0.2554</td>
<td>3.166</td>
</tr>
<tr>
<td>Student Veterans of America chapter</td>
<td>-0.8579</td>
<td>0.7616</td>
<td>0.2604</td>
<td>2.511a</td>
</tr>
<tr>
<td>Counseling and psych services for veterans</td>
<td>1.1946</td>
<td>0.6437</td>
<td><strong>0.0640</strong></td>
<td>3.478</td>
</tr>
<tr>
<td>Peer mentoring</td>
<td>-1.3040</td>
<td>0.7941</td>
<td><strong>0.1015</strong></td>
<td>4.076a</td>
</tr>
<tr>
<td>Dedicated Web pages/portal for veterans</td>
<td>-0.2053</td>
<td>0.6658</td>
<td>0.7579</td>
<td>1.278a</td>
</tr>
<tr>
<td>Veteran recognition activities</td>
<td>0.8667</td>
<td>0.6601</td>
<td>0.1897</td>
<td>2.513</td>
</tr>
</tbody>
</table>

*Note.* Score statistic ($p=0.0476$, chi-square=31.6722, df=19); Pseudo $R^2=0.0855$. Statistically significant variables are in boldface.

*aOdds ratios for negative $\beta$ coefficients have been converted to the same bounds as the positive odds ratios (1 - infinity) by switching the coding of the dependent variable from 1 to 0.

*Predictors with $p$-value 0.10 or less.

The Score chi-square statistic was used to test the null hypothesis that all of the predictor variables have coefficients equal to 0. The resultant $p$-value of 0.0476 for the Score test (chi-square=31.6722 and df=19), led to the rejection of the null hypothesis and conclusion that overall the model is significant and at least one of the predictor coefficients is
not 0. Pseudo $R^2$ was used as a measure of the model’s goodness of fit. The pseudo $R^2$ of 0.0855 indicated that the variables in the model predicted 8.5 percent of the variability in intent to persist.

Shtatland et al. (2001) note that the use of a significance level of 0.05 is more of an unwritten “statistical tradition” often used without any grounds by those who do not have a strong personal opinion. Hosmer and Lemeshow (1989) advocate relaxing a study’s significance level, deeming the choice of 0.05 as too stringent and one that could possibly result in the exclusion of important variables from the model. Given the current study’s small sample size, which could result in effects not being as pronounced and therefore the exclusion of variables that could be important, the researcher relaxed the confidence level and accept a significance level of 0.10. The 0.10 $p$-value resulted in three variables—family and friends support, counseling and psychological services tailored to veterans, and peer mentoring—that are statistically significant for the average of the 40 imputed data sets.

Family and friends support ($p=0.0063$) has an odds ratio of 1.837, indicating that a one-unit increase in the family and friends encouragement scale (on a scale of 0 to 5) is associated with an 84 percent increase in the predicted odds of persistence. Veteran students who have the support and approval of family and friends are 1.8 times more likely to persist than those students who do not have the support and approval of their family and friends.

Counseling and psychological services tailored to veterans ($p=0.0640$) has an odds ratio of 3.478, indicating that veteran students who feel that counseling and psychological services are an important support service have a 248 percent increase in their predicted odds
of persisting—they are 3.5 times more likely to persist than students who do not feel this is an important service.

Peer mentoring \((p=0.1015)\) has an odds ratio of 4.076; its negative \(\beta\) coefficient indicates that it has an inverse relationship with intent to persist—individuals who feel that peer mentoring is a valuable support service have decreased odds of intending to persist. Veteran students who consider peer mentoring to be a valuable support service have a 307 percent decrease in their predicted odds of persisting—they are 4.1 times less likely to persist than students who do not feel this is an important service.

**Revised model.**

As indicated in chapter 3, the current study’s survey instrument included questions related to the use and value of various institutional support services; some of these questions related directly to the study’s model and addressed the study’s second research question; eight additional questions were not directly correlated to the study’s model but provided descriptive information that complemented the information collected for the study’s first research question. The eight additional questions inquired about academic advising/planning for veterans, career planning/counseling for veterans, child care, financial aid/tuition assistance counseling for veterans, job placement assistance, orientation specifically for veterans, peer or other tutoring for veterans, and VA education benefits counseling.

Review of the survey response data revealed that the two highest rated institutional support services, in terms of both importance and frequency of use—financial aid/tuition assistance counseling for veterans and VA education benefits counseling—were not part of
the study’s original model. The researcher therefore performed a second, expanded logistic regression that included all of the institutional support services that were included in the survey. Following Osborne’s (2006) recommendation, the researcher reversed the coding of the dependent variable (intent to persist) to obtain an odds ratio greater than 1.0 (and therefore unbounded) for all variables that had negative β coefficients. The results of the expanded model for predicting intent to persist are presented in Table 4.25; variables listed above the dashed line are from the study’s original model; the variables listed below the dashed line are the additional variables that were included in the expanded analysis.
Table 4.25

*Logistic Regression of Intent to Persist – Revised Model*

<table>
<thead>
<tr>
<th>Predictor</th>
<th>$\beta$</th>
<th>Std Err</th>
<th>$p$</th>
<th>Odds Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>-4.2188</td>
<td>2.7698</td>
<td>0.1283</td>
<td></td>
</tr>
<tr>
<td>GPA</td>
<td>0.1837</td>
<td>0.3543</td>
<td>0.6041</td>
<td>1.206</td>
</tr>
<tr>
<td>Age</td>
<td>0.0063</td>
<td>0.0627</td>
<td>0.9204</td>
<td>1.007</td>
</tr>
<tr>
<td>Enrollment status</td>
<td>0.3928</td>
<td>0.6066</td>
<td>0.5132</td>
<td>1.518</td>
</tr>
<tr>
<td>Gender</td>
<td>0.6078</td>
<td>0.5475</td>
<td>0.2670</td>
<td>1.858</td>
</tr>
<tr>
<td>Race</td>
<td>0.0820</td>
<td>0.5267</td>
<td>0.8762</td>
<td>1.103</td>
</tr>
<tr>
<td>Time between HS and college</td>
<td>0.0088</td>
<td>0.0626</td>
<td>0.8882</td>
<td>1.010</td>
</tr>
<tr>
<td>Active duty</td>
<td>-0.0021</td>
<td>0.0531</td>
<td>0.9678</td>
<td>1.002*</td>
</tr>
<tr>
<td>Deployments</td>
<td>-0.0392</td>
<td>0.0842</td>
<td>0.6416</td>
<td>1.040*</td>
</tr>
<tr>
<td>Hours per week working</td>
<td>0.0061</td>
<td>0.0135</td>
<td>0.6530</td>
<td>1.006</td>
</tr>
<tr>
<td>Married</td>
<td>-0.3105</td>
<td>0.5214</td>
<td>0.5514</td>
<td>1.373*</td>
</tr>
<tr>
<td>Children living at home</td>
<td>0.1732</td>
<td>0.5764</td>
<td>0.7639</td>
<td>1.199</td>
</tr>
<tr>
<td>Hours per week caring for dependents</td>
<td>0.0054</td>
<td>0.0072</td>
<td>0.4549</td>
<td>1.005</td>
</tr>
<tr>
<td>Family and friends support</td>
<td>0.6225</td>
<td>0.2530</td>
<td></td>
<td>*<em>0.0139</em></td>
</tr>
<tr>
<td>On-campus veterans service center</td>
<td>0.3281</td>
<td>1.2802</td>
<td>0.7981</td>
<td>1.905</td>
</tr>
<tr>
<td>Student Veterans of America chapter</td>
<td>-0.8075</td>
<td>0.9910</td>
<td>0.4157</td>
<td>2.643*</td>
</tr>
<tr>
<td>Counseling and psych services for veterans</td>
<td>1.4458</td>
<td>0.7999</td>
<td></td>
<td>*<em>0.0714</em></td>
</tr>
<tr>
<td>Peer mentoring</td>
<td>-1.0876</td>
<td>1.1240</td>
<td>0.3342</td>
<td>3.825*</td>
</tr>
<tr>
<td>Dedicated Web pages/portal for veterans</td>
<td>-0.5667</td>
<td>0.7845</td>
<td>0.4702</td>
<td>1.862*</td>
</tr>
<tr>
<td>Veteran recognition activities</td>
<td>1.0627</td>
<td>0.7040</td>
<td>0.1316</td>
<td>3.051</td>
</tr>
<tr>
<td>Academic advising/planning for veterans</td>
<td>1.0901</td>
<td>1.1024</td>
<td>0.3236</td>
<td>3.765</td>
</tr>
<tr>
<td>Career planning/counseling for veterans</td>
<td>-0.0221</td>
<td>0.8877</td>
<td>0.9802</td>
<td>1.096</td>
</tr>
<tr>
<td>Child care</td>
<td>-1.1285</td>
<td>0.6597</td>
<td></td>
<td>*<em>0.0876</em></td>
</tr>
<tr>
<td>Financial aid counseling for veterans</td>
<td>1.7248</td>
<td>0.9152</td>
<td></td>
<td>*<em>0.0599</em></td>
</tr>
<tr>
<td>Job placement assistance</td>
<td>-0.3332</td>
<td>1.0652</td>
<td>0.7547</td>
<td>1.693*</td>
</tr>
<tr>
<td>Orientation specifically for veterans</td>
<td>-0.6447</td>
<td>1.1732</td>
<td>0.5834</td>
<td>3.219*</td>
</tr>
<tr>
<td>Peer or other tutoring for veterans</td>
<td>-0.3963</td>
<td>1.2389</td>
<td>0.7494</td>
<td>2.002*</td>
</tr>
<tr>
<td>VA education benefits counseling</td>
<td>1.0966</td>
<td>1.5324</td>
<td>0.4758</td>
<td>7.585</td>
</tr>
</tbody>
</table>

*Note.* The variables above the dashed line are from the original model; the variables below the dashed line are the additional variables that were included in the revised model. Score statistic ($p=0.0138$, chi-square=48.2188, df=27); Pseudo $R^2=0.1361$; statistically significant variables are in boldface.

*Odds ratios for negative $\beta$ coefficients have been converted to the same bounds as the positive odds ratios (1 - infinity) by switching the coding of the dependent variable from 1 to 0.

*Predictors with $p$-value 0.10 or less.
In the expanded model, the Score chi-square statistic was 48.2188 (df=27, p=0.0138). This led to the rejection of the null hypothesis and conclusion that overall the model with expanded variables is significant and at least one of the predictor coefficients is greater than 0. Pseudo R² was used as a measure of the model’s goodness of fit. The pseudo R² of 0.1361 indicated that the variables in the model predicted 13.6 percent of the variability in intent to persist.

Using a significance level of 0.10, four variables—family and friends support (p=0.0139), financial aid/tuition assistance counseling for veterans (p=0.0599), counseling and psychological services tailored to veterans (p=0.0714), and child care (p=0.0876)—were statistically significant. A fifth variable, veteran recognition activities (p=0.1316), was very close to being statistically significant.

The odds ratio estimate for family and friends support is 1.869, indicating that a one-unit increase in the family and friends encouragement scale (on a scale of 0 to 5) is associated with an 87 percent increase in the predicted odds of persistence. Veteran students who have the support and approval of family and friends are 1.9 times more likely to persist than those students feel they have less support from their family and friends.

The odds ratio estimate for financial aid/tuition assistance counseling for veterans is 6.179, indicating veteran students who feel that that financial aid/tuition assistance counseling is important have a greater odds (by 518 percent) of persisting. Veteran students who perceive that financial aid/tuition assistance counseling is important are 6.2 times more
likely to persist than students who don’t consider financial aid/tuition assistance counseling to be important.

Counseling and psychological services tailored to veterans has an odds ratio of 4.600, indicating that veteran students who feel that counseling and psychological services are an important support service have a greater odds (by 360 percent) of persisting—they are 4.6 times more likely to persist than students who do not feel this is an important service.

Child care has an odds ratio of 3.238; its negative β coefficient indicates that child care has an inverse relationship with intent to persist—individuals who feel that child care is a valuable support service have decreased odds of intending to persist. Veteran students who consider child care to be a valuable support service have a 224 percent decrease in their predicted odds of persisting—they are 3.2 times less likely to persist than students who do not feel this is an important service.

Veteran recognition activities are on the cusp of statistical significance. Given the odds ratio for this support program, 3.051, it can be concluded that these are indeed a significant consideration in veteran students’ persistence. Veteran students who consider recognition activities to be important have a greater odds (by 205 percent) of persisting—they are 3.1 times more likely to persist than students who do not feel that these activities are important.

Table 4.26 presents a comparison of the original and revised models. The revised model proved to be a better predictor of veteran students’ intent to persist—the variables in the model predicted 13.6 percent of the variability in intent to persist compared to 8.6 percent
of the variability predicted by the original model. The revised model resulted in five statistically significant predictors (family and friends support, financial aid/tuition assistance counseling for veterans, counseling and psychological services tailored to veterans, child care, and veteran recognition activities) compared with three predictors in the original model (family and friends support, counseling and psychological services tailored to veterans, and peer mentoring).
Table 4.26

Odds Ratios of Original and Revised Models

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Original Model</th>
<th>Revised Model</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OR 95% CI</td>
<td>OR 95% CI</td>
</tr>
<tr>
<td>GPA</td>
<td>1.182 [0.624-2.238]</td>
<td>1.206 [0.617-2.361]</td>
</tr>
<tr>
<td>Age</td>
<td>1.013a [0.908-1.076]</td>
<td>1.007 [0.917-1.106]</td>
</tr>
<tr>
<td>Enrollment status</td>
<td>1.545 [0.584-4.090]</td>
<td>1.518 [0.514-4.490]</td>
</tr>
<tr>
<td>Gender</td>
<td>1.533 [0.605-3.882]</td>
<td>1.858 [0.665-5.197]</td>
</tr>
<tr>
<td>Race</td>
<td>1.098 [0.446-2.706]</td>
<td>1.103 [0.419-2.906]</td>
</tr>
<tr>
<td>Time between HS and college</td>
<td>1.027 [0.942-1.120]</td>
<td>1.010 [0.917-1.111]</td>
</tr>
<tr>
<td>Active duty</td>
<td>1.003a [0.910-1.093]</td>
<td>1.002a [0.905-1.101]</td>
</tr>
<tr>
<td>Deployments</td>
<td>1.010a [0.844-1.163]</td>
<td>1.040a [0.818-1.330]</td>
</tr>
<tr>
<td>Hours per week working</td>
<td>1.002 [0.979-1.025]</td>
<td>1.006 [0.981-1.031]</td>
</tr>
<tr>
<td>Married</td>
<td>1.274a [0.314-1.978]</td>
<td>1.373a [0.273-1.995]</td>
</tr>
<tr>
<td>Children living at home</td>
<td>1.367 [0.493-3.788]</td>
<td>1.199 [0.400-3.604]</td>
</tr>
<tr>
<td>Hours per week caring for dependents</td>
<td>1.003 [0.991-1.015]</td>
<td>1.005 [0.993-1.018]</td>
</tr>
<tr>
<td>Family and friends support</td>
<td>1.837*** [1.204-2.803]</td>
<td>1.869*** [1.165-2.999]</td>
</tr>
<tr>
<td>On-campus veterans service center</td>
<td>3.166 [0.813-12.403]</td>
<td>1.905 [0.328-11.204]</td>
</tr>
<tr>
<td>Student Veterans of America chapter</td>
<td>2.511a [0.126-1.644]</td>
<td>2.643a [0.109-2.434]</td>
</tr>
<tr>
<td>Peer mentoring</td>
<td>4.076***a [0.088-1.026]</td>
<td>3.825* [0.084-2.154]</td>
</tr>
<tr>
<td>Dedicated Web pages/portal for vets</td>
<td>1.278a [0.261-2.730]</td>
<td>1.862a [0.150-2.369]</td>
</tr>
<tr>
<td>Veteran recognition activities</td>
<td>2.513 [0.824-7.671]</td>
<td>3.051*** [0.904-10.323]</td>
</tr>
<tr>
<td>Academic advising/planning for vets</td>
<td>3.765 [0.660-21.680]</td>
<td>1.096 [0.264-4.572]</td>
</tr>
<tr>
<td>Career planning/counseling for vets</td>
<td>1.096 [0.284-4.572]</td>
<td>3.238***a [0.110-1.043]</td>
</tr>
<tr>
<td>Child care</td>
<td>3.238***a [0.110-1.043]</td>
<td>6.179*** [1.291-29.877]</td>
</tr>
<tr>
<td>Financial aid counseling for vets</td>
<td>6.179*** [1.291-29.877]</td>
<td>1.693a [0.175-4.410]</td>
</tr>
<tr>
<td>Job placement assistance</td>
<td>1.693a [0.175-4.410]</td>
<td>3.219a [0.135-3.208]</td>
</tr>
<tr>
<td>Orientation specifically for veterans</td>
<td>3.219a [0.135-3.208]</td>
<td>2.002a [0.163-5.424]</td>
</tr>
<tr>
<td>Peer or other tutoring for veterans</td>
<td>2.002a [0.163-5.424]</td>
<td>7.585 [0.891-76.249]</td>
</tr>
</tbody>
</table>
| VA education benefits counseling               | 7.585 [0.891-76.249] | 19 27 31.6722 48.2188 0.0855 0.1361

Note. OR=odds ratio; CI=confidence interval.
Research Question 3

The following sections will compare veteran students’ ratings (in terms of importance and frequency of use) of institutional support programs and services with college administrators’ perceptions of veteran students’ use of these programs and services.

College Administrators’ Responses

Of the 13 colleges that participated, ten administrators indicated that their colleges currently have programs and services specifically designed for veteran students. The two most-offered programs and services were VA education benefits counseling and veteran recognition activities (offered at seven and six colleges, respectively), followed by academic advising and academic tutoring (each offered by four colleges); financial aid counseling (three colleges); career planning/career services, employment assistance, and website/portal (each offered by two colleges); and veteran student lounge/service center (one college). However, when asked to estimate the veteran students’ usage rate of these services, a larger number of administrators provided responses than had indicated that these services were offered specifically for veteran students at their colleges. The researcher therefore concluded that administrators’ usage estimates reflect veterans’ usage of these services, whether they were veteran-specific or offered for the general student population.

College administrators estimated that the three most widely-used services were VA education benefits counseling (used “often” by 100 percent), financial aid counseling (used
“often” by 88 percent), and academic advising (used “often” by 86 percent). The least utilized service, according to administrators, was a veteran student lounge/service center (“not applicable” by 86 percent).

Veteran Students’ Responses

The three most widely-used services, as reported by veteran students, were financial aid counseling (used “often” by 36.2 percent), VA education benefits counseling (used “often” by 23.8 percent), and a veteran student lounge/service center (used “often” by 20.9 percent). The least utilized service was academic tutoring (60.3 percent of responding students indicated they rarely or never used it and an additional 25.2 percent indicated it was not applicable).

More revealing than the students’ usage of institutional support programs and services, was students’ perceived importance of these same programs and services. As was indicated earlier, there is not yet widespread implementation of institutional support programs among the North Carolina community colleges. If the programs and services are not available to students on their campuses, then they can’t make use of them. The students’ perceived importance, however, indicates the value of these services and it is these measures that should send messages to community college administrators.

The three most important institutional support programs and services, according to veteran students, were financial aid counseling (rated “very important” by 74.6 percent of responding veteran students), VA education benefits counseling (rated “very important” by 70.9 percent of responding veteran students), and a veteran student lounge/service center
(rated “very important” by 64.6 percent of responding veteran students). The support service that was the least important was academic tutoring (rated “not important at all” by 26.8 percent of responding veteran students).

The students’ responses were consistent in terms of frequency of use and perceived importance. The three most frequently used services were also viewed as the most important by students—financial aid counseling, VA education benefits counseling, and a veteran student lounge/service center. Similarly, the least used service held the lowest value to veteran students—academic tutoring. What is interesting is that for most support services, the percentage of students that ranked the service as very important was approximately twice the percentage of those who used the service frequently. For financial aid counseling, 36.2 percent indicated they used the service frequently, yet 74.6 percent rated that service as very important; for VA education benefits counseling, 23.8 percent indicated they used the service frequently, but 70.9 percent rated it as very important; for a veteran student lounge/service center, 20.9 percent used the service frequently, yet 64.6 percent rated it as very important.

**Comparison of Administrators’ and Students’ Responses**

Table 4.27 provides a comparison of community college administrators’ and veteran students’ responses.
Table 4.27

Comparison of Administrators’ and Students’ Responses on Usage of Institutional Support Services

<table>
<thead>
<tr>
<th>Programs and Services</th>
<th># of Colleges that Offer</th>
<th>N=</th>
<th>Often</th>
<th>Sometimes</th>
<th>Rarely/Never</th>
<th>N/A</th>
<th>Veteran Students’ Usage</th>
<th>Importance to Veteran Students</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Often</td>
<td>Sometimes</td>
</tr>
<tr>
<td>Academic advising</td>
<td>4</td>
<td>7</td>
<td>86%</td>
<td>14%</td>
<td>0%</td>
<td>0%</td>
<td>15.2%</td>
<td>40.8%</td>
</tr>
<tr>
<td>Academic tutoring</td>
<td>4</td>
<td>7</td>
<td>29%</td>
<td>71%</td>
<td>0%</td>
<td>0%</td>
<td>4.5%</td>
<td>10.0%</td>
</tr>
<tr>
<td>Career planning/services</td>
<td>2</td>
<td>7</td>
<td>29%</td>
<td>57%</td>
<td>14%</td>
<td>0%</td>
<td>10.4%</td>
<td>25.0%</td>
</tr>
<tr>
<td>Employment assistance</td>
<td>2</td>
<td>7</td>
<td>14%</td>
<td>57%</td>
<td>0%</td>
<td>29%</td>
<td>7.3%</td>
<td>15.9%</td>
</tr>
<tr>
<td>Financial aid counseling</td>
<td>3</td>
<td>8</td>
<td>88%</td>
<td>0%</td>
<td>13%</td>
<td>0%</td>
<td>36.2%</td>
<td>31.4%</td>
</tr>
<tr>
<td>Orientation</td>
<td>0</td>
<td>7</td>
<td>57%</td>
<td>43%</td>
<td>0%</td>
<td>0%</td>
<td>7.3%</td>
<td>13.0%</td>
</tr>
<tr>
<td>VA education benefits counseling</td>
<td>7</td>
<td>10</td>
<td>100%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>23.8%</td>
<td>30.8%</td>
</tr>
<tr>
<td>Vet recognition activities</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vet student lounge/service center</td>
<td>1</td>
<td>7</td>
<td>14%</td>
<td>0%</td>
<td>0%</td>
<td>86%</td>
<td>20.9%</td>
<td>26.7%</td>
</tr>
<tr>
<td>Website/portal</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The data highlight a significant disconnect between administrators’ perceptions of institutional support service usage and actual usage by veteran students. With the exception of a veteran student lounge/service center, of which administrators underestimated the usage, responding administrators grossly overestimated the use of institutional support services. The greatest discrepancy occurred in the usage of academic advising—administrators estimated that this service was used often 86 percent of the time, whereas 15.2 percent of students indicated they used this service often—administrators overestimated the use of this service by 70.8 percent. One redeeming point is that overall the administrators’ estimates were closer to the students’ importance ratings (but they were still not aligned).

There was agreement between the two groups that the two most widely used services were VA education benefits counseling and financial aid counseling; however administrators estimated that these services were used often by 100 percent and 88 percent of students, respectively, whereas 23.8 percent and 36.2 percent of students indicated they used these services often. Administrators’ estimates were closer to the 70.9 percent and 74.6 percent of students who indicated that VA education benefits counseling and financial aid counseling, respectively, were very important, however there was still an overestimation on the part of administrators on of the value of these services.

Another significant disparity related to use of a veteran student lounge/service center. According to administrators, this was the least used service, yet veteran students indicated this was their third most used and most valued service.
The comparison of administrators’ usage perceptions and veteran students’ actual usage and valuation is significant for two reasons—first, it provides a reality check for community college administrators, and second, it provides direction (both direct and implied). The reality is that the community colleges do not have accurate impressions of the institutional support services that are used and valued by their veteran students. Consequently, budgeting and resource allocation decisions are being misinformed. The insights provided by the students should assist the administrators direct their dollars, personnel, and efforts towards those services that will be most utilized—and therefore most beneficial—by veteran students. These findings also call to attention the need to put in place more effective data gathering processes and mechanisms.

**Conclusion**

This study sought to determine how North Carolina community colleges can enable persistence of their veteran students through the provision of institutional support programs and policies. In order to do so, it first ascertained what support programs and policies the colleges currently have in place and plan to include in the next five years and then examined whether academic, background, environmental, and institutional variables were predictors of veteran students’ intent to persist at North Carolina community colleges. Finally, it performed a reality check, comparing veteran students’ ratings of institutional support services (in terms of importance and frequency of use) and college administrators’ perceptions of veteran students’ usage of these services.
The colleges recognize the importance of offering programs and services for veteran students and having trained faculty and staff to interact with these students, however they are “behind the curve”—there is not yet widespread implementation of programs, policies, and initiatives. Less than half (38 percent) of the responding colleges currently include programs and services for veteran students as part of their long-term strategic plan, however an additional 23 percent indicated that are in the process of doing so. Their top priority matches veteran students’ top concern—financial aid—yet only 62 percent of the colleges identified financial aid as a priority. Only 77 percent of the colleges offer programs and services specifically designed for veteran students, on the positive side, the most-offered service is the second-most important service to veteran students (after financial aid)—VA education benefits counseling; on the negative side, only 54 percent of the colleges this service. Similarly, only 54 percent indicated they provide any type of social support services. These figures are not surprising when considered in conjunction that only 54 percent identified veteran student retention/degree or certificate completion as a priority.

An expanded model of veteran students’ intent to persist found four significant predictors and a fifth borderline significant predictor. One environmental variable, family and friends support \( (p=0.0139, \text{odds ratio}=1.869) \) and two institutional support variables, financial aid/tuition assistance counseling for veterans \( (p=0.0599, \text{odds ratio}=6.179) \) and counseling and psychological services tailored to veterans \( (p=0.0714, \text{odds ratio}=4.600) \), were positive predictors of veteran students’ intent to persist. A third institutional support variable, child care \( (p=0.0876, \text{odds ratio}=0.339) \), was a negative predictor of veteran
students’ intent to persist. An additional institutional support variable, veteran recognition activities \( (p=0.1316, \text{ odds ratio}=3.051) \), also had a strong positive influence on intent to persist. These findings confirm the importance of these specific social support and financial aid services in veteran students’ decision to remain in school.

Comparison of veteran students’ ratings of institutional support programs with those of college administrators revealed a disconnect between the colleges’ perceptions and the actual desires and usage by veteran students. This disconnect has potential negative consequences for both the institutions and the students—colleges will misallocate scarce resources and veterans will experience a poor ROI for their limited GI bill benefits.

Chapter 5 will discuss in more detail the results of this study, and will address the impact of this study’s findings on the existing literature, North Carolina community colleges, and future research and practice.
CHAPTER 5: SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Introduction

The purpose of this study was to examine the relationship between institutional support mechanisms and veteran student persistence at North Carolina community colleges. The study ascertained the colleges’ current and planned efforts to create a welcoming, positive, supportive learning environment for veterans; the study also examined whether academic, background, environmental, and institutional variables were predictors of veteran students’ intent to persist; and lastly, the study compared the colleges’ perceptions of veteran students’ usage of institutional support services with the students’ actual usage. This non-experimental research used a cross-sectional predictive design that utilized two sets of surveys to gather information from college administrators and veteran students at North Carolina community colleges. Twenty-five of the 58 North Carolina community colleges agreed to participate in the study. Administrators from 13 of the participating colleges completed usable administrators’ surveys. Seventeen of the 25 participating colleges provided lists of veteran students for a total of 2,860 veteran students in the survey sample. The researcher sent 2,860 veteran student surveys and received 517 responses, of which 348 were included for analysis. This chapter will present the conclusions drawn from the study’s findings, and the resultant recommendations for policy, practice, and future research.

Conclusions and Discussion

In academia, persistence is often defined as re-enrollment in the same institution in the subsequent semester. For this study, persistence was gauged by intent to persist which
has been found to be a significant predictor of actual persistence (Bean, 1980, 1982; Metzner and Bean, 1987; Pascarella, Duby, & Iverson, 1983; Pascarella et al., 1986), including at community colleges (Bers & Smith, 1991; Mulligan & Hennessy, 1990; Sorey & Duggan, 2008; Voorhees, 1987). The purpose of this study was to 1) determine the availability of services for veteran students at North Carolina community colleges, 2) develop a model for predicting veteran students’ intent to persist at North Carolina community colleges, and 3) compare the perceptions of North Carolina community college administrators with those of their veteran students concerning institutional support services.

Data from an administrators’ survey were analyzed with descriptive statistics to ascertain the community colleges’ current and planned services in support of their veteran student populations. The administrators’ responses revealed that while the colleges recognize the importance of offering programs and services for veteran students and having trained faculty and staff to interact with these students, there is not yet widespread implementation of programs, policies, and initiatives. The findings from the administrators’ survey will be compared with the results from two other similar studies in the literature—a nationwide study performed by Cook and Kim (2009) on behalf of the American Council on Education (ACE) and a nationwide study conducted by Queen and Lewis (2014) on behalf of the National Center for Education Statistics (NCES). While neither of the national studies was dedicated exclusively to community colleges, many of their results are reported by institution type, thereby facilitating comparison with the findings from the current study.
Data from the students’ survey were analyzed with logistic regression to determine the predictive ability, if any, of independent academic, background, environmental, and institutional variables on veteran students’ intent to persist. Prior to performing the logistic regression analysis, the researcher utilized multiple imputation by chain equations (MICE) on the student data to provide a more robust data set.

Logistic regression performed on the 19 independent variables that comprised the study’s original model revealed that there was a significant relationship at the 0.10 level between intent to persist and three predictor variables—family and friends support, counseling and psychological services tailored to veterans, and peer mentoring. A subsequent expanded logistic regression analysis of a revised model with eight additional support variables (academic advising/planning for veterans, career planning/counseling for veterans, child care, financial aid counseling for veterans, job placement assistance, orientation specifically for veterans, peer or other tutoring for veterans, VA education benefits counseling) confirmed the significance of family and friends support and counseling and psychological services tailored to veterans, and also found financial aid/tuition assistance counseling for veterans, child care, and veteran recognition activities to be statistically significant. The revised model was an improved predictor of veteran students’ intent to persist over the study’s original model, explaining 13.6 percent of the variability in intent to persist compared to 8.6 percent explained by the original model.

The five significant variables of the revised model—family and friends support, financial aid/tuition assistance counseling for veterans, counseling and psychological services
tailored to veterans, child care, and veteran recognition activities—will be discussed in terms of their predictive ability of veteran students’ intent to persist, as well as how these findings compare to previous research. Discussion will also include comments shared by survey participants. Although this was a quantitative study and did not solicit any qualitative responses, numerous participants contacted the researcher and provided additional commentary. These comments did not factor into the logistic regression analysis, however they will be reported here because they provide valuable insight into the mindsets of veteran students and have consequential implications for administrators of North Carolina community colleges.

The findings from the two sets of surveys (administrators and students) will then be considered in terms of their implications for policy, practice, and future research.

**Administrators’ Survey**

The administrators’ survey was sent to the director of institutional research at each of the 25 participating community colleges. The titles of the 13 respondents reflected the following areas of responsibility: institutional effectiveness (five respondents), veterans affairs/services (five respondents), research (three respondents), financial aid (two respondents), and registrar (one respondent) (this totals to more than 13 respondents since some respondents had more than one area of responsibility).

Data from the administrators’ survey revealed that there is not yet widespread implementation of programs, policies, and initiatives in support of veteran students at North Carolina community colleges. Less than half (38 percent) of the responding colleges
currently include programs and services for veteran students as part of their long-term strategic plan, however an additional 23 percent indicated that they are in the process of doing so. The colleges’ top priority matches veteran students’ top concern—financial aid—yet only 62 percent of the responding colleges identified financial aid as a priority.

Approximately three-quarters, 77 percent, of the responding colleges offer programs and services specifically designed for veteran students. The top three colleges in terms of veteran student enrollments were similarly ranked when it came to the number of services and programs for veteran students that were offered on their campuses. This is in accordance with earlier research that showed that institutions with larger veteran populations are more likely to offer programs and services for these students than campuses with smaller populations (Cook & Kim, 2009).

The most-offered service—VA education benefits counseling— is the second-most important service to veteran students (after financial aid), however only 54 percent of the responding colleges provide this service. Only 54 percent indicated they provide any type of social support services. These figures are not surprising when only 54 percent identified veteran student retention/degree or certificate completion as a priority.

The literature contained two similar studies. Cook and Kim (2009) conducted a study on behalf of the American Council on Education (ACE), in partnership with Servicemembers Opportunity Colleges (SOC), the American Association of State Colleges and Universities (AASCU), NASPA-Student Affairs Administrators in Higher Education, National Association of Veterans’ Program Administrators (NAVPA). Purporting to be the first
attempt to assess the status of programs and services for veteran students at college campuses across the country, Cooks and Kim’s survey (which was the basis for the current study’s survey), sent to 2,647 college and university presidents nationwide, contained 32 questions that solicited information on campus characteristics, institutional climate in terms of priority of veterans and military student services/programs, academic support services, student support services, administrative and physical infrastructure, enrollment management/financial assistance, as well as comments and contact information. Of the 723 responding institutions, 212 (or 30 percent), represented public two-year institutions. The researchers did not provide a breakdown by state, so it is not known how many North Carolina colleges were in the nationwide responses.

Queen and Lewis (2014) conducted a study in summer 2013 on behalf of NCES, part of the Institute of Education Sciences, using the Postsecondary Education Quick Information System (PEQIS). Questionnaires were sent to approximately 1,650 Title IV eligible, degree-granting institutions nationwide; the cover letter requested that the survey be completed by the individual who was most knowledgeable about the institution’s support programs and services for military and veteran students. Of the 1,520 responding institutions, 510 (or 34 percent), represented public two-year institutions. The researchers did not provide a breakdown by state, so it is not known how many North Carolina colleges were in the nationwide responses.

The following discussion will compare the findings from these two nationwide studies with the findings from this first North Carolina study. Because Cook and Kim’s
(2009) instrument was the basis for the current study, there will be more direct comparisons to their findings than those provided by Queen and Lewis (2014).

**Veteran student enrollment.**

For the 199 two-year institutions that reported veteran student enrollments in Cook and Kim’s (2009) national study, the average number of enrollments equaled 198.9. Queen and Lewis (2014) did not report specific enrollment numbers, however 99 percent of the 510 responding institutions enrolled veterans who received veteran’s financial education benefits; total enrollment of military service members, veterans, and dependents totaled 307,700, so an approximate average number of enrollments would equal 609 (510 x .99 x 307,700). For the 12 North Carolina community colleges that reported veteran student enrollments in the current study, the average number of enrollments equaled 642.9; it should be noted that one institution had enrollments greater than 1,000, one institution had enrollments greater than 2,000, and one institution had enrollments greater than 3,000. Five of the responding North Carolina community colleges were above the national average enrollment and seven were below. While the veteran student enrollments for North Carolina community colleges was comparable to the estimated enrollments for those of Queen and Lewis (2014), they were significantly larger than those of Cook and Kim (2009). Without know the geographic distribution of respondents for either of the national studies, the differences in average enrollments could be attributed to the timing of the studies and the possible increase in veteran student enrollments overall. Cook and Kim’s (2009) study was five years earlier than the current study and that of Queen and Lewis. In those ensuing years, as the wars in
Iraq and Afghanistan have wound down, additional veterans have returned and enrolled in postsecondary institutions, thereby increasing the average enrollments. One would expect that veteran enrollments (from these most recent conflicts) would eventually stabilize and then taper off. North Carolina community colleges will most likely always have high and higher-than-average enrollments due to the location of eight military bases in North Carolina—two Air Force, two Army, two Coast Guard, three Marine Corps, and one Navy. However, one could anticipate that veteran student enrollments will wax and wane as do military enlistments (as the result of future conflicts), with a certain time lag.

**Colleges’ perceptions of veteran students’ usage of programs and services.**

Cook and Kim (2009) found that as the proportion of veteran students increases, so does the likelihood that veteran-specific programs will be offered at that college and be part of the institution’s long-term strategic plan. As noted earlier, less than half (38 percent) of North Carolina community colleges currently include programs and services for veteran students as part of their long-term strategic plan, with an additional 23 percent in the process of doing so. Even taken together, this total of 61 percent is lower than the national average of 67.9 percent among the 209 reporting colleges in Cook & Kim’s (2009) study. The relatively low rate of North Carolina colleges is surprising given the number of military bases and veteran student enrollments at North Carolina community colleges.

A college’s long-term strategic plan should address issues that are critical to the institution, including goals, strategies, specific initiatives, and metrics for measuring success. Inclusion of items in a college’s long-term plan designate that these are items that are
important to the institution and warrant planning and budgeting—they are items that will be given attention and not overlooked. Omission of programs and services for veterans from a college’s long-term strategic plan sends a message to the community about the college’s outlook towards serving this constituency and makes it easier for these programs and services to be a non-priority when it comes to allocating resources. President Obama acknowledged the need to provide veterans with the supports they need when he signed the Executive Order—Establishing Principles of Excellence for Educational Institutions Serving Service Members, Veterans, Spouses and Other Family Members in April 2012. To continue to receive federal veteran education benefits, colleges must provide outcomes data. In order to ensure that colleges meet their fiduciary responsibilities and that veteran students’ needs are met and educational success attained, colleges should include programs and services for veteran students in their long-term strategic plan.

Table 5.1 presents a comparison of the colleges’ planned initiatives over the next five years.
### Table 5.1

**% of Community Colleges Planning Various Actions for Veterans during the Next 5 Years**

<table>
<thead>
<tr>
<th>Initiative</th>
<th>NC – Current Study N=13</th>
<th>Nationwide – Cook &amp; Kim N=210</th>
</tr>
</thead>
<tbody>
<tr>
<td>Establish dept for svc and programs</td>
<td>15%</td>
<td>11.4%</td>
</tr>
<tr>
<td>Professional development for faculty/staff</td>
<td>46%</td>
<td>62.9%</td>
</tr>
<tr>
<td>Increase number of vet student svc and programs</td>
<td>46%</td>
<td>39.5%</td>
</tr>
<tr>
<td>Establish a center for vet students</td>
<td>23%</td>
<td>17.6%</td>
</tr>
<tr>
<td>Increase budget for svc and programs</td>
<td>38%</td>
<td>23.3%</td>
</tr>
<tr>
<td>Train counseling staff in health issues</td>
<td>31%</td>
<td>47.1%</td>
</tr>
<tr>
<td>Increase staff for vet student svc and programs</td>
<td>46%</td>
<td>28.6%</td>
</tr>
<tr>
<td>Seek fed funding for programs for vet students</td>
<td>15%</td>
<td>38.5%</td>
</tr>
<tr>
<td>Seek state funding for programs for vet students</td>
<td>8%</td>
<td>38.5%</td>
</tr>
</tbody>
</table>

North Carolina community colleges fall below the national averages reported by Cook & Kim (2009) in terms of staff development and funding issues; specifically, professional development for faculty and staff, training counseling staff in health issues, and seeking federal or state funding. While both national (Cook & Kim, 2009) and North Carolina respondents rated professional development of faculty and staff as the number one initiative, a lower percentage of North Carolina institutions did so compared to the national average. North Carolina colleges seem to be in line with some of Queen and Lewis’ (2014) nationwide findings, which reported that 32 percent of colleges offered staff training in mental health issues associated with military service, 21 percent offered and 13 percent had mandatory staff training in physical health issues related to military service, and 29 percent offered staff training in student transitions from military to civilian life. Researchers (DiRamio et al., 2008; McBain et al., 2012; Persky & Oliver, 2010) recommend that colleges
conduct professional development for faculty and staff that takes a holistic view of veteran students’ issues, utilizes the experience of faculty and staff members who themselves are veterans, and fosters a more inclusive campus climate. Professional development of faculty and staff to help them gain a better understanding of military culture and mindset, and understand the challenges faced by veteran students, will be beneficial in removing the barriers to education for veteran students. Transitioning to college is among the most difficult adjustments that veterans will make when returning from wartime service (DiRamio et al., 2008); college faculty and staff must be properly trained in order to be prepared to assist in a successful transition.

North Carolina community colleges are above the national averages (Cook & Kim, 2009) in terms of plans to establish a department for veterans’ programs and services, increasing the number of veterans’ programs and services, establishing a center for veteran students, increasing the budget for veterans’ programs and services, and increasing the staffing for veterans’ programs and services. All of these initiatives will require additional funding. While 46 percent of North Carolina colleges planned to increase programs and services for veterans and 38 percent planned to increase budgeting for these programs, only 15 percent planned to seek federal funding and only 8 percent planned to seek state funding. Given that North Carolina state institutions will be facing budgetary shortfalls with the requirement to charge in-state tuition for all veteran students, the question is raised as to how they plan to fund these increased programs and budgets. One option is to reduce spending elsewhere (other programs and salaries, for example), which seems unlikely. Another option
for the colleges to consider would be partnerships with or sponsorships from private businesses. Those organizations that share a high commitment to developing veteran personnel would be a natural fit. This could also provide a clear employment channel for veteran students.

North Carolina falls below the national percentages (Cook & Kim, 2009) in terms of student- and institution-related issues identified as priorities (Table 5.2).

Table 5.2

% of Colleges that Have Identified Student- and Institution-related Issues as Priorities

<table>
<thead>
<tr>
<th>Student Issues</th>
<th>Current Study N=13</th>
<th>Nationwide Cook &amp; Kim N=137</th>
</tr>
</thead>
<tbody>
<tr>
<td>Financial aid</td>
<td>62%</td>
<td>85.4%</td>
</tr>
<tr>
<td>Student retention/degree or certificate completion</td>
<td>54%</td>
<td>76.6%</td>
</tr>
<tr>
<td>Health care (PTSD, TBI, etc.)</td>
<td>31%</td>
<td>47.4%</td>
</tr>
<tr>
<td>Student acculturation</td>
<td>15%</td>
<td>28.5%</td>
</tr>
<tr>
<td>Student protests</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>None</td>
<td>0%</td>
<td>5.8%</td>
</tr>
<tr>
<td>Other</td>
<td>0%</td>
<td>9.5%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Institutional Issues</th>
<th>N=13</th>
<th>N=134</th>
</tr>
</thead>
<tbody>
<tr>
<td>Qualified staff to address veteran students' needs</td>
<td>38%</td>
<td>35.8%</td>
</tr>
<tr>
<td>Faculty/staff sensitivity</td>
<td>31%</td>
<td>50.7%</td>
</tr>
<tr>
<td>Locating funding sources for added programs and services</td>
<td>31%</td>
<td>41.8%</td>
</tr>
<tr>
<td>None</td>
<td>23%</td>
<td>9.0%</td>
</tr>
<tr>
<td>Campus accessibility</td>
<td>15%</td>
<td>11.2%</td>
</tr>
<tr>
<td>Security for campus protests</td>
<td>8%</td>
<td>0%</td>
</tr>
<tr>
<td>Inadequate expense coverage by Post-9/11 GI Bill</td>
<td>0%</td>
<td>4.5%</td>
</tr>
<tr>
<td>Other</td>
<td>0%</td>
<td>3.0%</td>
</tr>
</tbody>
</table>
North Carolina community college administrators ranked the student-related issues in the same order as national respondents (Cook & Kim, 2009); however for all of the issues, a much smaller percentage of North Carolina administrators considered them to be priorities (compared to their national counterparts). While this concurrence in the prioritizing provides validation, the smaller percentage of North Carolina institutions recognizing these issues is further indication that North Carolina colleges are not as proactive in serving their veteran students as their national counterparts.

There is more of a divide concerning institutional issues. North Carolina administrators were slightly more concerned about having qualified staff to addresses veterans’ needs and campus accessibility, as well as being concerned about security for campus protests. Administrators at the national level were more concerned about faculty/staff sensitivity, locating funding sources for programs and services, and expense coverage by the Post-9/11 GI Bill (Cook & Kim, 2009). It is interesting to note that almost one-fourth of North Carolina administrators indicated that their colleges didn’t have any institutional issues concerning serving veteran students.

Of the nine responding North Carolina community colleges, seven (78 percent) have increased their emphasis on services and programs specifically for veterans since September 11, 2001, one (11 percent) has not, and one (11 percent) was unsure. These numbers are positive compared to the national averages, where out of 139 responding institutions, 64.7 percent had increased their emphasis, 30.9 percent had not, and 4.3 percent were unsure (Cook & Kim, 2009).
Table 5.3 presents the programmatic changes indicative of campuses’ increased emphasis on their veteran student populations.

Table 5.3

<table>
<thead>
<tr>
<th>Campus Services or Programmatic Changes</th>
<th>NC - Current Study</th>
<th>Nationwide - Cook &amp; Kim N=84</th>
</tr>
</thead>
<tbody>
<tr>
<td>Established new programs/services for vet students</td>
<td>46%</td>
<td>57.1%</td>
</tr>
<tr>
<td>Established mktg/outreach strategies to attract vet students</td>
<td>31%</td>
<td>52.4%</td>
</tr>
<tr>
<td>Increased counseling services/off-campus referral procedures</td>
<td>31%</td>
<td>52.4%</td>
</tr>
<tr>
<td>Increased institutional funding for vets’ programs &amp; services</td>
<td>31%</td>
<td>-</td>
</tr>
<tr>
<td>Policy changes to accept evaluated credit for military service</td>
<td>23%</td>
<td>-</td>
</tr>
<tr>
<td>Web page/linked to non-federal website for vet students</td>
<td>23%</td>
<td>-</td>
</tr>
<tr>
<td>Increased staff in existing programs and svcs for vet students</td>
<td>15%</td>
<td>28.6%</td>
</tr>
<tr>
<td>Added or expanded faculty/staff training on vets’ issues</td>
<td>15%</td>
<td>-</td>
</tr>
<tr>
<td>Other</td>
<td>8%</td>
<td>17.9%</td>
</tr>
<tr>
<td>Appointed a committee to develop a campus action plan</td>
<td>0%</td>
<td>25.0%</td>
</tr>
<tr>
<td>Established tuition waivers and/or reduced tuition rates</td>
<td>0%</td>
<td>-</td>
</tr>
</tbody>
</table>

Note. A “-” denotes data not available.

As with the prioritizing of student-related issues, this increased emphasis has manifested itself in similar ways on both North Carolina and national campuses; however, compared with campuses nationwide (Cook & Kim, 2009), a much smaller percentage of North Carolina colleges implemented each of these changes.

Approximately three-quarters, 77 percent, of North Carolina colleges offered programs and services specifically designed for veteran students, which is above the national average (N=212) of 65.6 percent (Cook & Kim, 2009). However, far smaller percentages of
North Carolina community colleges offered each of the services compared to the national averages (Cook & Kim, 2009; Queen & Lewis, 2014) (Table 5.4).

Table 5.4

<table>
<thead>
<tr>
<th>Programs and Services</th>
<th>NC - Current Study</th>
<th>Nationwide - Cook &amp; Kim N=139</th>
<th>Nationwide - Queen &amp; Lewis N=510</th>
</tr>
</thead>
<tbody>
<tr>
<td>VA education benefits counseling</td>
<td>54%</td>
<td>86.3%</td>
<td>85%</td>
</tr>
<tr>
<td>Veteran recognition activities</td>
<td>46%</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Academic advising</td>
<td>31%</td>
<td>57.6%</td>
<td>45%</td>
</tr>
<tr>
<td>Academic support/tutoring</td>
<td>31%</td>
<td>38.8%</td>
<td>24%</td>
</tr>
<tr>
<td>Financial aid counseling</td>
<td>23%</td>
<td>56.1%</td>
<td>49%</td>
</tr>
<tr>
<td>Campus social and/or cultural events</td>
<td>15%</td>
<td>33.8%</td>
<td></td>
</tr>
<tr>
<td>Career planning/career services</td>
<td>15%</td>
<td>38.8%</td>
<td>27%</td>
</tr>
<tr>
<td>Employment assistance</td>
<td>15%</td>
<td>54.0%</td>
<td>22%</td>
</tr>
<tr>
<td>Website/portal</td>
<td>15%</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>15%</td>
<td>10.1%</td>
<td></td>
</tr>
<tr>
<td>Transition assistance</td>
<td>8%</td>
<td>19.4%</td>
<td></td>
</tr>
<tr>
<td>Veteran student lounge/gathering place</td>
<td>8%</td>
<td>11.5%</td>
<td>32%</td>
</tr>
<tr>
<td>Orientation</td>
<td>0%</td>
<td>-</td>
<td>26%</td>
</tr>
<tr>
<td>None</td>
<td>0%</td>
<td>1.4%</td>
<td></td>
</tr>
</tbody>
</table>

*Note.* A “-” denotes data not available.

**Academic support services.**

North Carolina community colleges are not as proactive as the national average (Cook & Kim, 2009) in terms of offering academic support services. Of the 10 responding North Carolina colleges, only one (10 percent) provided tutorial services or academic assistance specifically for veteran students beyond what is available to other enrolled students, compared to 21.2 percent (N=132) of nationwide (Cook & Kim, 2009) respondents.
Queen and Lewis (2014) found that 43 percent of colleges help veteran students apply for tutorial assistance using VA education benefits. During focus groups held in July 2008, service members and veterans stated that what they most desired from colleges was information about programs’ transferability and the value or meaningfulness of different certificates and degrees. Focus group participants also cited difficulty identifying colleges that recognize training obtained and/or credits earned during active duty; some felt that acceptance was based on the institution’s attitude towards the military (Cook & Kim, 2009). Unfortunately, North Carolina colleges are not as generous in awarding college credit for prior learning experiences as colleges nationwide (Cook & Kim, 2009) (Table 5.5).

Table 5.5

<table>
<thead>
<tr>
<th>Prior Learning</th>
<th>Current Study</th>
<th>Nationwide - Cook &amp; Kim N=132</th>
</tr>
</thead>
<tbody>
<tr>
<td>College coursework at another institution</td>
<td>69%</td>
<td>97.7%</td>
</tr>
<tr>
<td>National testing programs</td>
<td>69%</td>
<td>87.9%</td>
</tr>
<tr>
<td>Evaluated credit awards for military training</td>
<td>62%</td>
<td>87.9%</td>
</tr>
<tr>
<td>Challenge exams/test-out procedures</td>
<td>46%</td>
<td>66.7%</td>
</tr>
<tr>
<td>Evaluated credit awards for military occupational training</td>
<td>38%</td>
<td>68.2%</td>
</tr>
<tr>
<td>Evaluated credit for corporate training programs</td>
<td>8%</td>
<td>32.6%</td>
</tr>
<tr>
<td>Portfolio review or assessment</td>
<td>0%</td>
<td>33.3%</td>
</tr>
<tr>
<td>Other</td>
<td>0%</td>
<td>2.3%</td>
</tr>
<tr>
<td>None</td>
<td>0%</td>
<td>0.8%</td>
</tr>
</tbody>
</table>
Far smaller percentages of North Carolina community colleges awarded college credit for each of the prior learning experiences compared to the national averages (Cook & Kim, 2009). Queen and Lewis (2014) reported that 93 percent of responding colleges awarded academic training for military training and 10 percent offered courses or sections of courses specifically for veterans. Many veterans arrive on campus with prior learning experiences, knowledge, and skill sets from their time in active service; many could probably teach the classes they are often required to take. It seems to be a waste of resources and a roadblock that both delays and dissuades veteran students’ completion of their certificate or degree, to make them duplicate that which they have already learned. A number of institutions have recognized this and have developed programs and policies to overcome the situation.

Fayetteville Technical Community College (FTCC) in North Carolina, partnering with the U.S. Army John F. Kennedy Special Warfare Center and School (USAJFKSWCS) at Fort Bragg, North Carolina, offers USAJFKSWCS graduates a “fast track” to an associate’s degree in general education upon completion of 16 credit hours at FTCC (Fayetteville Technical Community College, 2015). The Texas Workforce Commission administers the College Credit for Heroes program which facilitates the awarding of college credit for military service. Launched in 2011, seven community colleges helped define the standards to assess military training that can be used by any college in Texas. The initial emphasis was on allied health programs; this was expanded in 2013 to include other professions. Additional features of the program include an online portal for veterans to receive college credit hours with an official transcript, and articulation agreements among
select institutions for accelerated pathways to bachelor’s and master’s degrees (College Credit for Heroes, 2015).

While both of these programs have proved successful and could most likely be replicated at other institutions, another solution that would require less time to develop and implement is the option to test-out of required course work through the administering of written and/or practical exams. This would provide a viable short-term action plan while institutions explore more long-term options. North Carolina colleges need to develop policies and programs to help minimize veterans’ frustration, educational expense, and time to completion. In addition, whatever the institution’s policies, they should be spelled out clearly in the recruiting materials to establish an honest, open relationship and avoid potential feelings of confusion or deception.

Significantly smaller percentages of North Carolina community colleges offered alternative curriculum formats compared to national averages (Cook & Kim, 2009) (Table 5.6).
Table 5.6

<table>
<thead>
<tr>
<th>Curriculum</th>
<th>NC - Current Study</th>
<th>Nationwide - Cook &amp; Kim N=132</th>
</tr>
</thead>
<tbody>
<tr>
<td>Online</td>
<td>77%</td>
<td>97.7%</td>
</tr>
<tr>
<td>Hybrid</td>
<td>77%</td>
<td>-</td>
</tr>
<tr>
<td>Evening</td>
<td>69%</td>
<td>99.2%</td>
</tr>
<tr>
<td>Accelerated</td>
<td>46%</td>
<td>77.4%</td>
</tr>
<tr>
<td>Weekend</td>
<td>31%</td>
<td>77.4%</td>
</tr>
<tr>
<td>None</td>
<td>0%</td>
<td>0.8%</td>
</tr>
<tr>
<td>Other</td>
<td>0%</td>
<td>4.5%</td>
</tr>
</tbody>
</table>

Note. A “-” denotes data not available.

Veteran students are a subpopulation of nontraditional students, who by definition, have demographic characteristics—commute to campus, family responsibilities, employment—that challenge their ability to attend daytime weekday classes on campus. The colleges’ ability to recognize these obstacles to traditional class attendance and willingness to offer a variety of delivery modes and flexible scheduling, would contribute to veteran students’ ability to enroll and attain their educational goals.

Thirty percent of North Carolina community colleges (N=10) indicated they provide professional development training opportunities for faculty and administrators on the transitional needs of veteran students; an additional 30 percent currently don’t do so but that initiative is in progress. Taken together, the 60 percent exceeds the 45 percent (N=129) of nationwide colleges (Cook & Kim, 2009) that are providing such professional development activities. As noted earlier, transitioning to college is among the most difficult adjustments
that veterans will make when returning from wartime service (DiRamio et al., 2008) and college faculty and staff must be properly trained in order to be prepared to assist in a successful transition. Professional development of faculty and staff to help them gain a better understanding of military culture and mindset, and understand the challenges faced by veteran students, will be beneficial in removing the barriers to education for veteran students.

**Social support services.**

Smaller percentages of North Carolina community colleges offer social support services compared to their national counterparts (Cook & Kim, 2009) (Table 5.7). Queen and Lewis (2014) found a greater variety and more widespread use of mentoring programs and group counseling among their nationwide sample compared to North Carolina colleges: 15 percent had a formal mentoring or advising program in which faculty or staff who are current or former members of the military mentor veteran students; 16 percent of colleges offered veteran-to-veteran peer mentoring; and 10 percent of colleges offered group counseling specifically for veterans.

The lack of opportunity for veteran-to-veteran connections on campus is a major oversight by North Carolina community colleges. Research has demonstrated that social support, particularly from peers, is important for the academic adjustment of college students in general (Astin, 1993; Dennis et al., 2005; Hurtado et al., 1996) and for veteran students in particular (DiRamio et al., 2008; Elliott et al., 2011; Livingston et al., 2011; Persky & Oliver, 2011; Rumann & Hamrick, 2010). Social support among military personnel is considerable both during and after active service (Barber et al., 2008; Laffaye et al., 2008), and veteran
students are eager for mechanisms that enable them to identify and connect with other veterans on campus who have had similar experiences (Ackerman et al., 2009; Burnett & Segoria, 2009; Cook & Kim, 2009; O’Herrin, 2011; Weber, 2012). Veteran-to-veteran connections can be student-to-student but also student-to-staff. Research has shown that communication with faculty plays a significant role in veteran students’ acclimation to college (Rumann, Rivera, & Hernandez, 2011). Cape Fear Community College (CFCC) in North Carolina facilitates veteran students connecting with staff members who are veterans through a dedicated CFCC Employee Veterans web page; this page lists the name, title, phone, and email of current CFCC employees who are also veterans (currently six individuals are listed) and encourages veteran students to contact them (Cape Fear Community College, 2015). Providing mechanisms for veteran students to connect with other veterans—whether they be faculty, staff, or other students—does not necessarily require a large outlay of capital resources, so there is no justifiable reason why these types of programs are not offered system-wide.
Table 5.7

**% of Colleges that Offer Social Support Services for Veteran Students**

<table>
<thead>
<tr>
<th>Social Support Service</th>
<th>NC - Current Study</th>
<th>Nationwide - Cook &amp; Kim N=133</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staff trained to assist with college transition/orientation</td>
<td>31%</td>
<td>53.4%</td>
</tr>
<tr>
<td>Staff trained to deal with disabilities</td>
<td>23%</td>
<td>34.6%</td>
</tr>
<tr>
<td>Student organizations</td>
<td>23%</td>
<td>29.3%</td>
</tr>
<tr>
<td>None</td>
<td>23%</td>
<td>20.3%</td>
</tr>
<tr>
<td>Support groups/mentoring programs</td>
<td>8%</td>
<td>17.3%</td>
</tr>
<tr>
<td>Counselor/specialist to support/assist with brain injuries</td>
<td>8%</td>
<td>29.3%</td>
</tr>
<tr>
<td>Support groups for veteran students with disabilities</td>
<td>0%</td>
<td>3.8%</td>
</tr>
<tr>
<td>Veterans Upward Bound</td>
<td>0%</td>
<td>7.5%</td>
</tr>
<tr>
<td>Civilian life skills training</td>
<td>0%</td>
<td>-</td>
</tr>
<tr>
<td>Veteran-specific orientation</td>
<td>0%</td>
<td>-</td>
</tr>
<tr>
<td>Other</td>
<td>0%</td>
<td>6.0%</td>
</tr>
</tbody>
</table>

*Note. A “-” denotes data not available.*

North Carolina community colleges are comparable to colleges nationwide (Cook & Kim, 2009) when it came to providing counseling to assist students with PTSD, depression, social adjustment, and stress/anxiety management. A smaller percentage (23 percent) of North Carolina colleges provided counseling for all of the combat-related issues compared to the 40.9 percent of the colleges nationwide (Cook & Kim, 2009) that addressed all four issues. Queen and Lewis (2014) found that 25 percent of colleges offered mental health counseling specifically for veteran students.

The counseling centers at the North Carolina community colleges provided greater access to VA staff and services compared to colleges nationwide (Cook & Kim, 2009), but did not do as well with non-VA services such as off-campus support services and
psychiatrists (Table 5.8). The colleges in Queen and Lewis’ (2014) study fell between North Carolina colleges and those in Cook and Kim’s study when it came to providing information about or referrals for off-campus health services—63 percent provided information on medical and health services, and 69 percent provided information on counseling or mental health services.

Table 5.8

% of Colleges’ Counseling Centers that Offer Services

<table>
<thead>
<tr>
<th>Service</th>
<th>NC - Current Study</th>
<th>Nationwide - Cook &amp; Kim N=133</th>
</tr>
</thead>
<tbody>
<tr>
<td>Referral to off-campus support services</td>
<td>54%</td>
<td>81.2%</td>
</tr>
<tr>
<td>Referral to support services provided by VA</td>
<td>54%</td>
<td>49.6%</td>
</tr>
<tr>
<td>Visit with VA personnel</td>
<td>8%</td>
<td>6.0%</td>
</tr>
<tr>
<td>None</td>
<td>8%</td>
<td>12.8%</td>
</tr>
<tr>
<td>Access to psychiatrist</td>
<td>0%</td>
<td>10.5%</td>
</tr>
</tbody>
</table>

Administrative and physical infrastructure.

North Carolina community colleges both exceed and fall below the national averages when providing an office or department exclusively dedicated to serving veterans. Seventy percent of North Carolina colleges (N=10) had a dedicated office or department, compared with 56 percent of nationwide colleges (N=134) in Cook and Kim’s (2009) study and 94 percent of nationwide colleges and Queen and Lewis’ (2014) study. Of those colleges with a dedicated office or department, 57 percent of those in North Carolina (N=7) provided
services for family members of veterans compared to 79.7 percent of those nationwide (N=74) (Cook & Kim, 2009).

Both in North Carolina and nationwide there was great variety in campus structure for offering veteran student services and programs, with a veterans administrative office being the predominant structure in both studies. In North Carolina (N=7), 57.1 percent of responding community colleges delegated the responsibility to an administrative office; 14.3 percent had a veteran's office staffed by veterans that assist this population with enrollment and other needs; 14.3 percent had a veteran's education certifying official housed within the financial aid department; and 14.3 percent used the registrar's office to provide assistance with veteran educational benefits. Among colleges nationwide (N=74), 14.9 percent used a veterans center, 64.9 percent had a veterans administrative office, and 20.3 percent indicated “other” (Cook & Kim, 2009)

Both North Carolina and nationwide colleges (Cook & Kim, 2009) exhibited disparity in the primary point of contact for enrolled veteran students to receive information about institutional services and programs—with responsibility spread among Student Affairs, Admissions, the Registrar, Financial Aid, the Veteran Certifying Official, and Counseling (nationwide only).

Similarly, there was diversity in the campus unit(s) that administers veterans’ education benefits counseling, although the two most commonly used offices—both in North Carolina and nationwide (Cook & Kim, 2009)—were financial aid and student affairs (with financial aid utilized twice as frequently as student affairs in both studies).
Enrollment management.

Admissions or recruitment efforts specifically designed to attract veteran students were comparable for both North Carolina and nationwide colleges (Table 5.9). Both in North Carolina and nationwide (Cook & Kim, 2009), institutions were relatively evenly split as to whether or not they put forth efforts to attract veteran students; national respondents in Queen and Lewis’ (2014) were less proactive, with 32 percent providing admissions events or special admissions information sessions for prospective veteran students.

Table 5.9

% of Colleges Engaged in Veteran-specific Recruitment Efforts

<table>
<thead>
<tr>
<th></th>
<th>NC - Current Study N=9</th>
<th>Nationwide - Cook &amp; Kim N=133</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>44%</td>
<td>49.6%</td>
</tr>
<tr>
<td>No</td>
<td>44%</td>
<td>42.9%</td>
</tr>
<tr>
<td>Don't know</td>
<td>11%</td>
<td>7.5%</td>
</tr>
</tbody>
</table>

Table 5.10 outlines the outreach methods employed by the institutions to recruit veteran students.
Table 5.10

*Colleges’ Outreach Methods to Potential Veteran Students*

<table>
<thead>
<tr>
<th>Outreach Method</th>
<th>NC - Current Study</th>
<th>Nationwide - Cook &amp; Kim</th>
</tr>
</thead>
<tbody>
<tr>
<td>College catalog</td>
<td>80%</td>
<td>83.6%</td>
</tr>
<tr>
<td>Web-based advertising</td>
<td>60%</td>
<td>55.2%</td>
</tr>
<tr>
<td>Special events on military installations</td>
<td>60%</td>
<td>68.7%</td>
</tr>
<tr>
<td>Print advertising</td>
<td>40%</td>
<td>62.7%</td>
</tr>
<tr>
<td>On-campus admissions events</td>
<td>20%</td>
<td>50.7%</td>
</tr>
<tr>
<td>Blogs/social media</td>
<td>20%</td>
<td>-</td>
</tr>
<tr>
<td>None</td>
<td>20%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Other</td>
<td>0%</td>
<td>11.9%</td>
</tr>
</tbody>
</table>

*Note.* A “-” denotes data not available.

The college catalog was the most popular tool for both the North Carolina and national colleges (Cook & Kim, 2009). Both populations made relatively strong and relatively comparable use of Web-based advertising and special events on military installations, however the nationwide respondents made much greater use of print advertising and on-campus admissions events.

The college catalog was also the most popular tool for both populations to inform currently enrolled veteran students about existing programs and services designed specifically for them (Table 5.11).
Table 5.11

*Colleges’ Communication Methods to Inform Veteran Students about Programs and Services*

<table>
<thead>
<tr>
<th>Communication</th>
<th>NC - Current Study</th>
<th>Nationwide - Cook &amp; Kim</th>
</tr>
</thead>
<tbody>
<tr>
<td>College catalog</td>
<td>62%</td>
<td>81.2%</td>
</tr>
<tr>
<td>On-campus advisers</td>
<td>38%</td>
<td>72.9%</td>
</tr>
<tr>
<td>Dedicated campus web page</td>
<td>38%</td>
<td>-</td>
</tr>
<tr>
<td>Web-based advertising</td>
<td>23%</td>
<td>29.3%</td>
</tr>
<tr>
<td>Email</td>
<td>23%</td>
<td>37.6%</td>
</tr>
<tr>
<td>Print advertising</td>
<td>15%</td>
<td>26.3%</td>
</tr>
<tr>
<td>Postal mailings</td>
<td>8%</td>
<td>24.8%</td>
</tr>
<tr>
<td>Blog/social media</td>
<td>8%</td>
<td>-</td>
</tr>
<tr>
<td>None</td>
<td>8%</td>
<td>6.0%</td>
</tr>
<tr>
<td>Other</td>
<td>0%</td>
<td>3.8%</td>
</tr>
</tbody>
</table>

*Note.* A “-” denotes data not available.

Queen and Lewis (2014) did not differentiate marketing efforts between current and prospective students, however the colleges in their nationwide study made more extensive use of electronic mediums than either the North Carolina colleges or the nationwide colleges in Cook and Kim’s (2009) study. Of the colleges in Queen and Lewis’ study, 49 percent used mail to provide information, 75 percent used email, 89 percent used a website, 50 percent used social media, 73 percent used brochures, and 69 percent used bulletin boards.

One key to effective communication is to understand the audience and how they prefer to receive messages. Electronic marketing tools—websites, email, social media, blogs, and banner ads—offer the advantages of being low or no cost (in most instances there is no dollar cost involved but there is a time investment) and the ability to quickly and easily update messages to provide the most accurate, up-to-date information. Given these
advantages, there is no reason not to utilize these tools; however the extent to which colleges rely on these vehicles to communicate with current and prospective veteran students will depend on the intended recipients’ use of these delivery formats—not only which format(s), but when, where, and how they access them. Colleges need to gather and track data on usage (i.e., insert “priority codes,” ask students how they heard about the college/class/event) to help them make informed decisions on future usage.

Queen and Lewis (2014) also reported that 64 percent of colleges used college admission fairs and 36 percent used information fairs/events held on military bases in order to provide information to prospective students.

Financial assistance.

Colleges nationwide (Cook & Kim, 2009) are offering more financial assistance options than the colleges in North Carolina. While both populations offered in-state tuition rates to veteran students and scholarships designed specifically for veterans, none of the North Carolina colleges offered discounted tuition rates which were offered by 13.5 percent of the nationwide colleges (N=133) in Cook and Kim’s (2009) study. Queen and Lewis (2014) found variability in in-state tuition policy based on the veterans’ length of in-state residency. Fifty-six percent of colleges offered in-state tuition rates to veterans currently residing in the state, regardless of their length of residency; 79 percent of colleges offered in-state tuition rates to veterans who previously resided in the state but were stationed elsewhere, immediately upon their return to the state; and 96 percent of colleges offered in-
state tuition rates to veterans who maintained the state as their home of record during their active duty.

Cook and Kim (2009) found that eligibility for in-state tuition was more prevalent at institutions with high and moderate veteran enrollment than at institutions with low veteran enrollment. However, this is a chicken-and-egg situation and begs the question, are veterans attracted to institutions that offer in-state tuition (a build-it-and-they-shall-come situation) or are institutions with larger veteran populations more veteran-friendly and have in place more policies and services to facilitate veteran students’ education experience?

When this study was undertaken, North Carolina institutions were not required to offer in-state tuition; at that time, six (46 percent) of the responding colleges indicated that they did offer in-state tuition to veteran students. Since then, there have been two significant pieces of legislation—one at the state level and the other at the federal level—that affect the financing of veteran students’ education within the state of North Carolina.

On August 7, 2014 the North Carolina General Assembly enacted the Appropriations Act of 2014 (S.L. 2014-100); Section 11.12(a) requires that the North Carolina Community College System (as well as the University of North Carolina) participate in the federal Yellow Ribbon Program which provides federal funds to offset the cost differential between in-state and out-of-state tuition. The General Assembly also appropriated $1 million on an annual basis (starting with fiscal year 2014-15) to the North Carolina Community College System; these funds are to be used for the non-federal matching required by the Yellow Ribbon Program (State Board of Community Colleges, 2014).
Also on August 7, 2014, through an act of Congress, the Veterans Access, Choice, and Accountability Act of 2014 (H.R. 3230) became public law. This legislation requires public colleges to offer in-state tuition rates to veterans in order for the institutions to remain eligible to receive G.I. Bill educational payments (State Board of Community Colleges, 2014).

These two pieces of legislation, enacted to improve veterans’ educational benefits, have significant implications for both the students and the institutions. For veteran students, the guarantee of in-state tuition makes their educational pursuits more affordable. The educational benefits of the Post-9/11 G.I. Bill pay only up to the in-state tuition rate; with tuition now fully covered by the G.I. Bill, there is a reduced need for outside financing and/or incurring debt. The financing of their education is a major concern for veteran students—from being a primary motivator for enlisting in the military in the first place (Ackerman et al., 2009; Carnevale, 2006; Smith-Osborne, 2009) to completing their education. Finances are a major reason for non-persistence at two-year colleges (Butters, 2003; Wade, 1995). With their tuition now being fully covered by their G.I. Bill benefits, veteran students may face less barriers to persistence and exhibit increased completion rates. The availability of in-state tuition at all public institutions may also expand veterans’ institutional options by eliminating geographic barriers and making attendance at a four-year institution more feasible.

The institutions, on the other hand, face budgetary shortfalls as a result of these legislative changes. The current resident tuition rate is $72.00 per credit hour; the non-
resident tuition rate is $264.00 per credit hour (Central Piedmont Community College, 2015) for a tuition rate difference of $192.00 per credit hour. For fiscal year 2013-14, the North Carolina Community College System enrolled 905 non-resident veteran students (625 full-time and 280 part-time) in an estimated 10,430 credit hours (State Board of Community Colleges, 2014). These students paid the $264.00 non-resident tuition rate. However, under the new legislation, these same students will pay the in-state tuition rate, resulting in a system-wide reduction of $2,002,560.00 in tuition revenue ($192.00 x 10,430). Colleges will need to find new sources of funding, get increased dollars from existing sources, or reduce expenditures (which could translate to reduction or elimination of programs and resources). Institutions could also face increased competition for students. The guarantee of in-state tuition at all public institutions eliminates financial barriers to entry for many veteran students and results in expanded institutional options, in terms of both geography and type. So at the same time they are facing reduced revenue receipts, institutions will need to expand or enhance their marketing efforts to attract veteran students as well as ensure they provide the programs and services wanted by veteran students. They will be faced with the challenge of having to do more with less.

**Students’ Survey**

The following sections will discuss the findings from the students’ survey. The five significant variables—family and friends support, financial aid/tuition assistance counseling for veterans, counseling and psychological services tailored to veterans, child care, and Veteran recognition activities—will be discussed in order of impact on the dependent
variable, intent to persist, starting with the most significant. Non-significant variables will also be addressed, as well as comments submitted by some of the student respondents. Results will be presented in the framework of past research. Discussion of implications for policy, practice, and future research will be at the end.

**Variable 1: Family and friends support.**

Family and friends support was a 5-item scale measuring friends’ support, friends’ encouragement, family’s support, family’s approval, and family’s encouragement. The research revealed that veteran students who had a higher score on family and friends support were 1.9 times more likely to persist than those who scored lower. In both the initial and revised analyses, family and friends support was the most influential variable and was statistically significant at the 0.01 level. It is concluded that veteran students are more likely to persist as they feel increasing support from their family and friends.

This finding is consistent with the earlier research that demonstrated the importance of social support systems for college students (Astin, 1993; Dennis et al., 2005; Hurtado et al., 1996; Procidano & Heller, 1983) and its significance as a predictor of persistence (Burdette, 2009; Robbins et al., 2004; Weber, 2012). Burdette (2009) found social support from family and peers to be an important contributor to community college students’ persistence. In addition, research has shown social support to be considerable among military personnel, both during and after active service (Barber et al., 2008; Laffaye et al., 2008), and an important factor that influences veteran students’ adjustment to higher education (DiRamio et al., 2008; Elliott et al., 2011; Livingston et al., 2011; Persky & Oliver,
2011; Rumann & Hamrick, 2010; Wheeler, 2012). With the exception of one study (Weber, 2012), the majority of the research addressing social support for veteran students has been qualitative; there is a paucity of quantitative studies investigating social support among this population (Whiteman et al., 2013), especially on community college campuses. In addition, there has not been a study that has specifically addressed the significance of family and friends support, so this study fills a void by quantitatively testing and proving the importance of the support of veterans’ inner circle—their family and friends.

**Variable 2: Financial aid/tuition assistance counseling for veterans.**

Financial aid/tuition assistance counseling for veterans was the highest rated, in terms of both importance and frequency of use, of the 14 institutional support services that were included on the survey; it was the strongest predictor (odds ratio: 6.179) of intent to persist. The results showed that veteran students who perceive that financial aid/tuition assistance counseling is important are 6.2 times more likely to persist than those who don’t perceive it as important.

The significance of financial aid/tuition assistance counseling for veterans is consistent with earlier research. The financing of their education is a major concern for veteran students—rom being a primary motivator for enlisting in the military in the first place (Ackerman et al., 2009; Carnevale, 2006; Smith-Osborne, 2009) to completing their education. However, many veteran students feel they lack information on what specific educational benefits are available to them and how to access those benefits; the availability of military education centers varies across locations and many campuses lack a central
information source from which veteran students can obtain details about education benefits (Cook & Kim, 2009). Weber (2012) found that use of campus programs and services was associated with more positive persistence decisions, and that financial aid services was the second most frequently utilized campus program/service. Finances are a major reason for non-persistence at two-year colleges (Butters, 2003; Wade, 1995). However, the findings of these earlier studies, along with the current study, counter the conclusions drawn by Barnhart (2011) who surmised that financial need is not one of the biggest issues of veteran students at two-year colleges. The results of this study show the importance of having an accessible and knowledgeable source of educational benefits information cannot be overemphasized.

**Variable 3: Counseling and psychological services tailored to veterans.**

Results indicated that veteran students who feel that counseling and psychological services are an important support service are 4.6 times more likely to persist than students who do not feel this is an important service.

This is not surprising given that enrolling in college after military service can be a stressful and frustrating experience for veteran students. There are potentially many transition challenges; in addition to physical injuries such as PTSD and TBI, they could face issues in the areas of confidence, community, and family that translate into anger, depression, and alcohol abuse (Ackerman et al., 2009; Philpott, 2012). Studies vary in their reports of the percentage of returning veterans with mental health problems, ranging from 20 percent to over 30 percent (Ackerman et al., 2009). Today, more veterans are lost to suicide than to combat (Philpott, 2012). Campuses should be prepared to help their veteran students address
these issues; however even if they have the resources available, campuses face additional challenges in serving their veteran students with mental and physical health issues—many veteran students are reluctant to seek assistance, disclose limitations, and/or be labeled as disabled (Burnett & Segoria, 2009).

**Variable 4: Child care.**

Veteran students who consider child care to be a valuable support service are 3.2 times less likely to persist than students who do not feel this is an important service. Discussion of the availability of child care and use by veteran students on community college campuses was not found in the literature. The only reference to this item was inclusion as a question on the Community College Survey of Student Engagement (Center for Community College Student Engagement, 2013); for the 2015 cohort (comprised of survey respondents from spring 2013, 2014, and 2015), 53.0 percent indicated that this service was not important at all, 19.1 percent indicated it was somewhat important, and 27.9 percent indicated it was very important. These statistics are for all responding community college students—not veterans only.

**Variable 5: Veteran recognition activities.**

Veteran recognition activities are on the cusp of statistical significance; given the odds ratio for this support program, 3.051, it can be concluded that these are indeed a significant consideration in veteran students’ persistence. Veteran students who consider recognition activities to be important are 3.1 times more likely to persist than students who do not feel that these activities are important.
Researchers (Abel et al., 2013) recommend acknowledgement and recognition activities to build awareness of and respect for the contributions of veteran students, and studies have found evidence of the value of these activities (Elliott et al., 2011)—including impacting persistence decisions (Weber, 2012).

**Non-significant variables.**

The lack of significance of the model’s background variables and environmental constraints as predictors of persistence counters earlier research findings. Researchers (Coley, 2000; Hawley & Harris, 2005; Horn & Premo, 1995) identified seven factors that put students at risk for not completing a degree—delayed entry, financial independence, full-time employment, part-time enrollment, dependents, single parenthood, and lack of a high school diploma; students with the highest proportion of risk factors attend community colleges—24 percent of community college students have at least four of these factors (Coley, 2000). Background variables, specifically age, race, gender, and enrollment status, were found to exert the strongest influence on veteran student persistence at two-year colleges (Barnhart, 2011). The environmental constraint of employment has been shown to have a negative relationship with persistence at two-year colleges (Boice, 2007; Butters, 2003; Byun, 2000).

The study did not find statistical significance for many of the institutional social support mechanisms, including those that would facilitate peer-to-peer connections and relationships. An earlier study (Livingston et al., 2011) supports this finding, reporting under-utilization of social support by veteran students on account of their military experience and the resultant pride and self-sufficiency that it imbues. Research has shown, however,
that insufficient institutional support may make the combat-to-college transition more
difficult (Association of Private Sector Colleges and Universities, 2013).

Veteran students perceive veteran clubs/organizations and peer counseling as high
priorities to assist in veterans’ collegiate acclimation, and have expressed in focus groups and
veteran summits and conferences the need to connect with others on campus who share
similar experiences (Cook & Kim, 2009). Social isolation is one of the biggest issues facing
veteran students (Chappell, 2010; DiRamio et al., 2008; Weber, 2012), and veteran students
are eager for mechanisms that enable them to identify and connect with other veterans on
campus who have had similar experiences (Ackerman et al., 2009; Burnett & Segoria, 2009;
Cook & Kim, 2009; O’Herrin, 2011; Weber, 2012). The establishment and maintenance of
campus-based student organizations that enable veterans to connect with students who share
similar experiences facilitate veterans’ transitions to civilian life and college (Ackerman et
al., 2009; Cook & Kim, 2009; Mikelson & Saunders, 2013; Summerlot et al., 2009); for
veterans, peer-to-peer support is the key to helping them attain success in higher education
(Lanigan, 2008; Wheeler, 2012).

On-campus veterans centers provide veterans with a place to meet, obtain resources,
and find solace (Chappell, 2010; Citrus College, 2013; Elliott et al., 2011; Philpott, 2012).
The Veterans Center is an instrumental resource at one of North Carolina’s community
colleges, Cape Fear Community College—it provides a place for veterans to meet, study, get
assistance, and be with other veteran students; as such, it provides a sense of camaraderie and
community, offers peer support, and helps build confidence for the college’s veteran student
population (Philpott, 2012). Weber (2012) found that a veteran student lounge was associated with more positive persistence decisions; 40 percent of her respondents recommended a military/veteran student lounge. Although it did not prove statistically significant as a predictor of persistence in this study, an on-campus veterans’ service center was the third-highest rated institutional support service, both in terms of ranked importance and frequency of use; 64.6 percent of respondents rated this as very important, indicating it is a highly valued service and something that North Carolina community colleges should make an effort to develop.

The literature (Altus, 2013; Rumann et al., 2011) has indicated that membership in an SVA chapter provides the veteran student with beneficial connections—the association can help with questions about what to do on campus, work with administration on benefits, and help build a social network—but this seems to be a resource that is utilized more at four-year institutions, with the number of chapters at four-year institutions outnumbering those at community colleges by nearly 4 to 1 (Rumann et al., 2011). Additionally, social integration and involvement in campus organizations, such as SVA, are more often characteristics of four-year rather than two-year institutions. It is therefore not surprising that SVA membership was non-significant and it was the second-lowest rated program in terms of ranked importance and frequency of use; only 31.3 percent of respondents rated SVA as very important. This finding contributes to the literature by offering additional insights into SVA membership and that is more likely to be used by and benefit veteran students at four-year institutions where social integration and campus involvement are more prominent.
Despite earlier research that found peer mentoring to be of value in persistence decisions for students in general (Barnett, 2011; Crisp, 2010; Pagan & Edwards-Wilson, 2003; Salinitri, 2005; Sorrentino, 2007) and beneficial to veteran students in particular (Abel et al., 2013; O’Herrin, 2011; Philpott, 2012; Wheeler, 2012), peer mentoring was not found to be statistically significant in the current study—it was the third-lowest rated support program, with only 32 percent of respondents indicating it was very important. This was particularly surprising given the adjustment that is required to transition to a college environment and veteran students’ desire to connect with others who share similar experiences.

Although this study did not find support for the significance of any of these institutional support programs and resources at North Carolina community colleges, it did fill a void by being the first study to quantitatively investigate the significance of these variables at North Carolina community colleges.

**Student comments.**

This was a quantitative study and as such did not solicit qualitative comments from participants. However, a number of participants took the initiative to send emails to the researcher, using the contact information that was provided on the survey’s opening page (following standard research protocol). Some of these comments are being included here to provide insight to the veteran student experience and, taken together with the quantitative findings from the students’ and administrators’ surveys, to assist North Carolina community colleges in supporting veteran students.
Funding their education is a primary concern of veteran students. The quantitative findings indicated that the two highest rated institutional support services, in terms of both importance and frequency of use, were financial aid/tuition assistance counseling and VA education benefits counseling; financial aid/tuition assistance counseling was also the strongest predictor of intent to persist. The comments submitted by the students are further testimony to the attention that needs to be paid to these areas. One student noted, “…I am a veteran and I need some assistance with my bills and you all cannot and will not provide that so there is my opinion.” Another student offered, “…What troubled me was the lack of a free text portion to the survey. Maybe that's by design, I don't know, but there are many things I would like to say about the Veterans affairs office at [institution]. I promise you none of the things I would say are complimentary to the office. That office is probably the greatest source of discontent with veterans attending that school.” Another student was more elaborate:

I noticed that you are doing a dissertation, so I did choose to participate in your survey. I do feel that I have something relevant to add to my answers, however. Using the Post 9/11 GI Bill in conjunction with my community college has been a huge hassle. Most people getting out of the military do not have money saved for college because they were counting on the GI Bill to pay for it. I am one of those people. Since being in college, I have spent hundreds of dollars on classes, books, and supplies, despite the fact that I have 100% eligibility with the Post 9/11 GI Bill. Unfortunately, most of this is the
fault of my academic advisers at the college. They helped me sign up for the classes I need that would set me up for success in the nursing program, and they signed me up for classes that were not covered under the GI Bill. One semester, I only got $600 per month in BAH [Basic Allowance for Housing] when I should have gotten over $1200, just because I was not signed up for the right classes. I even asked if the class in question was covered, and I was told that it was. The GI Bill also only allows up to $500 per semester for a book stipend. Despite buying or renting used books, my expenses usually exceed $500. Upon EASing from the military, I was under the impression that college would be completely free for me, as long as I didn't go over like $19,000 or something. That assumption was completely wrong. The negligence and ignorance of my academic advisers who CLAIM to know the GI Bill rules has caused me to spend hundreds of dollars on school as well as LOSE hundreds of dollars in BAH each month. It is quite discouraging, to say the least. There is ONE person at my college who is in contact with the VA, and he is the one that submits my transcripts each month to make sure I get paid. This is ridiculous, because I am in a military town, so the amount of veterans at this school is very high. It is nearly impossible to get an appointment with this VA rep, and when I do get to see him, he seems very absent-minded. He saw my transcripts himself and failed to mention that
"Intro to Chemistry 090" would NOT be covered under my GI Bill. That is one of those very small things that most students simply do not know.

College administrators seem to be aware of the significance of the importance of these issues—they indicated that the three most frequently used programs and services are VA education benefits counseling, financial aid counseling, and academic advising; in addition, they indicated that the three most pressing issues that affect veteran students’ educational progress understanding of VA educational benefits, academic-related stress, and financial issues. However there seems to be a significant disconnect between awareness and action. To rectify this situation would not require additional financial investment; these issues could be addressed with proper training and professional development.

**Implications for Policy and Practice**

The North Carolina community colleges need to embrace words offered by California State University Chancellor Charlie Reed at the 2008 American Council on Education Annual Meeting, “…Do an assessment of how you’re doing with programs and services for service members and veterans. You won’t find a pretty picture. What you will find is that you need to reorganize and reprioritize” (Cook & Kim, 2009, p. iii).

This study is a first step in that journey; its findings confirmed North Carolina community colleges’ oversight of their veteran student population, at both the System and individual college levels. At the time this study was undertaken, the North Carolina Community College System had neither records of nor tracking of its veteran student population at the system level—each individual college had to be contacted to obtain a list of
currently-enrolled veteran students. Additionally, the individual colleges’ ability to track their own students may be questionable, as evidenced by over 113 survey follow-up postcards that were returned as undeliverable, indicating that the colleges did not have the most current contact information for their students. The returned postcards represent approximately 4 percent of the survey population. This is particularly surprising given that the student lists were current lists, provided by the colleges at the time the surveys were sent out. Additionally surprising is that half of the returned postcards were from students at one community college—the college with the largest veteran student population, both in terms of enrollments and as a percentage of total enrollments.

There is a lack of widespread implementation of programs, policies, and initiatives in support of veteran students at North Carolina community colleges. Less than half (38 percent) of the responding colleges currently include programs and services for veteran students as part of their long-term strategic plan and just over three-quarters (77 percent) currently offer programs and services specifically designed for veteran students. The most-offered service is the second-most important service to veteran students (after financial aid)—VA education benefits counseling; however, just over half (54 percent) of the responding colleges provide this service. Similarly, just over half (54 percent) of the colleges provide any type of social support services. These figures are not surprising when only 54 percent of the colleges identified veteran student retention/degree or certificate completion as a priority.
When compared with community colleges in two nationwide surveys—one performed by Cook and Kim (2009) on behalf of the American Council on Education and another conducted by Queen and Lewis (2014) on behalf of the National Center for Education Statistics—North Carolina community colleges lag behind national averages in terms of: including programs and services for veterans in their strategic plan; plans for staff development and seeking funding; identification of student- and institution-related issues as priorities; actions taken since 9/11 to better serve veterans; offering various services and programs specifically for veteran students; offering academic support services; awarding college credit for prior learning experiences; offering alternative curriculum delivery formats; offering social support services; offering financial assistance options.

Additionally, community college administrators do not have accurate impressions of the institutional support services that are used and valued by their veteran students, resulting in misinformed budgeting and resource allocation decisions and veteran students’ needs going unmet.

Based on these findings, it is recommended the development and implementation of the following policies, programs, and services to foster commitment and develop the infrastructure for North Carolina community colleges to meet their fiduciary responsibility to their veteran student populations.

First and foremost is implementation of a veteran database—at both the college and System levels. The colleges must be able to identify, monitor, and communicate with their veteran students. This study made evident the deficiencies in this area. Over 113 follow-up
postcards were returned to the researcher as undeliverable, indicating the colleges did not have the most current contact information for all their students; half of those were from one college’s student list. This system should be viewed as a customer relationship management (CRM) system, starting from the moment of matriculation and continuing throughout the student’s progress through his/her program, and extend past their tenure at the institution. The college—and system—should actively maintain current contact information, demographics, and academic progress; it should also monitor the student’s progress and any stoppages—and the reasons for these stoppages. This is no longer an optional consideration.

If colleges wish to continue to receive federal veteran education benefits, they must provide outcomes data, per Executive Order—Establishing Principles of Excellence for Educational Institutions Serving Service Members, Veterans, Spouses and Other Family Members signed by President Obama in April 2012. In order to provide outcomes data, colleges must first be able to identify and track their veteran students.

In addition to a veteran student database, institutions should be able to identify any faculty or staff members who are veterans (from any time period, not necessarily from Post-9/11). College employees who are veterans are a valuable resource to both the institution and veteran students. When forming institutional committees or counsels, especially in areas that would affect veteran students, the college should be sure to include representation by a veteran staff member; such representation would provide the veteran student population with a voice and ensure that discussions and decisions take into consideration military culture and mindset, and the challenges faced by veteran students. Additionally, these employees are
individuals with whom veteran students could feel a bond and therefore serve as confidantes and sources of counsel and comfort. The colleges’ demonstration that they understand and seek to address the unique challenges facing veteran students will help foster a sense of trust and commitment on the part of veteran students that can contribute towards persistence.

Cape Fear Community College (CFCC) in North Carolina has a dedicated CFCC Employee Veterans web page; this page lists the name, title, phone, and email of current CFCC employees who are also veterans (currently six individuals are listed) and encourages veteran students to contact them (Cape Fear Community College, 2015). If the college currently does not have any faculty and/or staff who are veterans, perhaps they could enlist the services of veteran student alumni. These are no-cost options—ones that only require buy-in from faculty and staff to give of their time; there is no reason why colleges could not take these steps.

Colleges must also address the financial concerns of veterans. The financing of their education is a major concern for veteran students—from being a primary motivator for enlisting in the military in the first place (Ackerman et al., 2009; Carnevale, 2006; Smith-Osborne, 2009) to completing their education. As noted by one study participant:

Most people getting out of the military do not have money saved for college because they were counting on the GI Bill to pay for it…Upon EASing from the military, I was under the impression that college would be completely free for me, as long as I didn't go over like $19,000 or something. That assumption was completely wrong.
Finances are a major reason for non-persistence at two-year colleges (Butters, 2003; Wade, 1995). Enactment of North Carolina’s Veterans Access, Choice, and Accountability Act of 2014 (H.R. 3230), and its guarantee of in-state tuition eliminates some of the barriers to persistence for veteran students at North Carolina state institutions. With their tuition expenses now fully covered by their Post-9/11 G.I. Bill benefits (which cover a maximum of in-state tuition fees), attaining a postsecondary education has become much more affordable for veterans. However, veterans feel there is a lack of readily available information about the exact educational benefits they are entitled to and how to access those benefits (Cook & Kim, 2009), as noted by one study participant, “Using the Post 9/11 GI Bill in conjunction with my community college has been a huge hassle.” There should be a central information source on campus who can provide veterans with details about their education benefits—what they how, how to access them, and how to apply them. Veteran students’ identification of financial aid/tuition assistance counseling as the most important and most frequently used institutional service should make this area a focal point for colleges.

This action is related to the next recommendation—for colleges to provide professional development to their faculty and staff so they are familiar with the challenges these students could be facing. Transitioning to college is among the most difficult adjustments that veterans will make when returning from wartime service (DiRamio et al., 2008) and college faculty and staff must be properly trained in order to be prepared to assist in a successful transition. It is particularly important that they have someone who is an “expert” in the educational benefits afforded veteran students by the government and what
these individuals must do to obtain full use of these benefits. When they retire from active
duty, veterans lose their connection to the education offices on military bases, thereby
severing their access to support systems that provide valuable information. Colleges must fill
this void by providing a knowledgeable, accessible point of contact for information about
educational benefits—what they are, how to access them, and how they can and should be
used at the institution. In addition, there should be professional development of faculty and
staff to help them gain a better understanding of military culture and mindset, and understand
the challenges faced by veteran students. Perhaps faculty and staff should be required to take
Veteran Students 101 to help them understand veteran students, recognize potential areas of
concern, and how they can adapt their own actions to help veteran students successfully
adapt to and succeed in a campus environment. Proper training of faculty and staff will be
beneficial in removing the barriers to education for veteran students.

Similarly, academic advisors must be familiar not only with academic requirements
but also with the benefits requirements in order to effectively advise veteran students. One
study participant shared their experience:

Since being in college, I have spent hundreds of dollars on classes, books, and
supplies, despite the fact that I have 100% eligibility with the Post 9/11 GI
Bill. Unfortunately, most of this is the fault of my academic advisers at the
college...they signed me up for classes that were not covered under the GI
Bill. One semester, I only got $600 per month in BAH [Basic Allowance for
Housing] when I should have gotten over $1200, just because I was not signed
up for the right classes. I even asked if the class in question was covered, and I was told that it was... The negligence and ignorance of my academic advisers who CLAIM to know the GI Bill rules has caused me to spend hundreds of dollars on school as well as LOSE hundreds of dollars in BAH each month. It is quite discouraging, to say the least.

To ensure that staff who counsel veteran students have the knowledge and needed skill sets, training should follow a two-level approach—one at the system-wide level (with the appropriate representatives from all of the colleges) and additional training at the individual campus level. Mandatory system-wide training in universally applicable areas such as veterans’ federal education benefits and funding options would ensure that representatives from all the campuses receive the training to effectively counsel veterans; it would also guarantee that individuals across all the campuses receive consistent information. Campuses would only receive entitlements (i.e., state funding) once the designated representative(s) participated in the “certification” training. Campus-specific training should address issues that are unique to each campus; individual campuses would decide whether to make the training mandatory or optional.

Another infrastructure recommendation is to provide a dedicated office on campus to serve veteran students. Cook and Kim (2009) found that the presence of a dedicated office is indicative of institutional commitment to this population. This offer could provide “one stop shopping” for access to financial, academic, and personal resources. Upon exiting the military, veterans lose access to military resources that can facilitate their transition from
boots to books (Cook & Kim, 2009). A centralized place of contact would benefit both the institution and the students—it would enable the college to make efficient use of limited resources and develop “subject matter experts” who have the depth and breadth of knowledge to effectively service veteran students; from the students’ perspective, it would simplify the bureaucracy and eliminate confusion and frustration. A dedicated office providing needed information would foster a sense of trust and satisfaction and serve to eliminate some of the road blocks on the path to persistence.

Community colleges should also enhance marketing and communication efforts directed to prospective and current veteran students. Many veterans, lacking adequate information on postsecondary education options, look to college catalogs and websites (Cook & Kim, 2009). Colleges should use search engine optimization to make their websites easy to find, ensure they are ADA compliant, and make veteran-relevant information easy to locate. College catalogs, cited as the most widely used communication tool by both North Carolina and nationwide colleges to communicate with both prospective and current veteran students, should include sections dedicated to veteran-specific issues along with contact information. All information should be complete, current, and accurate.

Social media and other e-marketing tools offer low or no-cost marketing options, however colleges need to understand the usage of these media by current and prospective veteran students if they are to be used effectively. Electronic marketing using email, social media, blogs, and banner ads offer the advantages of being low or no cost (in most instances there is no dollar cost involved but there is a time investment) and the ability to quickly and
easily update messages to provide the most accurate, up-to-date information. Given these advantages, there is no reason not to utilize these tools; however the extent to which colleges rely on these vehicles to communicate with current and prospective veteran students will depend on the intended recipients’ use of these delivery formats—not only which format(s), but when, where, and how they access them. Colleges should gather and track data on usage (i.e., insert “priority codes,” ask students how they heard about the college/class/event) to help them make informed decisions on future usage.

These recommendations are based on the findings from the two sets of surveys. Although the literature provided insights that could generate additional suggestions for campus improvements to foster veteran student persistence, discussion has been limited to suggestions stemming from the current study’s results.

Limitations

The greatest limiting factor of this study was the relative low participation rate, both on the part of the colleges and the students. Of 58 community colleges in North Carolina, only 25 presidents (43 percent) agreed to have their institutions participate in the study. Of the 25 consenting colleges, only 13 college administrators (52 percent of consenting colleges and 22 percent of all North Carolina community colleges) completed and submitted usable surveys, and only 17 provided (68 percent of participating colleges and 29 percent of all North Carolina community colleges) provided student lists. The 17 supplied student lists contained 2,860 individuals, 517 of whom submitted surveys (18 percent response rate), 348 of which were usable for analysis (67 percent of submitted surveys, 12 percent overall
response rate). Most notably absent from analysis was one of the most proactive veteran-friendly campuses in the North Carolina community college system; its president did not even respond to the request to participate in the study. Responses from both its administrator and its students would have been insightful.

The low participation rate raises the issue of possible nonresponse bias—whether non-respondents are different from the respondents in a way that is significant to the study (Dillman et al., 2009). This could result in the findings being non-representative of the population and may inhibit the ability to generalize the findings.

There also exist numerous potentials for error among those who did participate in the study. The researcher assumed that the colleges were providing current, accurate lists of students that met the requested criteria. Based on the number of returned, undeliverable follow-up postcards, as well as emails received from survey recipients, the researcher questioned the reliability of some of the college-provided student lists. Additionally, not all respondents answered all the questions. Missing data necessitated in the researcher using multiple imputation during data analysis to overcome SAS’s deletion of respondent data with incomplete responses. Lastly, some responses (i.e., 168 for numbers of hours per week spent caring for dependents) were not realistic and were outliers that affected data analysis; however a decision by the researcher as to what was realistic would have introduced personal value judgements and another type of error. So answers, no matter how unlikely they seemed, remained intact.
Lastly, this study was quantitative in nature. While analysis provided statistics for use in drawing conclusions, it did not provide rich, in-depth insights into students’ perceptions and use of institutional support programs and services, or their persistence decisions. More detailed information containing thoughts, feelings, and reasons would be available through a qualitative study.

**Suggestions for Future Research**

Despite over 70 years of education benefits for U.S. veterans, there has been very little research into the availability and effectiveness of institutional support programs and policies on U.S. college campuses, especially at the community college level which historically has had attrition challenges. The national study by Cook and Kim (2009) was the first attempt to assess the status of programs and services—at campuses that were four-year and two-year, public and private—in support of veteran students. The current study focused exclusively on two-year colleges and was the first of its kind to do so in North Carolina and to include the perspectives of both the institutions and the students. However, additional work needs to be done in order to recognize and understand best practices, identify gaps, and transform colleges into veteran-friendly campuses that enable veteran student persistence and success.

A major shortcoming of persistence studies in general is that they frequently do not differentiate between dropping out (permanent withdrawal), stopping out (temporary withdrawal), and transferring (alternative matriculation); in addition, many studies do not differentiate among the various “categories” of dropping out (academic dismissal, permanent
voluntary withdrawal, transfer to another institution). Students who withdraw from an institution before obtaining their degree or certificate may or may not be withdrawing from post-secondary education permanently. In most research, persistence is a dichotomous measurement—either the individual persisted (usually measured by enrollment or intent to enroll the following semester) or they didn’t. There is a curtailment of enrollment before the educational goal is achieved. However, viewing all discontinuity of enrollment as dropping out is not an accurate portrayal; there are various reasons why a student would not choose to re-enroll the subsequent period—a temporary hiatus from classes due to entry into the workforce or unforeseen family, medical, or other personal/nonacademic reasons with an eventual return to school (stopping out) or transfer to another community college or four-year institution. Future research must address the various attributes and characteristics of the term “dropout.” Community colleges must distinguish transfers and not count them as dropouts (Stahl & Pavel, 1992). In addition, part-time community college students have different goals—some are attending to obtain a degree, while others may be enrolling in a course for job advancement, while others may be pursuing a subject for personal enrichment; a student’s short-term goal could be achieved before a degree is earned and they therefore would not return to the institution (Nakajima et al., 2012). Such an occurrence of dropping out without degree attainment but with goal attainment should be differentiated from instances of dropping out with neither degree nor goal attainment. Failure to adopt a definition from a differential perspective can lead to seemingly contradictory findings (Tinto, 1975) and an overestimation of dropout rates (Johnson, 1991).
As was noted in the literature and became evident during the current study, veteran students in general are a private group and do not like to self-identify. As such, they are skeptical of written surveys from strangers and are reluctant to divulge and share information, making it challenging to obtain sufficient quantities of complete data to make statistically significant generalizable conclusions. Veteran students do have a story to tell and want their voices to be heard. To obtain the rich, detailed data to more thoroughly understand and serve this population, future research should involve qualitative, in-depth interviews with individuals who are willing to share their stories, including the challenges they face, the role of support mechanisms, and the sources of their support. It would be important to gather information from a cross-section of campuses that represents the demographic diversity of the 58 campuses.

Despite earlier research findings and reports in the literature, this study did not find statistical significance for institutional support programs and services that would connect veteran students with each other. One possible explanation is the lack of availability of these programs and services on the campuses of study participants—only one campus had a lounge for veteran students and only two campuses offered social/cultural activities. None of the responding campuses offered a veteran-specific orientation, which would not only assist veterans in acclimating to the college but would also afford them the opportunity to connect with fellow veterans at the outset of their educational experience. There is at least one campus within the North Carolina community college system that does provide multiple
venues and opportunities for veterans to connect with each other—both fellow students and faculty and staff—however they did not participate in the study.

It is therefore recommended that additional, similar research examine the availability, use, and value of institutional support services at community college campuses that provide more profuse and diverse social support opportunities. Feedback from students at more veteran-friendly campuses would provide greater insight into the true value of campus support mechanisms; as became evident with the current study, you can’t use that which is not available and it is hard to make a value judgement on something you are not familiar with. Other states with military base concentrations similar to or greater than North Carolina—and theoretically would be veteran-friendly—including Alaska, California, Florida, Georgia, Hawaii, Texas, and Virginia.

Ideally, a longitudinal study would allow a more comprehensive understanding of veteran students’ challenges and persistence decisions. While earlier persistence studies have found intent to persist a viable measure of re-enrollment plans, it is not a true reflection of actual enrollment decisions. A longitudinal study which tracks actual actions rather than intentions and captures true attendance patterns including stop outs and re-enrollments that are not reflected in cross-sectional studies—would provide more reliable data upon which to draw conclusions and base decisions.

It is also suggested that the findings from these qualitative and quantitative studies be compiled into a “best practices” report that can be used by community colleges to make their campuses more veteran-friendly.
Summary

Veteran students are a unique population on college campuses; in addition to issues faced by other nontraditional students, veterans must overcome challenges that are tied to their military experience. North Carolina community colleges need to understand this population and their needs, and must put forth efforts to create a veteran-friendly environment where veteran students can feel comfortable and succeed. By removing barriers and enabling persistence of their veteran students—and documenting these efforts--North Carolina community colleges will meet their obligations to this student population as well as local, state, and federal constituencies.

This study filled a gap in the existing literature and lays the foundation for future research to explore this subject area further. The administrators’ survey revealed that North Carolina community colleges face a number of challenges in serving their veteran student population. A major shortfall is the lack of policies and procedures to identify and track veteran students. Communication and data are essential. North Carolina community colleges also fall below many of the national averages in terms of efforts to serve veteran students. The students’ survey showed that veteran students are primarily concerning with the financing of their education and that support of family and friends is a significant factor in their persistence decisions. Institutional social support did not figure prominently despite reports in the literature; however this may be tied to the findings from the administrators’ survey that institutional efforts are lacking. The study’s findings will provide North Carolina community college administrators—both at the system and individual college level—with a
better understanding of the current state of campuses’ ability to serve their veteran students and options for the future.
REFERENCES


http://www.kmimediagroup.com/component/k2/5181-from-battle-zone-to-comfort-zone


Byun, K. (2000). *A study on the applicability of Bean and Metzner’s nontraditional student attrition model for older students using four different measures of persistence*


https://www.collegecreditforheroes.org/


Cunningham, A. (2010). *Factors associated with the persistence of students receiving learning support in a two-year college* (Doctoral dissertation). The University of Georgia, Athens, GA.


Hoyt, J. J. (1989). *The effects of background, environmental, academic and attitudinal variables; grade point average; and intent on the persistence of adult students at a community college* (Doctoral dissertation). Retrieved from ProQuest Dissertations and Theses database. (UMI No. 9004289)


McClenny, K., Marti, C. N., & Adkins, C. (2007). *Student engagement and student outcomes: Key findings from CCSSEE validation research*. Austin, TX: Community College Survey on Student Engagement.


Mikelson, J. D., & Saunders, K. P. (2013). Enrollment, transfers, and degree completion for veterans. In F. A. Hamrick & C. B. Rumann (Eds.), *Called to serve: A handbook on*


87-102.

theoretical model of college withdrawal in a commuter institution setting. *Sociology
of Education, 56*(2), 88-100.

and academic performance as predictors of freshman year persistence, early
withdrawal, and stopout behavior in an urban, nonresidential university. *Research in

work inhibit cognitive development during college? *Educational Evaluation and
Policy Analysis, 20*(2), 75-93.


Pascarella, E. T., & Terenzini, P. T. (1980). Predicting freshman persistence and voluntary
dropout decisions from a theoretical model. *Journal of Higher Education, 51*(1), 60-
75.

persistence/withdrawal behavior in a residential university: A path analytic validation
of Tinto’s model. *Journal of Educational Psychology, 75*(2), 215-226.


Smith-Osborne, A. (2009). Mental health risk and social ecological variables associated with educational attainment for Gulf War veterans: Implications for veterans returning to
doi:10.1007/s10464-009-9278-0


Association for Institutional Research, Boston, MA. (ERIC Document Reproduction Service No. ED387000)


Webb, M. (1988). Freshman year retention at three campuses of a large urban community

(UMI No. 3495315)


Westat. (2010). *National survey of veterans, active duty service members, demobilized National Guard and Reserve members, family members, and surviving spouses* (Final Report, Deliverable 27). Retrieved from

*Community College Journal of Research & Practice, 36*(10), 775-792.

doi:10.108010668926.2012.679457

doi: 10.1002/sim.4067
member/veteran and civilian student drinking motives. Journal of Student Affairs
Research and Practice, 48, 297-313. doi:10.2202/1949-6605.6322

development and implications of peer emotional support for student service
members/veterans and civilian college students. Journal of Counseling Psychology,
60(2), 265-278. doi: 10.1037/a0031650

traumatic stress disorder and health risk behaviors among Afghanistan and Iraq war
doi:10.5993/AJHB.35.4.1

Afghanistan and Iraq war veterans attending college. American Journal of Health
Promotion, 26, 101-108. doi:10.4278/ajhp.090826-QUAN-278

Community College Journal of Research and Practice, 26, 503-519.
doi:10.1080/02776770290041864

Windham, P. (1994, August). The relative importance of selected factors to attrition at
public community colleges. Paper presented at the 23rd annual conference of the
Southeastern Association for Community Colleges, Savannah, GA. (ERIC Document
Reproduction Service No. ED373833)


APPENDICES
Appendix A

Survey Announcement to Community College Presidents - Personalized Letter

[NC STATE UNIVERSITY]

[date]
[Sal] [First name] [Last name]
>Title
[Community College Name]
[Mailing address]
[City], [State] [Zip]

Dear [Sal] [Last name]:

We are writing to seek your institution’s participation in an upcoming study being conducted as part of a doctoral dissertation on the experience of veteran students at North Carolina community colleges. *Enabling Persistence of Veteran Students at NC Community Colleges* will examine veteran-specific programs and services currently being offered and planned by North Carolina community colleges, and which programs and services are utilized by veteran students attending those institutions.

Two sets of surveys will be sent out—one to the director of institutional research at each of the 58 North Carolina community colleges and another to a random sample of veteran students currently enrolled in the North Carolina community college system. This study will greatly assist the North Carolina Community College System in identifying programs and services to better meet the needs of veteran students and ensure their success in attaining their educational goals.

With your consent, we will contact your director of institutional research via email with a request to complete a short online questionnaire. We will also contact your office of financial aid to request a list of veteran students who are utilizing Post-9/11 GL Bill educational benefits to currently enroll in degree or certificate programs. A random sample will be selected from the list of student names; all data will remain confidential.

If you are willing to have your institution participate in this study and agree to have us contact your college’s director of institutional research and financial aid office, please check the box below and return this letter in the provided self-addressed, stamped envelope.

We are happy to share our findings from the research, which should be available by fall 2014, with your college. If you would like to receive a copy of the study’s findings and/or if
you would like for us to make a live presentation to members of your staff, please contact Janice Sitzes at 919.515.8189 or by email at janice_sitzes@ncsu.edu.

Thank you in advance for your assistance and participation.

Sincerely,

[signature]

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I hereby consent to have my institution participate in the *Enabling Persistence of Veteran Students at NC Community Colleges* study and give the researchers permission to contact the director of institutional research and financial aid office.
Appendix B

Survey Instrument – Community College Directors of Institutional Research
Enabling Persistence of Veteran Students at NC Community Colleges

Campus Characteristics

Distance, in miles, from nearest military facility (i.e., Pope AFB, Seymour Johnson AFB, Fort Bragg, Camp Lejeune, MCAS Cherry Point, MCAS New River, Air Station Elizabeth City, National Strike Force)

Please provide estimated institutional enrollment of veteran students.

Veteran students as a percentage of total enrollments.

Are programs/services for veteran students a part of your institution's long-term strategic plan?

- Yes
- No
- Not at present, but in progress
- Don't know
Which of the following initiatives has your institution undertaken to serve veteran students? Please select all that apply.

- Sought private funding for campus programs
- Sought state funding for campus programs
- Sought federal funding for campus programs
- Trained counseling staff to assist students with post-traumatic stress disorder (PTSD), brain injuries, and other health issues
- Increased budget for veteran students’ services and programs
- Increased number of veteran students’ services and programs
- Increased staff for veteran students’ services and programs
- Established department for veteran students’ services and programs
- Established center for veteran students
- Provided professional development for faculty on veteran students’ issues
- Provided professional development for staff on veteran students’ issues
- None of the above
- Other (please specify below)

Which of the following initiatives do you anticipate your institution having accomplished five years from now? Please select all that apply.

- Sought private funding for campus programs for veteran students
- Sought state funding for campus programs for veteran students
- Sought federal funding for campus programs for veteran students
- Trained counseling staff to assist veteran students with post-traumatic stress disorder (PTSD), brain injuries, and other health issues
- Increased budget for veteran students’ services and programs
- Increased number of veteran students’ services and programs
- Increased staff for veteran students’ services and programs
- Established department for veteran students’ services and programs
- Established center for veteran students
- Provided professional development for faculty on veteran students’ issues
- Provided professional development for staff on veteran students’ issues
- None of the above
- Other (please specify below)
Is your admissions/financial aid staff aware of amendments to the Post-9/11 GI Bill (also known as the Post-9/11 Veterans Educational Assistance Improvements Act of 2010)?

- Yes
- No
- Don't know

Does your institution currently have programs and services specifically designed for veteran students?

- Yes
- No
- Not at present, but in progress
Enabling Persistence of Veteran Students at NC Community Colleges

Institutional Climate: Priority of Veteran Students’ Programs and Services

What student-related issues related to veteran students have been identified by your institution as priorities? Please select all that apply.

- Financial aid
- Student retention/degree or certificate completion
- Health care (PTSD, traumatic brain injury, etc.)
- Social acculturation
- Student protests
- No issues related to veteran students
- Other (please specify below)

What institution-related issues related to veteran students have been identified by your institution as priorities? Please select all that apply.

- Campus accessibility
- Faculty/staff sensitivity to issues related to veteran students
- Locating funding sources for added campus programs and services
- Qualified staff trained to address veteran students’ needs
- Security needs for campus protests
- Post-9/11 GI Bill does not adequately cover college tuition and living expenses
- No issues related to veteran students
- Other (please specify below)
Since September 11, 2001, has your institution increased its emphasis on services and programs specifically for veteran students?

- Yes
- No
- Don't know
Enabling Persistence of Veteran Students at NC Community Colleges

What campus services or programmatic changes demonstrate this increased emphasis on veteran students? Please select all that apply.

- Appointed committee to develop a campus responsiveness action plan
- Established new programs or services for veteran students
- Established marketing and outreach strategies to attract veteran student population
- Increased staff in existing programs and services for veteran students
- Increased counseling services and/or off-campus referral procedures to address veteran students’ needs
- Added or expanded faculty and/or staff development training on veterans’ issues
- Increased or expanded institutional funding for veterans’ programs and services
- Established tuition waivers and/or reduced tuition rates for veteran students
- Made institutional policy changes to accept evaluated credit for military service
- Created a website for veteran students or linked to a non-federal website for veteran students (i.e., ACE Military Programs, Servicemembers Opportunity Colleges, Student Veterans of America)
- Other (please specify below)
Please indicate which of the following services and/or programs specifically for veteran students exist at your institution. Please select all that apply.

- Academic advising
- Academic support/tutoring
- Campus social and/or cultural events
- Career planning/career services
- Employment assistance (i.e., VA work study, student work study, on-campus employment, off-campus job placement)
- Financial aid/tuition assistance counseling
- Orientation (i.e., campus orientation sections specifically for veterans)
- Transition assistance (i.e., housing, personal counseling, social adjustment referrals)
- VA education benefits counseling
- Veteran recognition activities
- Veteran student lounge or designated gathering place
- Website/portal
- None of the above
- Other (please specify below)

**Academic Support Services**

Does your institution offer tutorial services or academic assistance specifically for veteran students beyond what is available to other enrolled students? If so, are there costs for these services?

- Yes; services are offered at no cost
- Yes; services are offered at a reduced rate
- Yes; services are offered at a standard student rate
- No tutorial services or academic assistance specifically for veteran students are offered
For what types of prior learning does your institution award college credit? Please select all that apply.

- College coursework at another institution
- Evaluated credit awards for military training (e.g., basic training and military training schools, as recommended by the ACE Guide to the Evaluation of Educational Experiences in the Armed Services)
- Evaluated credit awards for military occupational training (e.g., MOS and related military experiences, as recommended by the ACE Guide to the Evaluation of Educational Experiences in the Armed Services)
- National testing programs (e.g., Advanced Placement, CLEP, DANTES)
- Evaluated credit for corporate training programs, as recommended by the ACE Guide to the Evaluation of Corporate Training
- Portfolio review or assessment
- Challenge examinations or test-out procedures
- None of the above
- Other (please specify below)

Does your campus offer any alternative curriculum delivery formats? Please select all that apply.

- Online education
- Hybrid courses (combining face-to-face instruction and distance learning components)
- Evening/night courses
- Weekend courses
- Accelerated courses (i.e., 6-8 week course completion time)
- None of the above
- Other (please specify below)

Does your institution offer professional development training opportunities for faculty and administrators regarding the transitional needs of veteran students?

- Yes
- No
- Not at present, but in progress

Social Support Services
Does your institution have any of the following? Please select all that apply.

- Staff specifically trained to assist with veteran students' transition/ orientation to college
- A staff member, such as a licensed counselor or psychologist, trained specifically to address the needs of veteran students with disabilities
- Support groups or mentoring programs specifically for veteran students
- Support groups specifically for veteran students with disabilities
- Counselor/specialist qualified to support/assist veteran students with brain injuries
- Student organization for veteran students (excluding ROTC programs)
- Veterans Upward Bound program
- Civilian life skills management training
- Veteran-specific student orientation program
- None of the above
- Other (please specify below)

Does your campus provide counseling to assist students who are combat veterans with the following issues? Please select all that apply.

- Post-traumatic stress disorder
- Depression
- Social adjustment
- Stress/anger management
- None of the above

Does your counseling center offer the following? Please select all that apply.

- Access to psychiatrist
- Coordination and referral to off-campus support services
- Coordination and referral to support services provided by the U.S. Department of Veterans Affairs
- Site visits by or co-location of U.S. Department of Veterans Affairs personnel on campus
- None of the above
- Other (please specify below)

Administrative and Physical Infrastructure
Does your institution have an office or department exclusively dedicated to serving veteran students?

- Yes
- No
- Not at present, but in progress
Enabling Persistence of Veteran Students at NC Community Colleges

Does this office or department exclusively dedicated to serving veterans also provide services for family members of veteran students?

- Yes
- No
- Not at present, but in progress

Which of the following descriptions most accurately describes your campus structure for offering veteran student services and programs?

- Veteran student center (defined as dedicated campus space for veterans students, typically including lounge or meeting space and centralized office, with trained college employee[s] to facilitate administrative and or campus services for veteran students)
- Administrative office (defined as an independent department, with college employee[s] to facilitate administrative and/or campus services for veteran students)
- Other (please specify below)

Which office is the primary point of contact for enrolled students to receive information about institutional services and programs for veterans?

- Academic affairs
- Admissions office
- Counseling office
- Registrar's office
- Student affairs/student services
- Office serving disabled students
- No primary point of contact
- Other (please specify below)
Which campus unit(s) administers veterans' education benefits counseling? Please select all that apply.

- Admissions
- Bursar
- Business office
- Financial aid
- Registrar
- Student affairs/student services
- None of the above
- Other (please specify below)

Enrollment Management/Financial Assistance

Which of the following sources of financial assistance does your institution offer to veteran students? Please select all that apply.

- Discounted tuition rates for veteran students
- Eligibility for in-state tuition rates
- Scholarships designed specifically for veterans
- Tuition waiver
- None of the above
- Other (please specify below)

What communication methods does your institution employ to inform currently enrolled veteran students about existing programs and services designed specifically for them? Please select all that apply.

- College catalog
- On-campus advisers
- Targeted print advertising
- Targeted web-based advertising
- Targeted postal mailings
- Targeted email
- Dedicated campus web page
- Blogs or social media
- None of the above
Does your institution engage in admissions or recruitment efforts specifically designed to attract veteran students?

- Yes
- No
- Don't know
Enabling Persistence of Veteran Students at NC Community Colleges

What outreach methods to potential veteran students does your institution employ? Please select all that apply.

- College catalog
- Targeted print advertising
- Targeted web-based advertising
- Targeted on-campus admissions events (e.g., open houses or special tours specifically for veteran students)
- Participation in special events on military installations (e.g., education fairs, transition assistance counseling, community meetings)
- Blogs or social media
- None of the above
- Other (please specify below)

Veteran Students' Usage of Offered Programs and Services

With what frequency do veteran students use the programs and services that your institution provides?

<table>
<thead>
<tr>
<th></th>
<th>Often</th>
<th>Sometimes</th>
<th>Rarely</th>
<th>Never</th>
<th>Not applicable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic advising</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Academic support/tutoring</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Campus social and/or cultural events</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Career planning/career services</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employment assistance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Financial aid/tuition assistance counseling</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transition assistance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VA education benefits counseling</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Veteran student lounge or designated gathering place</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Orientation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Regarding your veterans' programs, what challenges, if any, are you or your veterans' coordinator experiencing? Please select all that apply.

☐ Space availability on campus for veterans
☐ Funding at the institutional level
☐ Funding from private sources (donations, scholarships, etc.)
☐ State funding levels affecting program support
☐ Identification and tracking of veteran students
☐ Other (please specify)

To your knowledge, what are the most pressing issues affecting veterans' educational progress at your institution? Please select the top three issues.

☐ Financial issues related to tuition and educational expenses
☐ Financial issues related to housing and living allowances
☐ Appropriate housing availability
☐ Clear understanding of VA educational benefits
☐ Health issues related to military service or disability
☐ Timely issuance of VA education benefits
☐ Inclusive and accepting campus climate
☐ Academic-related stress
☐ Job placement after graduation
☐ Child care or other family issues
☐ Other (please specify)

At your institution, have you identified any unique issues affecting veteran students? If so, please specify below.

Contact Information
Please provide your contact information so we may follow up with you if additional information is needed about your veteran-related programs.

Name
Title
Institution Name
Phone number
Email

The original version of this survey instrument was created by the American Council on Education.
Appendix C

Permission to Use Cook and Kim’s Survey Instrument

From: Janice Sites [mailto:jsites@ncau.edu]
To: Young Kim <YKim@acron.edu>

Fri, Nov 09, 2012 at 1:30 PM

Subject: RE: From Soldier to Student: Easing the Transition of Service Members on Campus

Mr. Kim, would it be possible for me to use a modified version of your instrument when I conduct my own research?

Thank you,

Janice

On Thu, Nov 8, 2012 at 8:19 AM, Y Kim <YKim@acron.edu> wrote:

> Janice,
> 
> > We put the kind of request from time to time. We do allow access to
> > our data, however, all inclusion identifying information (e.g.
> > names, the institution) cannot be shared due to confidentiality agreement with
> > those institutions that participated in our study.
> > 
> > We could maintain certain variables that would be useful for your
> > work, such as institutional type and Carnegie.
> >
Appendix D

Survey Instrument – Veteran Students
Enabling Persistence of Veteran Students at NC Community Colleges

Default Question Block

Welcome to the Enabling Persistence of Veteran Students at NC Community Colleges survey. Your name was chosen from a list of veteran students who are utilizing Post-9/11 GI Bill education benefits to attend North Carolina community colleges.

Please take a few minutes to complete this survey on the availability and value of programs and services for veteran students at your college. Your responses will provide useful feedback to North Carolina community colleges to help them develop and offer programs and services that could make the return to college a more positive and rewarding experience for veteran students.

To get started, please click on the double arrow in the lower right corner. You will be taken to an Informed Consent Form for Research; please read this document and click on the button at the end of the form to indicate you agree to participate in the study. You will then be taken to the start of the survey.

The survey will be available until Monday, November 17 and should take you no more than 15 minutes to complete. Thank you!

Contact information:
Janice Sitzes
919.515.8189
janice_sitzes@ncsu.edu
Enabling Persistence of Veteran Students at NC Community Colleges

North Carolina State University
INFORMED CONSENT FORM for RESEARCH

Title of Study: Enabling Persistence of Veteran Students at NC Community Colleges
Principal Investigator: Janice Sitzes
Faculty Sponsor: Dr. Duane Akroyd

What are some general things you should know about research studies?
You are being asked to take part in a research study. Your participation in this study is voluntary. You have the right to be a part of this study, to choose not to participate or to stop participating at any time without penalty. The purpose of research studies is to gain a better understanding of a certain topic or issue. You are not guaranteed any personal benefits from being in a study. Research studies also may pose risks to those that participate. In this consent form you will find specific details about the research in which you are being asked to participate. If you do not understand something in this form it is your right to ask the researcher for clarification or more information. A copy of this consent form will be provided to you. If at any time you have questions about your participation, do not hesitate to contact the researcher named above.

What is the purpose of this study?
The purpose of this study is to gain an understanding of what factors contribute to veteran students successfully completing their education at North Carolina community colleges. Specifically, the researcher is interested in understanding what institutional programs and services are used by veteran students and what programs and services they view as valuable in helping them complete their education. As part of the study, the researcher is seeking to survey 1,710 veteran students who are using the Post-9/11 GI Bill to attend a community college within North Carolina. The study is part of the researcher’s doctoral dissertation.

What will happen if you take part in the study?
If you agree to participate in this study, you will be asked to read and sign this form of consent agreeing to participate in the study, and complete a 15-minute online survey.

Risks
There is minimal risk associated with participation. It is possible that questions in the survey might be considered invasive. It is also possible, but unlikely, that the data collected could be lost or stolen.

Benefits
While there are no direct benefits to participating in this study, it provides the opportunity to gain a deeper understanding of what programs and services veteran students utilize and value while attending community college in North Carolina. The knowledge gained from this study may assist
community colleges in developing and offering programs and services that could make the return to college a more positive and rewarding experience for veteran students, as well as help them complete their education.

Confidentiality
The information in the study records will be kept confidential to the full extent allowed by law. Survey responses will be downloaded from Qualtrics and stored in a locked Excel document on a dedicated USB drive. When not in use, the USB drive will be stored in a locked drawer in the researcher's locked office. All analysis and writing will be conducted on a password-protected laptop to which only the researcher has access. No reference will be made in oral or written reports which could link you to the study. You will NOT be asked to write your name on any study materials so that no one can match your identity to the answers that you provide. No reference will be made in oral or written reports which could link you to the study. Any information you provide will be kept confidential. The researcher will not use your information for any purposes outside of this research study.

Compensation
There is no compensation for participation in this study; you will not receive anything.

What if you are a NC State University employee?
Participation in this study is not a requirement of your employment at NC State University, and your participation or lack thereof, will not affect your job.

What if you have questions about this study?
If you have questions at any time about the study or the procedures, you may contact the researcher, Janice Sitzes, at NC State University, CB 7401, Raleigh, NC 27695; by phone at 919.515.8189; or by email at janice_sitzes@ncsu.edu.

What if you have questions about your rights as a research participant?
If you feel you have not been treated according to the descriptions in this form, or your rights as a participant in research have been violated during the course of this project, you may contact Deb Paxton, Regulatory Compliance Administrator, Box 7514, NCSU Campus (919.515.4514).

Consent to Participate
"I have read and understand the above information. I have received a copy of this form. I agree to participate in this study with the understanding that I may choose not to participate or to stop participating at any time without penalty or loss of benefits to which I am otherwise entitled."

* By clicking this button I consent to participate in this study.
Enabling Persistence of Veteran Students at NC Community Colleges

Academics

Approximately how many hours in a typical 7-day week do you spend preparing for class (studying, reading, writing, rehearsing, doing homework, or other activities related to your program)? (Please type the number of hours in the box below.)

Indicate which of the following are your reasons/goals for attending this college.

<table>
<thead>
<tr>
<th>Reason/Goal</th>
<th>Primary goal</th>
<th>Secondary goal</th>
<th>Not a goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complete a certificate program</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Obtain an associate degree</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transfer to a 4-year college or university</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Obtain or update job-related skills</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

How many TOTAL credit hours have you earned at this college, not counting the courses you are currently taking this term?

- 0
- 1-14 credits
- 15-29 credits
- 30-44 credits
- 45-50 credits
- 60 or more credits

At this college, in what range is your overall college grade average? (Select the category that best applies.)

- A to A+ (3.7 and above)
- B to B+ (2.7 to 3.69)
- C to C+ (1.7 to 2.69)
- Lower than C- (less than 1.7)
- Do not have a GPA at this school
- Pass/Fail classes only
Enabling Persistence of Veteran Students at NC Community Colleges

Environment

Approximately how many hours in a typical 4-day week do you spend working for pay? [Please type the number of hours in the box below.]

Yes
No

Do you have children who live with you?

Yes
No

Approximately how many hours in a typical 4-day week do you spend providing care for dependents during work or personal activities? [Please type the number of hours in the box below.]

How likely is it that the following issues would cause you to withdraw from college? [Please respond to each item.]

- Very unlikely
- Unlikely
- Likely
- Very likely

Are your family members aware of your attending college?

Yes
No

Are you participating in any volunteer or community service activities?

Yes
No

Are you participating in any extracurricular activities?

Yes
No

Are you participating in any sports activities?

Yes
No

Are you participating in any clubs or organizations?

Yes
No

How satisfied are you with the facilities at this college?

Very dissatisfied
Dissatisfied
Satisfied
Very satisfied

Are you participating in any academic activities?

Yes
No

Are you participating in any university activities?

Yes
No

Are you participating in any student government activities?

Yes
No

Are you participating in any student association activities?

Yes
No

Are you participating in any student group activities?

Yes
No

Are you participating in any student club activities?

Yes
No

Are you participating in any student organization activities?

Yes
No

Are you participating in any student association activities?

Yes
No

Are you participating in any student group activities?

Yes
No

Are you participating in any student club activities?

Yes
No

Are you participating in any student organization activities?

Yes
No

Are you participating in any student association activities?

Yes
No

Are you participating in any student group activities?

Yes
No

Are you participating in any student club activities?

Yes
No

Are you participating in any student organization activities?

Yes
No

Are you participating in any student association activities?

Yes
No

Are you participating in any student group activities?

Yes
No

Are you participating in any student club activities?

Yes
No

Are you participating in any student organization activities?

Yes
No

Are you participating in any student association activities?

Yes
No

Are you participating in any student group activities?

Yes
No

Are you participating in any student club activities?

Yes
No

Are you participating in any student organization activities?

Yes
No

Are you participating in any student association activities?

Yes
No

Are you participating in any student group activities?

Yes
No

Are you participating in any student club activities?

Yes
No

Are you participating in any student organization activities?
## Enabling Persistence of Veteran Students at NC Community Colleges

### Institutional Support Services

This question has two parts. Please answer both sections, indicating (1) HOW OFTEN you use the following services, and (2) HOW IMPORTANT the services are to you at this college.

<table>
<thead>
<tr>
<th>Service</th>
<th>How Often</th>
<th>How Important</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic advising/planning for veterans</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Career planning/counseling for veterans</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Child care</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Counseling and psychological services for veterans</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dedicated Web page/portal for veterans</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Financial aid/advisement counseling for veterans</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Job placement assistance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>On-campus veterans service center</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Orientation specific to veterans</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peer mentoring</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peer or other tutoring for veterans</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student Veterans of America chapter</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VA education benefits counseling</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Veteran recognition activities</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Enabling Persistence of Veteran Students at NC Community Colleges

Re-enrollment Plans

It is likely I will re-enroll at this college next spring.

- Yes
- No

When do you plan to take classes at this college again?

- I will accomplish my goal(s) during this term and will not be re-enrolling
- Next semester
- Not next semester, but within the next 12 months
- I have no definite plan to return
- Uncertain
Enabling Persistence of Veteran Students at NC Community Colleges

Background Information

What is your age? (Please type your age in the box below)

Did you begin college at this college or elsewhere?

Gender:

What is your racial identification? (please only one)

How many times did you fail high school? (Please type the number of years and number of months in the boxes below)

How long were you in the military? (Please type the number of years and number of months in the boxes below)

How many times were you deployed?

In which military branch did you belong?

Thank you for starting your survey. Your responses are confidential and individual responses will not be reported. Participation in this study is entirely voluntary and you may end it at any point.
Appendix E

Email Invitation with Survey Link to Community College Directors of Institutional Research

Dear [Sal] [Last Name],

I recently contacted President [president last name] requesting your college’s participation in a study being conducted as part of a doctoral dissertation on the experience of veteran students at North Carolina community colleges. *Enabling Persistence of Veteran Students at NC Community Colleges* will examine veteran-specific programs and services currently being offered and planned by North Carolina community colleges, and which programs and services are utilized by veteran students attending those institutions.

With President [president’s last name]’s permission, you are one of a select group I am asking to participate in this short survey. Because the number of people I am contacting is relatively small, your participation is important to the accuracy and usefulness of the survey results. If you are not the correct individual to complete this survey, please forward this invitation to the appropriate person. All responses will be confidential. It should take no more than 15 minutes to complete the survey.

To get started, click on the link below or copy and paste it into your browser.

[survey link]

You can access the survey online until [date].

If you have any questions about this study or experience any problems accessing the survey, please contact me at 919.515.8189 or email janice_sitzes@ncsu.edu.

Thank you for taking the time to provide me with your input. Your responses will greatly assist the North Carolina Community College System in identifying programs and services to better meet the needs its veteran students and ensure their students’ success in attaining their educational goals.
If you would like to receive a copy of the study’s findings and/or if you would like to arrange for a live presentation to members of your staff, please contact me at 919.515.8189 or by email at janice_sitzes@ncsu.edu.

Sincerely,
Janice Sitzes
Doctoral candidate, Higher Education Administration
Assistant Director, Marketing
North Carolina State University
Continuing & Professional Education
CB 7401
Raleigh, NC 27695-7401
Appendix F

Thank You/Reminder Postcard to Community College Directors of Institutional Research and Veteran Students

[date]

Last week you should have received an email from me asking you to participate in the Enabling Persistence of Veteran Students at NC Community Colleges survey.

You are one of a select group whose feedback I am seeking on how North Carolina community colleges can better meet the needs and ensure the success of veteran students. Your input is important!

If you have already answered your survey, please accept my sincere thanks. There is no need to respond again. If you have not yet responded, please provide me with your feedback at your earliest convenience. You can access the survey online until [date] at: [survey link]

If you need help completing your survey or if you have any questions, please call me at 919.515.8189 or email me at janice_sitzes@ncsu.edu.

Sincerely,

[signature]

Janice Sitzes
Doctoral candidate, Higher Education Administration
Assistant Director, Marketing
North Carolina State University
Continuing & Professional Education
CB 7401
Raleigh, NC 27695-7401
Appendix G

Final Reminder Email to Community College Directors of Institutional Research

Dear [Sal] [Last name]:

A few weeks ago I sent you an email with a link to a short survey seeking your feedback on veteran-specific programs and services at your community college. You are one of a select group targeted to provide insights regarding how the North Carolina Community College System is addressing the needs of its veteran students. Your opinions are important!

Many valuable replies have been received so far—but I have not received your responses. I would still like to hear from you! The survey should take you less than 15 minutes to complete and will be available online until [date]. You can access the survey by clicking on the link below or by cutting and pasting it into your browser.

[survey link]

Thank you for your help!

Sincerely,
Janice Sitzes
Doctoral candidate, Higher Education Administration
Assistant Director, Marketing
North Carolina State University
Continuing & Professional Education
CB 7401
Raleigh, NC 27695-7401
Appendix H

Email Invitation with Survey Link to Veteran Students

Dear [Sal] [Last Name],

I am seeking your input as to how North Carolina community colleges can better meet the needs and help ensure the success of veteran students such as you. You are one of a select group—randomly selected from a list of veteran students attending North Carolina community colleges—that I am asking to participate in a short survey. Enabling Persistence of Veteran Students at NC Community Colleges is part of my doctoral dissertation research. The findings from this study will greatly assist the North Carolina Community College System in identifying programs and services to better meet the needs of veteran students and ensure their success in attaining their educational goals.

If you agree to participate in this study, you will be asked to sign a letter of consent agreeing to participate in the study and complete a 15-minute online survey. Your participation in this study is voluntary. This means that everyone will respect your decision about whether or not you want to participate in this study. No one at the college will treat you differently if you decide not to participate in this study. Your academic progress is in no way related to whether or not you participate in this study or to how you may answer any of the questions. If you decide to participate in the study now, you can still change your mind during any point in the survey. If you feel uncomfortable during the survey, you may stop at any time.

There is no compensation for participation in this study.

Any information you provide will be kept confidential. I will not use your information for any purposes outside of this research study. I will not include your name or anything else that could identify you in any reports of this study.

Your input will provide invaluable insights into what veteran students need from their institutions in order to complete their educational objectives. To get started, click on the link below or copy and paste it into your browser.

[Survey Link]
You can access the survey online until [date].

If you have any questions about this study or experience any problems accessing the survey, please contact me at 919.515.8189 or email janice_sitzes@ncsu.edu.

Thank you for taking the time to provide me with your input. Your feedback will help North Carolina community colleges develop programs and services to enhance the learning experience of veteran students such as you.

Sincerely,
Janice Sitzes
Doctoral candidate, Higher Education Administration
Assistant Director, Marketing
North Carolina State University
Continuing & Professional Education
CB 7401
Raleigh, NC 27695-7401
Appendix I

Final Reminder Email to Veteran Students

Dear [Sal] [Last name]:

A few weeks ago I sent you an email with a link to a short survey seeking your feedback on your experience at one of North Carolina’s community colleges. You are one of a select group targeted to provide insights regarding the ability of the North Carolina Community College System to meet the needs of its veteran students. Your opinions are important!

Many valuable replies have been received so far—but I have not received your responses. I would still like to hear from you! It is only with your assistance that North Carolina community colleges can create and provide opportunities to meet the educational needs of veterans such as you and ensure their success. The survey should take you less than 15 minutes to complete and will be available online until [date]. You can access the survey by clicking on the link below or by cutting and pasting it into your browser.

[survey link]

Thank you for your help!

Sincerely,
Janice Sitzes
Doctoral candidate, Higher Education Administration
Assistant Director, Marketing
North Carolina State University
Continuing & Professional Education
CB 7401
Raleigh, NC 27695-7401
Appendix J

SAS Commands for Initial Data Clean-up Before Imputation (Delete Responses Not Part of the Target Audience and Convert Months to Years)

* load original data;
PROC IMPORT OUT= WORK.original
   DATAFILE= "data\0405studentdata.xls"
   DBMS=EXCEL REPLACE;
   RANGE="studentdata2$";
   GETNAMES=YES;
   MIXED=NO;
   SCANTEXT=YES;
   USEDATE=YES;
   SCANTIME=YES;
RUN;

/*
 * print to verify;
 title 'Original dataset';
 proc print data = original; run;
 */

* add observation number as identifier;
data original;
   set original;
   ID = _n_;
run;

* additional data cleanup;
data originalNotDone;
   set original;
   * remove students finishing that semester;
   if classes = 1 then delete;
   * delete IDs corresponding to GPA of 5 or 6;
   if ID in (18 29 62 73 111 118 132 139 150 161 162 184 191 200 236 241 256 263 284 287 302 358) then delete;
   * convert months to years;
   HSCOLL = HSCollMos/12;
   ACTIVE = ActiveMos/12;
   drop HSCollMos ActiveMos;
run;

/*
 * print to verify;
 title1 'Original Data Without Students in Final Semester';
 title2 'First 30 Observations';
 proc print data = originalNotDone (obs=30); run;
 */
Appendix K

SAS Commands to Create Multiple Imputation Dataset

*** Perform Multiple Imputation ***;

* part 1;
title1 'Multiple Imputation for missing values - part 1';
proc mi data = originalNotDone out = multipleImputation1 nimpute = 40 seed = 2015;
   class SS1F FriendsEncourage Withdraw4 Withdraw1
      Children Married CreditHrs Deployments SS14F SS13F SS8F SS6F
      FamilyApprove Withdraw5 Race Gender Begin SS9F SS2F
   FamilyEncourage
      Withdraw3 Branch Status SS12F SS11F;
   var SS1F FriendsEncourage Withdraw4 Withdraw1
      Children Married CreditHrs Deployments SS14F SS13F SS8F SS6F
      FamilyApprove Withdraw5 Race Gender Begin SS9F SS2F
   FamilyEncourage
      Withdraw3 Branch Status SS12F SS11F;
      fcs logistic(SS1F);
      fcs logistic(FriendsEncourage);
      fcs logistic(Withdraw4);
      fcs logistic(Withdraw1);
      fcs logistic(Children);
      fcs logistic(Married);
      fcs logistic(CreditHrs);
      fcs logistic(Deployments);
      fcs logistic(SS14F);
      fcs logistic(SS13F);
      fcs logistic(SS8F);
      fcs logistic(SS6F);
      fcs logistic(FamilyApprove);
      fcs logistic(Withdraw5);
      fcs logistic(Race);
      fcs logistic(Gender);
      fcs logistic(Begin);
      fcs logistic(SS9F);
      fcs logistic(SS2F);
      fcs logistic(FamilyEncourage);
      fcs logistic(Withdraw3);
      fcs logistic(Branch);
      fcs logistic(Status);
      fcs logistic(SS12F);
      fcs logistic(SS11F);
run;

* part 2;
title1 'Multiple Imputation for missing values - part 2';
proc mi data = originalNotDone out = multipleImputation2 nimpute = 40 seed = 2015;
class Care SS4I SS6I SS1I SS10I SS14I SS12I SS8I SS5I SS2I SS11I SS7I Reason3 Reason2 SS9I SS3I Reason4 Reason1 HrsStudy;
var Care SS4I SS6I SS1I SS10I SS14I SS12I SS8I SS5I SS2I SS11I SS7I Reason3 Reason2 SS9I SS3I Reason4 Reason1 HrsStudy;

fcs logistic(Care);
fcs logistic(SS4I);
fcs logistic(SS6I);
fcs logistic(SS1I);
fcs logistic(SS10I);
fcs logistic(SS14I);
fcs logistic(SS12I);
fcs logistic(SS8I);
fcs logistic(SS5I);
fcs logistic(SS2I);
fcs logistic(SS11I);
fcs logistic(SS7I);
fcs logistic(Reason3);
fcs logistic(Reason2);
fcs logistic(SS9I);
fcs logistic(SS3I);
fcs logistic(Reason4);
fcs logistic(Reason1);
fcs logistic(HrsStudy);
run;

* part 3;
title1 'Multiple Imputation for missing values - part 3';
proc mi data = originalNotDone out = multipleImputation3 nimpute = 40 seed = 2015;
    class FamilySupport FriendsSupport SS13I Age SS3F Work ;
    var FamilySupport FriendsSupport SS13I Age SS3F Work ;
    fcs logistic(FamilySupport);
    fcs logistic(FriendsSupport);
    fcs logistic(SS13I);
    fcs logistic(Age);
    fcs logistic(SS3F);
    fcs logistic(Work);
run;

* part 4;
title1 'Multiple Imputation for missing values - part 4';
proc mi data = originalNotDone out = multipleImputation4 nimpute = 40 seed = 2015;
    class SS7F SS4F SS3F SS5F Withdraw2 SS10F HSCOLL ;
    var SS7F SS4F SS3F SS5F Withdraw2 SS10F HSCOLL ;
    fcs logistic(SS7F);
    fcs logistic(SS4F);
    fcs logistic(SS3F);
    fcs logistic(SS5F);
    fcs logistic(Wdraw2);
fcs logistic(SS10F);
fcs logistic(HSCOLL);

run;

* part 5;
title1 'Multiple Imputation for missing values - part 5';
proc mi data = originalNotDone out = multipleImputation5 nimpute = 40 seed = 2015;
    class ACTIVE SS1F FriendsEncourage;
    var ACTIVE SS1F FriendsEncourage;
    fcs logistic(ACTIVE);
    fcs logistic(SS1F);
    fcs logistic(FriendsEncourage);
run;

*** Clean & Combine Multiple Imputation Datasets ***;

** drop variables that weren't imputed from each dataset;

* imputation part 1;
data multipleImputation1Small(keep = GPA CLASSES REENROLL SS1F FriendsEncourage Withdraw4 Withdraw1 Children Married CreditHrs Deployments SS14F SS13F SS8F SS6F FamilyApprove Withdraw5 Race Gender Begin SS9F SS2F FamilyEncourage Withdraw3 Branch Status SS12F SS11F _Imputation_ ID);
    set multipleImputation1;
run;

* imputation part 2;
data multipleImputation2Small(keep = Care SS4I SS6I SS1I SS10I SS14I SS12I SS8I SS5I SS2I SS11I SS7I Reason3 Reason2 SS9I SS3I Reason4 Reason1 HrsStudy _Imputation_ ID);
    set multipleImputation2;
run;

* imputation part 3;
data multipleImputation3Small(keep = FamilySupport FriendsSupport SS13I Age SS3F Work _Imputation_ ID);
    set multipleImputation3;
run;

* imputation part 4;
data multipleImputation4Small(keep = SS7F SS4F SS3F SS5F Withdraw2 SS10F HSCOLL _Imputation_ ID);
    set multipleImputation4;
run;
* imputation part 5;
data multipleImputation5Small(keep = ACTIVE _Imputation_ ID);
  set multipleImputation5;
run;

** merge datasets together;

* sort datasets by _Imputation_ and ID;
proc sort data = multipleImputation1Small;
  by _Imputation_ ID;
run;

proc sort data = multipleImputation2Small;
  by _Imputation_ ID;
run;

proc sort data = multipleImputation3Small;
  by _Imputation_ ID;
run;

proc sort data = multipleImputation4Small;
  by _Imputation_ ID;
run;

proc sort data = multipleImputation5Small;
  by _Imputation_ ID;
run;

data multipleImputation;
  * reorder variables to match original dataset;
  retain _Imputation_ HrsStudy Reason1 Reason2 Reason3 Reason4 CreditHrs GPA Work Married Children Care Withdraw1 Withdraw2 Withdraw3 Withdraw4 Withdraw5 FriendsSupport FriendsEncourage FamilySupport FamilyApprove FamilyEncourage SS1F SS2F SS3F SS4F SS5F SS6F SS7F SS8F SS9F SS10F SS11F SS12F SS13F SS14F SS1I SS2I SS3I SS4I SS5I SS6I SS7I SS8I SS9I SS10I SS11I SS12I SS13I SS14I Reenroll Classes Age Begin Status Gender Race HSColl Active Deployments Branch ID;
  merge
    multipleImputation1Small
    multipleImputation2Small
    multipleImputation3Small
    multipleImputation4Small
    multipleImputation5Small;
  by _Imputation_ ID;
run;

* print to verify;
title 'Multiple Imputation Dataset - First 30 observations';
proc print data = multipleImputation (obs = 30); run;
* proc freq to verify no missing;
title 'Multiple Imputation - Frequencies';
proc freq data = multipleImputation;
  *by _imputation_;
tables _all_;
run;

* Save Imputed Datasets;
PROC EXPORT DATA= WORK.multipleImputation
  OUTFILE= "data\multipleImputation.csv"
  DBMS=CSV REPLACE;
  PUTNAMES=YES;
RUN;
Appendix L

SAS Commands for Data Clean-up of Imputation Dataset for Logistic Regression (Re-coding of Variables and Calculation of Compiled Variable, Encouragement from Family and Friends)

* load multiple imputation data;
PROC IMPORT OUT= WORK.multipleImputation
   DATAFILE= "data\multipleImputation.csv"
   DBMS=CSV REPLACE;
   GETNAMES=YES;
   DATAROW=2;
RUN;

/* print to verify;*/
proc print data = multipleImputation (where = (ID = 8)); run;

* clean up dataset;*
data multipleImputationClean (rename = (GPAtemp=GPA Marriedtemp=Married
   Childrentemp=Children));
   set multipleImputation;
   * re-code variables;
   if GPA = 1 then GPAtemp = 4;
   if GPA = 2 then GPAtemp = 3;
   if GPA = 3 then GPAtemp = 2;
   if GPA = 4 then GPAtemp = 1;
   if Status = 2 then Status = 0;
   if Gender = 2 then Gender = 0;
   if Race in (1 2 3 4 6 7) then Race = 0;
   if Race = 5 then Race = 1;
   if Married = 1 then Marriedtemp = 0;
   if Married = 2 then Marriedtemp = 1;
   if Children = 1 then Childrentemp = 0;
   if Children = 2 then Childrentemp = 1;
   if FriendsSupport in (1 2 3) then FriendsSupport = 1;
   if FriendsSupport = 4 then FriendsSupport = 0;
   if FriendsEncourage = 2 then FriendsEncourage = 0;
   if FamilySupport in (1 2 3) then FamilySupport = 1;
   if FamilySupport = 4 then FamilySupport = 0;
   if FamilyApprove = 2 then FamilyApprove = 0;
   if FamilyEncourage = 2 then FamilyEncourage = 0;
   if SS1I = 1 or SS1I = 2 then SS1I = 1;
   if SS1I = 3 then SS1I = 0;
   if SS2I = 1 or SS2I = 2 then SS2I = 1;
   if SS2I = 3 then SS2I = 0;
   if SS3I = 1 or SS3I = 2 then SS3I = 1;
   if SS3I = 3 then SS3I = 0;
   if SS4I = 1 or SS4I = 2 then SS4I = 1;
   if SS4I = 3 then SS4I = 0;
if SS5I = 1 or SS5I = 2 then SS5I = 1;
if SS5I = 3 then SS5I = 0;
if SS6I = 1 or SS6I = 2 then SS6I = 1;
if SS6I = 3 then SS6I = 0;
if SS7I = 1 or SS7I = 2 then SS7I = 1;
if SS7I = 3 then SS7I = 0;
if SS8I = 1 or SS8I = 2 then SS8I = 1;
if SS8I = 3 then SS8I = 0;
if SS9I = 1 or SS9I = 2 then SS9I = 1;
if SS9I = 3 then SS9I = 0;
if SS10I = 1 or SS10I = 2 then SS10I = 1;
if SS10I = 3 then SS10I = 0;
if SS11I = 1 or SS11I = 2 then SS11I = 1;
if SS11I = 3 then SS11I = 0;
if SS12I = 1 or SS12I = 2 then SS12I = 1;
if SS12I = 3 then SS12I = 0;
if SS13I = 1 or SS13I = 2 then SS13I = 1;
if SS13I = 3 then SS13I = 0;
if SS14I = 1 or SS14I = 2 then SS14I = 1;
if SS14I = 3 then SS14I = 0;
if Reenroll = 2 then Reenroll = 0;
FFsupport = FriendsSupport + FriendsEncourage + FamilySupport + FamilyApprove + FamilyEncourage;
* drop original variables;
drop GPA Married Children;
run;

* print to verify;
proc print data = multipleImputationClean (obs=30); run;
*/

* Save Logistic Regression Dataset;
PROC EXPORT DATA= WORK.multipleImputationClean
    OUTFILE= "data\multipleImputationClean.csv"
    DBMS=CSV REPLACE;
    PUTNAMES=YES;
RUN;
Appendix M

SAS Commands for the Combination Variable Selection Method
(Initial Model Variables)

* load data file;
PROC IMPORT OUT= WORK.multipleImputationClean
   DATAFILE= "data\multipleImputationClean.csv"
   DBMS=CSV REPLACE;
   GETNAMES=YES;
   DATAROW=2;
RUN;

/*
title 'Cleaned Multiple Imputation Dataset';
proc print data = multipleImputationClean (obs=30); run;
*/

*** Load macros ***;
%INCLUDE 'code\selectionMacros.sas';

*******************************************************************************;
**** Combo Variable Selection ****;
**** Stepwise + IC + Best Subset ****;
*******************************************************************************;

*** Using FFSupport (#1) ***;

* extract the stepwise path;
title1 'Logistic Regression - Combo Variable Selection - Stepwise Path';
title2 'Janice Variables - FFSupport';
proc logistic data = multipleImputationClean;
   class GPA / param = reference;
   by _imputation_;
   model reenroll(event='1') = GPA AGE STATUS GENDER RACE HSCOLL ACTIVE
   DEPLOYMENTS
      WORK MARRIED CHILDREN CARE FFSupport
      SS8I SS12I SS4I SS10I SS5I SS14I
   / selection = stepwise slentry=1 slstay=1 details; * FamilySupport;
   ods output ModelBuildingSummary=SUM1;
   ods output FitStatistics=FIT1;
RUN;

/*
* print stepwise fit statistics;
title 'Combo Selection Stepwise Fit Statistics - Using FFSupport';
proc print data = FIT1; run;
*/
/*
*/
proc print data = FIT1 (where = (Criterion='SC')); run;
/*
* Find minimum SC;
proc sql ;
create table FIT1_minSC as 
select *,
  min(InterceptAndCovariates) as minSC format = 8.3
from FIT1 (where = (Criterion='SC'))
  group by _Imputation_
quit;
/*
* print dataset with minimum SC variable added;
proc print data = FIT1_minSC; run;
*/
* Find minimum AIC;
proc sql ;
create table FIT1_minAIC as 
select *,
  min(InterceptAndCovariates) as minAIC format = 8.3
from FIT1 (where = (Criterion='AIC'))
  group by _Imputation_
quit;
/*
* print dataset with minimum AIC variable added;
proc print data = FIT1_minAIC; run;
*/
* sort by imputation and step (SC);
proc sort data = FIT1_minSC; 
  by _Imputation_ Step;
run;
* sort by imputation and step (AIC);
proc sort data = FIT1_minAIC; 
  by _Imputation_ Step;
run;
* Combine summary numbers together;
data combo1SelectTemp;
  merge 
    SUM1 (drop = EffectEntered EffectRemoved DF ScoreChiSq WaldChiSq ProbChiSq) 
    FIT1_minSC (drop = Equals InterceptOnly Criterion rename = (InterceptAndCovariates = SC))
FIT1_minAIC (drop = Equals InterceptOnly Criterion rename =
(InterceptAndCovariates = AIC));
   by _Imputation_ Step;
run;

/*
proc print data = combo1SelectTemp; run;
*/

* only keep minimum values;
data combo1SelectTemp;
  set combo1SelectTemp;
  if SC = minSC or AIC = minAIC;
run;

/*
proc print data = combo1SelectTemp; run;
*/

* find average model size for SC;
proc means data = combo1SelectTemp (where = (SC = minSC)) noprint;
   var NumberInModel;
   output out = combo1_k_SC mean = k_SC;
run;

/*
proc print data = combo1_k_SC; run;
*/

* find average model size for AIC;
proc means data = combo1SelectTemp (where = (AIC = minAIC)) noprint;
   var NumberInModel;
   output out = combo1_k_AIC mean = k_AIC;
run;

/*
proc print data = combo1_k_AIC; run;
*/

* use model size using SC to determine model sizes to consider for best
subset selection;
data combo1_k_SC;
  set combo1_k_SC;
  k_SCrounded = floor(k_SC);
  if k_SCrounded = 1 then
     do;
       k_start = 1;
       k_end = 4;
     end;
  else if k_SCrounded = 2 then
     do;
       k_start = 1;
k_end = 5;
end;
else if k_SCrounded ge 3 and k_SCrounded le (_FREQ_ - 2) then
do;
k_start = k_SCrounded - 2;
k_end = k_SCrounded + 2;
end;
else if k_SCrounded = (_FREQ_ - 1) then
do;
k_start = k_SCrounded - 3;
k_end = k_SCrounded + 1;
end;
else if k_SCrounded = _FREQ_ then
do;
k_start = k_SCrounded - 4;
k_end = k_SCrounded;
end;

run;

/*
proc print data = combo1_k_SC; run;
*/

* prevent results from being printed;
ods results off;

* macro to do "combo" variable selection
  Janice = uses initial model variables
  FFSupport = Uses FFSupport instead of its components;
%MACRO ComboJaniceFFSupport(sizes=, data=, imputeStart=, imputeEnd=) ;

* select starting and ending model sizes for best subset selection;
proc sql noprint;
  select k_start into: kstart
  from &sizes;
quit;

proc sql noprint;
  select k_end into: kend
  from &sizes;
quit;

proc sql noprint;
  select max(_imputation_) into: m
  from &data;
quit;

%let numImputations=(1 + &imputeEnd - &imputeStart);
%do j=&imputeStart %to &imputeEnd;

* conduct best subset selection for those model sizes;
proc logistic data = &data (where = (_imputation_ = &j));
   model reenroll(event='1') = GPA AGE STATUS GENDER RACE HSCOLL ACTIVE DEPLOYMENTS WORK MARRIED CHILDREN CARE FFSupport SS8I SS12I SS4I SS10I SS5I SS14I /
   selection = score start = &kstart stop = &kend;
   ods output BestSubsets=Best_Subsets;
   *ods output parameterestimates = logparmsMI;
run;

proc sql noprint;
   select (nobs - delobs) into: num
   from dictionary.tables
   where libname = 'WORK'
   and memname = "BEST_SUBSETS";
   %let num=#
quit;

* for a given imputation number, extract all possible subsets and fit logistic regression using all possible variables ;
%do i=1 %to &num;
   data _null_;
   set Best_Subsets;
   if _N_ = &i;
   call symput('list', VariablesInModel);
run;

* fit logistic regression model using the select covariates;
proc logistic data = &data (where = (_imputation_ = &j));
   model reenroll(event='1') = &list;
   ods output FitStatistics = bestSubsetFit_&i;
run;

* delete log likelihood statistic;
data bestSubsetFit_&i;
   set bestSubsetFit_&i;
   if Criterion='-2 Log L' then delete;
run;
%end;

* combine the fit statistics together;
data bestSubsetFit_All;
   set bestSubsetFit_1;
run;
%do i=2 %to &num;

proc append base = bestSubsetFit_All data = bestSubsetFit_&i;
run;
%end;

* find min SC among all possible subsets;
proc sql;
  create table bestSubsetFit_minSC as
  select *,
    min(InterceptAndCovariates) as minSC format = 8.3
  from bestSubsetFit_All (where = (Criterion='SC')) ;
quit;

* merge subsets dataset with fit statistics;
data bestSubsetVariablesAndFit;
  merge
    Best_Subsets (drop = control_var NumberOfVariables ScoreChiSq)
    bestSubsetFit_minSC (drop = Criterion InterceptOnly);
run;

* find covariate corresponding to min. SC value;
data bestSubsetVariables_&j;
  set bestSubsetVariablesAndFit;
  if InterceptAndCovariates = minSC;
run;
%end;

* combine selected variables together;
data bestSubsetVariables_All;
  set bestSubsetVariables_&imputeStart;
run;
%do i=(&imputeStart+1) %to &imputeEnd;
  proc append base = bestSubsetVariables_All data = bestSubsetVariables_&i;
  run;
%end;

*** split strings and convert to long format;

* split names of selected variables;
data bestSubsetVariables_AllWide;
  set bestSubsetVariables_All;
  x1 = scan(VariablesInModel,1, ' ');
  x2 = scan(VariablesInModel,2, ' ');
  x3 = scan(VariablesInModel,3, ' ');
  x4 = scan(VariablesInModel,4, ' ');
  x5 = scan(VariablesInModel,5, ' ');
  x6 = scan(VariablesInModel,6, ' ');

x7 = scan(VariablesInModel, 7, ' ');
x8 = scan(VariablesInModel, 8, ' ');
x9 = scan(VariablesInModel, 9, ' ');
run;

* convert to long format;
data bestSubsetVariables_AllLong;
  set bestSubsetVariables_AllWide;
  array xvars [9] x1-x9;
  do i = 1 to 9;
    Variable = xvars[i]; observation = i; output;
  end;
run;

* remove blank observations and unneeded variables;
data bestSubsetVariables_AllLong;
  set bestSubsetVariables_AllLong (drop = x1-x9 i);
  if Variable = '' then delete;
run;

*** summarize which variables were selected; * determine how many times each variable was selected;
proc freq data = bestSubsetVariables_AllLong;
  tables Variable / out = bestSubsetVariables;
run;

* calculate percents;
data bestSubsetVarsFFSupport;
  set bestSubsetVariables;
  *if Variable = 'Intercept' then delete;
  PERCENT = (COUNT/&numImputations)*100;
  if PERCENT < 50 then delete;
run;

%MEND;

* use macro to extract variables identify by combo procedure;
%ComboJaniceFFSupport(sizes=combol_k_SC, data=multipleImputationClean, imputeStart=1, imputeEnd=40);

* save the rest of the output to html;
ods html path = "output\round2\"
  file = "multipleImputationClean_ComboJanice_FFSupport.htm";

* Final Estimation using selected variables;
title1 'Logistic Regression - Combo Variable Selection - Final Estimation';
title2 'Janice Variables - FFsupport';
%MISELECT(bestSubsetVarsFFSupport);

* calculate averages for model output of interest;
DATA\
"%MISELECTAVERAGES"

* close ods for saving output to html;
ods _all_ close;
ods html;
ods results on;

*** Using FFSupport Components (#2) ***;

* extract the stepwise path;
title1 'Logistic Regression - Combo Variable Selection - Stepwise Path';
title2 'Janice Variables - FFSupport Components';
proc logistic data = multipleImputationClean;
  class GPA / param = reference;
  by _imputation_;  
  model reenroll(event='1') = GPA AGE STATUS GENDER RACE HSCOLL ACTIVE DEPLOYMENTS WORK MARRIED CHILDREN CARE FriendsSupport FriendsEncourage FamilySupport FamilyApprove FamilyEncourage SS8I SS12I SS4I SS10I SS5I SS14I / selection = stepwise slentry=1 slstay=1 details; * FamilySupport;
ods output ModelBuildingSummary=SUM2;
ods output FitStatistics=FIT2;
run;

/*
* print stepwise fit statistics;
title 'Combo Selection Stepwise Fit Statistics - Using FFSupport Components';
proc print data = FIT2; run;
*/

/*
proc print data = FIT2 (where = (Criterion='SC')); run;
*/

* Find minimum SC;
proc sql;
  create table FIT2_minSC as
  select *,
     min(InterceptAndCovariates) as minSC format = 8.3
  from FIT2 (where = (Criterion='SC'))
  group by _imputation_
  quit;

/*
* print dataset with minimum SC variable added;
proc print data = FIT2_minSC; run;
*/

* Find minimum AIC;
proc sql;
create table FIT2_minAIC as
select *,
min(InterceptAndCovariates) as minAIC format = 8.3
from FIT2 (where = (Criterion='AIC'))
group by _Imputation_
quit;

/*
* print dataset with minimum AIC variable added;
proc print data = FIT2_minAIC; run;
*/

* sort by imputation and step (SC);
proc sort data = FIT2_minSC;
   by _Imputation_ Step;
run;

* sort by imputation and step (AIC);
proc sort data = FIT2_minAIC;
   by _Imputation_ Step;
run;

* Combine summary numbers together;
data combo2SelectTemp;
merge
   SUM2 (drop = EffectEntered EffectRemoved DF ScoreChiSq WaldChiSq ProbChiSq)
   FIT2_minSC (drop = Equals InterceptOnly Criterion rename = (InterceptAndCovariates = SC))
   FIT2_minAIC (drop = Equals InterceptOnly Criterion rename = (InterceptAndCovariates = AIC));
   by _Imputation_ Step;
run;

/*
proc print data = combo2SelectTemp; run;
*/

* only keep minimum values;
data combo2SelectTemp;
set combo2SelectTemp;
   if SC = minSC or AIC = minAIC;
run;

/*
proc print data = combo2SelectTemp; run;
*/

* find average model size for SC;
proc means data = combo2SelectTemp (where = (SC = minSC)) noprint;
var NumberInModel;
output out = combo2_k_SC mean = k_SC;
run;

/*
proc print data = combo2_k_SC; run;
*/

* find average model size for AIC;
proc means data = combo2SelectTemp (where = (AIC = minAIC)) noplease;
var NumberInModel;
output out = combo2_k_AIC mean = k_AIC;
run;

/*
proc print data = combo2_k_AIC; run;
*/

* use model size using SC to determine model sizes to consider for best subset selection;
data combo2_k_SC;
set combo2_k_SC;
k_SCrounded = floor(k_SC);
if k_SCrounded = 1 then
   do;
      k_start = 1;
      k_end = 4;
   end;
else if k_SCrounded = 2 then
   do;
      k_start = 1;
      k_end = 5;
   end;
else if k_SCrounded ge 3 and k_SCrounded le (_FREQ_ - 2) then
   do;
      k_start = k_SCrounded - 2;
      k_end = k_SCrounded + 2;
   end;
else if k_SCrounded = (_FREQ_ - 1) then
   do;
      k_start = k_SCrounded - 3;
      k_end = k_SCrounded + 1;
   end;
else if k_SCrounded = _FREQ_ then
   do;
      k_start = k_SCrounded - 4;
      k_end = k_SCrounded;
   end;
run;

/*
/* prevent results from being printed; 
ods results off;
*/

* macro to do "combo" variable selection
Janice = uses initial model variables
FFSupportComponents = Uses components of FFSupport instead of composite variable;
%MACRO ComboJaniceFFSupportComponents(sizes=, data=, imputeStart=, imputeEnd=) ;

* select starting and ending model sizes for best subset selection;
proc sql noprint;
   select k_start into: kstart
   from &sizes;
quit;

proc sql noprint;
   select k_end into: kend
   from &sizes;
quit;

proc sql noprint;
   select max(_imputation_) into: m
   from &data;
quit;

%let numImputations=(1 + &imputeEnd - &imputeStart);

%do j=&imputeStart %to &imputeEnd;

* conduct best subset selection for those model sizes;
proc logistic data = &data (where = (_imputation_ = &j));
   model reenroll(event='1') = GPA AGE STATUS GENDER RACE HSCOLL ACTIVE DEPLOYMENTS WORK MARRIED CHILDREN CARE FriendsSupport FriendsEncourage FamilySupport FamilyApprove FamilyEncourage SS8I SS12I SS4I SS10I SS5I SS14I / selection = score start = &kstart stop = &kend;
   ods output BestSubsets=Best_Subsets;
   *ods output parameterestimates = logparmsMI;
run;

proc sql noprint;
   select (nobs -delobs) into: num
   from dictionary.tables
   where libname = 'WORK'
   and memname = "BEST_SUBSETS";
%let num=&num;
quit;

* for a given imputation number, extract all possible subsets and fit logistic regression using all possible variables ;
%do i=1 %to &num;
   data _null_; 
   set Best_Subsets;
   if _N_ = &i;
   call symput('list', VariablesInModel);
   run;

   * fit logistic regression model using the select covariates;
   proc logistic data = &data (where = (_imputation_ = &j));
      model reenroll(event='1') = &list;
      ods output FitStatistics = bestSubsetFit_&i;
   run;

   * delete log likelihood statistic;
   data bestSubsetFit_&i;
      set bestSubsetFit_&i;
      if Criterion='2 Log L' then delete;
   run;
%end;

* combine the fit statistics together;
data bestSubsetFit_All;
   set bestSubsetFit_1;
run;

%do i=2 %to &num;
   proc append base = bestSubsetFit_All data = bestSubsetFit_&i;
   run;
%end;

* find min SC among all possible subsets;
proc sql;
   create table bestSubsetFit_minSC as
      select *,
      min(InterceptAndCovariates) as minSC format = 8.3
      from bestSubsetFit_All (where = (Criterion='SC')) ;
   quit;

* merge subsets dataset with fit statistics;
data bestSubsetVariablesAndFit;
   merge 
      Best_Subsets (drop = control_var NumberOfVariables ScoreChiSq ) 
      bestSubsetFit_minSC (drop = Criterion InterceptOnly);
run;
* find covariate corresponding to min. SC value;
  data bestSubsetVariables_&_j;
    set bestSubsetVariablesAndFit;
    if InterceptAndCovariates = minSC;
  run;
%end;

* combine selected variables together;
  data bestSubsetVariables_All;
    set bestSubsetVariables_&_imputeStart;
  run;

%do i=(&imputeStart+1) %to &imputeEnd;
  proc append base = bestSubsetVariables_All data = bestSubsetVariables_&_i;
  run;
%end;

*** split strings and convert to long format;

* split names of selected variables;
  data bestSubsetVariables_AllWide;
    set bestSubsetVariables_All;
    x1 = scan(VariablesInModel, 1, ' ');
    x2 = scan(VariablesInModel, 2, ' ');
    x3 = scan(VariablesInModel, 3, ' ');
    x4 = scan(VariablesInModel, 4, ' ');
    x5 = scan(VariablesInModel, 5, ' ');
    x6 = scan(VariablesInModel, 6, ' ');
    x7 = scan(VariablesInModel, 7, ' ');
    x8 = scan(VariablesInModel, 8, ' ');
    x9 = scan(VariablesInModel, 9, ' ');
  run;

* convert to long format;
  data bestSubsetVariables_AllLong;
    set bestSubsetVariables_AllWide;
    array xvars [9] x1-x9;
    do i=1 to 9;
      Variable = xvars[i]; observation = i; output;
    end;
  run;

* remove blank observations and unneeded variables;
  data bestSubsetVariables_AllLong;
    set bestSubsetVariables_AllLong (drop = x1-x9 i);
    if Variable = '' then delete;
  run;
*** summarize which variables were selected;
* determine how many times each variable was selected;
proc freq data = bestSubsetVariables_AllLong;
    tables Variable / out = bestSubsetVariables;
run;

* calculate percents;
data bestSubsetVarsFFSupportComp;
    set bestSubsetVariables;
    *if Variable = 'Intercept' then delete;
    PERCENT = (COUNT/&numImputations)*100;
    if PERCENT < 50 then delete;
run;

%MEND;

* use macro to extract variables identify by combo procedure;
%ComboJaniceFFSupportComponents(sizes=combo2_k_SC,
data=multipleImputationClean, imputeStart=1, imputeEnd=40);

* save the rest of the output to html;
ods html path ="output\round2";
    file = "multipleImputationClean_ComboJanice_FFSupportComponents.htm";

* Final Estimation using selected variables;
title1 'Logistic Regression - Combo Variable Selection - Final Estimation';
title2 'Janice Variables - FFSupport Components';
%MISELECT(bestSubsetVarsFFSupportComp);

* calculate averages for model output of interest;
%MISELECTAVERAGES

* close ods for saving output to html;
ods _all_ close;
ods html;
ods results on;
Appendix N

SAS Commands for the Combination Variable Selection Method (Revised Model Variables)

* load data file;
PROC IMPORT OUT= WORK.multipleImputationClean
    DATAFILE= "data\multipleImputationClean.csv"
    DBMS=CSV REPLACE;
    GETNAMES=YES;
    DATAROW=2;
RUN;
/*
title 'Cleaned Multiple Imputation Dataset';
proc print data = multipleImputationClean (obs=30); run;
*/

*** Load macros ***;
%INCLUDE 'code\selectionMacros.sas';

***************************************************************;
****     Combo Variable Selection     ****;
**** Stepwise + IC + Best Subset     ****;
***************************************************************;

*** Using FFSupport (#1) ***;
* extract the stepwise path;
title1 'Logistic Regression - Combo Variable Selection - Stepwise Path';
title2 'Expanded Variables - FFSupport';
proc logistic data = multipleImputationClean;
    class GPA / param = reference;
    by _imputation_;
    model reenroll(event='1') = GPA AGE Branch Begin GPA Age Status
         Gender Race HSCOLL ACTIVE DEPLOYMENTS WORK MARRIED CHILDREN
         CARE FFSupport
             SS1I SS2I SS3I SS4I SS5I SS6I SS7I SS8I SS9I SS10I SS11I SS12I
             SS13I SS14I
             / selection = stepwise slentry=1 slstay=1 details; * FamilySupport;
    ods output ModelBuildingSummary=SUM1;
    ods output FitStatistics=FIT1;
run;
/*
* print stepwise fit statistics;
title 'Combo Selection Stepwise Fit Statistics - Using FFSupport';
proc print data = FIT1; run;

/*
proc print data = FIT1 (where = (Criterion='SC')); run;
*/

* Find minimum SC;
proc sql;
create table FIT1_minSC as
select *
min(InterceptAndCovariates) as minSC format = 8.3
from FIT1 (where = (Criterion='SC'))
group by _Imputation_
quit;

/*
* print dataset with minimum SC variable added;
proc print data = FIT1_minSC; run;
*/

* Find minimum AIC;
proc sql;
create table FIT1_minAIC as
select *
min(InterceptAndCovariates) as minAIC format = 8.3
from FIT1 (where = (Criterion='AIC'))
group by _Imputation_
quit;

/*
* print dataset with minimum AIC variable added;
proc print data = FIT1_minAIC; run;
*/

* sort by imputation and step (SC);
proc sort data = FIT1_minSC;
  by _Imputation_ Step;
run;

* sort by imputation and step (AIC);
proc sort data = FIT1_minAIC;
  by _Imputation_ Step;
run;

* Combine summary numbers together;
data combolSelectTemp;
merge
  SUM1 (drop = EffectEntered EffectRemoved DF ScoreChiSq WaldChiSq ProbChiSq)
FIT1_minSC (drop = Equals InterceptOnly Criterion rename =
(InterceptAndCovariates = SC))
FIT1_minAIC (drop = Equals InterceptOnly Criterion rename =
(InterceptAndCovariates = AIC));
by _Imputation_ Step;
run;
/*
proc print data = combo1SelectTemp; run;
*/
* only keep minimum values;
data combo1SelectTemp;
set combo1SelectTemp;
  if SC = minSC or AIC = minAIC;
run;
/*
proc print data = combo1SelectTemp; run;
*/
* find average model size for SC;
proc means data = combo1SelectTemp (where = (SC = minSC)) noprint;
  var NumberInModel;
  output out = combo1_k_SC mean = k_SC;
run;
/*
proc print data = combo1_k_SC; run;
*/
* find average model size for AIC;
proc means data = combo1SelectTemp (where = (AIC = minAIC)) noprint;
  var NumberInModel;
  output out = combo1_k_AIC mean = k_AIC;
run;
/*
proc print data = combo1_k_AIC; run;
*/
* use model size using SC to determine model sizes to consider for best
subset selection;
data combo1_k_SC;
set combo1_k_SC;
  k_SCRounded = floor(k_SC);
  if k_SCRounded = 1 then
    do;
      k_start = 1;
      k_end = 4;
    end;
  else if k_SCRounded = 2 then
do;
    k_start = 1;
    k_end = 5;
end;
else if k_SCrounded ge 3 and k_SCrounded le (_FREQ_ - 2) then
    do;
        k_start = k_SCrounded - 2;
        k_end = k_SCrounded + 2;
    end;
else if k_SCrounded = (_FREQ_ - 1) then
    do;
        k_start = k_SCrounded - 3;
        k_end = k_SCrounded + 1;
    end;
else if k_SCrounded = _FREQ_ then
    do;
        k_start = k_SCrounded - 4;
        k_end = k_SCrounded;
    end;
run;

/*
proc print data = combo1_k_SC; run;
*/

* prevent results from being printed;
ods results off;

* macro to do "combo" variable selection
    Expanded = uses expanded list of possible variables
    FFSupport = Uses FFSupport instead of its components;
%MACRO ComboExpandedFFSupport(sizes=, data=, imputeStart=, imputeEnd=) ;

* select starting and ending model sizes for best subset selection;
proc sql noprint;
    select k_start into: kstart
    from &sizes;
quit;

proc sql noprint;
    select k_end into: kend
    from &sizes;
quit;

proc sql noprint;
    select max(_imputation_) into: m
    from &data;
quit;
%let numImputations=(1 + &imputeEnd - &imputeStart);
%do j=&imputeStart %to &imputeEnd;

* conduct best subset selection for those model sizes;
proc logistic data = &data (where = (_imputation_ = &j));
   model reenroll(event='1') = GPA AGE Branch Begin GPA Age Status
   Gender Race HSCOLL ACTIVE DEPLOYMENTS WORK MARRIED CHILDREN CARE FFSupport
   SS1I SS2I SS3I SS4I SS5I SS6I SS7I SS8I SS9I SS10I SS11I SS12I
   SS13I SS14I
   / selection = score start = &kstart stop = &kend;
   *ods output BestSubsets=Best_Subsets;
   *ods output parameterestimates = logparmsMI;
run;

proc sql noprint;
   select (nobs -delobs) into: num
   from dictionary.tables
   where libname = 'WORK'
   and memname = "BEST_SUBSETS";
%let num=&num;
quit;

* for a given imputation number, extract all possible subsets and fit
logistic regression using all possible variables;
%do i=1 %to &num;
   data _null_;
   set Best_Subsets;
   if _N_ = &i;
   call symput('list',
      VariablesInModel);
   run;

* fit logistic regression model using the select covariates;
proc logistic data = &data (where = (_imputation_ = &j));
   model reenroll(event='1') = &list;
   ods output FitStatistics = bestSubsetFit_&i;
run;

* delete log likelihood statistic;
data bestSubsetFit_&i;
   set bestSubsetFit_&i;
   if Criterion='–2 Log L' then delete;
run;

%end;

* combine the fit statistics together;
data bestSubsetFit_All;
   set bestSubsetFit_1;
run;

%do i=2 %to &num;
   proc append base = bestSubsetFit_All data = bestSubsetFit_&i;
   run;
%end;

* find min SC among all possible subsets;
proc sql;
   create table bestSubsetFit_minSC as
   select *
   , min(InterceptAndCovariates) as minSC format = 8.3
   from bestSubsetFit_All (where = (Criterion='SC'));
   quit;

* merge subsets dataset with fit statistics;
data bestSubsetVariablesAndFit;
   merge Best_Subsets (drop = control_var NumberOfVariables ScoreChiSq)
   bestSubsetFit_minSC (drop = Criterion InterceptOnly);
run;

* find covariate corresponding to min. SC value;
data bestSubsetVariables_&j;
   set bestSubsetVariablesAndFit;
   if InterceptAndCovariates = minSC;
run;
%end;

* combine selected variables together;
data bestSubsetVariables_All;
   set bestSubsetVariables_&imputeStart;
run;

%do i=(&imputeStart+1) %to &imputeEnd;
   proc append base = bestSubsetVariables_All data =
   bestSubsetVariables_&i;
   run;
%end;

*** split strings and convert to long format;

* split names of selected variables;
data bestSubsetVariables_AllWide;
   set bestSubsetVariables_All;
   x1 = scan(VariablesInModel, 1, ' ');
   x2 = scan(VariablesInModel, 2, ' ');
   x3 = scan(VariablesInModel, 3, ' ');

x4 = scan(VariablesInModel, 4, ' ');

x5 = scan(VariablesInModel, 5, ' ');

x6 = scan(VariablesInModel, 6, ' ');

x7 = scan(VariablesInModel, 7, ' ');

x8 = scan(VariablesInModel, 8, ' ');

x9 = scan(VariablesInModel, 9, ' ');

run;

* convert to long format;

data bestSubsetVariables_AllLong;
  set bestSubsetVariables_AllWide;
  array xvars {9} x1-x9;
  do i=1 to 9;
    Variable = xvars[i]; observation = i; output;
  end;
run;

* remove blank observations and unneeded variables;

data bestSubsetVariables_AllLong;
  set bestSubsetVariables_AllLong (drop = x1-x9 i);
  if Variable = '' then delete;
run;

*** summarize which variables were selected;
* determine how many times each variable was selected;
proc freq data = bestSubsetVariables_AllLong;
  tables Variable / out = bestSubsetVariables;
run;

* calculate percents;

data bestSubsetVarsFFSupport;
  set bestSubsetVariables;
  *if Variable = 'Intercept' then delete;
  PERCENT = (COUNT/40)*100;
  if PERCENT < 50 then delete;
run;

&numImputations
%MEND;

* use macro to extract variables identify by combo procedure;
%ComboExpandedFFSupport(sizes=combo1_k_SC, data=multipleImputationClean, imputeStart=1, imputeEnd=40);

* save the rest of the output to html;
ods html path = "output\round2";
  file = "multipleImputationClean_ComboExpanded_FFSupport.htm";

* Final Estimation using selected variables;
  title1 'Logistic Regression - Combo Variable Selection - Final Estimation';
  title2 'Expanded Variables - FFSupport';
%MISELECT(bestSubsetVarsFFSupport);

* calculate averages for model output of interest;
%MISELECTAVERAGES

* close ods for saving output to html;
ods _all_ close;
ods html;
ods results on;

*** Using FFSupport Components (#2) ***;

* extract the stepwise path;
title1 'Logistic Regression - Combo Variable Selection - Stepwise Path';
title2 'Expanded Variables - FFsupport Components';
proc logistic data = multipleImputationClean;
   class GPA / param = reference;
   by _imputation_; 
   model reenroll(event='1') = GPA AGE Branch Begin GPA Age Status 
   Gender Race HSCOLL ACTIVE DEPLOYMENTS WORK MARRIED CHILDREN 
   CARE FriendsSupport
   FriendsEncourage FamilySupport FamilyApprove FamilyEncourage 
   SS1I SS2I SS3I SS4I SS5I SS6I SS7I SS8I SS9I SS10I SS11I SS12I 
   SS13I SS14I 
   / selection = stepwise slentry=1 slstay=1 details; * FamilySupport;
   ods output ModelBuildingSummary=SUM2;
   ods output FitStatistics=FIT2;
run;

/*
 * print stepwise fit statistics;
title 'Combo Selection Stepwise Fit Statistics - Using FFSupport Components';
proc print data = FIT2; run;
*/
/*
proc print data = FIT2 (where = (Criterion='SC')); run;
*/

* Find minimum SC;
proc sql ;
   create table FIT2_minSC as
   select *,
     min(InterceptAndCovariates) as minSC format = 8.3
   from FIT2 (where = (Criterion='SC'))
     group by _Imputation_
   quit;

/*
 * print dataset with minimum SC variable added;
* Find minimum AIC;
proc sql;
  create table FIT2_minAIC as
  select *,
    min(InterceptAndCovariates) as minAIC format = 8.3
  from FIT2 (where = (Criterion='AIC'))
  group by _Imputation_
quit;

/*
* print dataset with minimum AIC variable added;
proc print data = FIT2_minAIC; run;
*/

* sort by imputation and step (SC);
proc sort data = FIT2_minSC;
  by _Imputation_ Step;
run;

* sort by imputation and step (AIC);
proc sort data = FIT2_minAIC;
  by _Imputation_ Step;
run;

* Combine summary numbers together;
data combo2SelectTemp;
  merge
    SUM2 (drop = EffectEntered EffectRemoved DF ScoreChiSq WaldChiSq ProbChiSq)
    FIT2_minSC (drop = Equals InterceptOnly Criterion rename = (InterceptAndCovariates = SC))
    FIT2_minAIC (drop = Equals InterceptOnly Criterion rename = (InterceptAndCovariates = AIC));
  by _Imputation_ Step;
run;

/*
proc print data = combo2SelectTemp; run;
*/

* only keep minimum values;
data combo2SelectTemp;
  set combo2SelectTemp;
    if SC = minSC or AIC = minAIC;
run;

/*
proc print data = combo2SelectTemp; run;
* find average model size for SC;
  proc means data = combo2SelectTemp (where = (SC = minSC)) noprint;
    var NumberInModel;
    output out = combo2_k_SC mean = k_SC;
  run;

  /*
  proc print data = combo2_k_SC; run;
  */

  * find average model size for AIC;
  proc means data = combo2SelectTemp (where = (AIC = minAIC)) noprint;
    var NumberInModel;
    output out = combo2_k_AIC mean = k_AIC;
  run;

  /*
  proc print data = combo2_k_AIC; run;
  */

  * use model size using SC to determine model sizes to consider for best
    subset selection;
  data combo2_k_SC;
    set combo2_k_SC;
    k_SCrounded = floor(k_SC);
    if k_SCrounded = 1 then do;
      k_start = 1;
      k_end = 4;
    end;
    else if k_SCrounded = 2 then do;
      k_start = 1;
      k_end = 5;
    end;
    else if k_SCrounded ge 3 and k_SCrounded le (_FREQ_ - 2) then do;
      k_start = k_SCrounded - 2;
      k_end = k_SCrounded + 2;
    end;
    else if k_SCrounded = (_FREQ_ - 1) then do;
      k_start = k_SCrounded - 3;
      k_end = k_SCrounded + 1;
    end;
    else if k_SCrounded = _FREQ_ then do;
      k_start = k_SCrounded - 4;
      k_end = k_SCrounded;
    end;
/*
proc print data = combo2_k_SC; run;
*

* prevent results from being printed;
ods results off;

* macro to do "combo" variable selection
   Expanded = uses list of possible variables
   FFSupportComponents = Uses components of FFSupport instead of
   composite variable;
%MACRO ComboExpandedFFSupportComponents(sizes=, data=, imputeStart=, imputeEnd=) ;

* select starting and ending model sizes for best subset selection;
proc sql noprint;
   select k_start into: kstart
   from &sizes;
quilt;
proc sql noprint;
   select k_end into: kend
   from &sizes;
quilt;
proc sql noprint;
   select max(_imputation_) into: m
   from &data;
quilt;
%let numImputations=(1 + &imputeEnd - &imputeStart);
%do j=&imputeStart %to &imputeEnd;

* conduct best subset selection for those model sizes;
proc logistic data = &data (where = (_imputation_ = &j));
      model reenroll(event='1') = GPA AGE Branch Begin GPA Age Status
          Gender Race HSCOLL ACTIVE DEPLOYMENTS WORK MARRIED CHILDREN
          CARE FriendsSupport FamilySupport FamilyApprove FamilyEncourage
          SS11I SS21I SS31I SS41I SS51I SS61I SS7I SS81I SS9I SS101I SS111I SS121I
          SS13I SS14I
         / selection = score start = &kstart stop = &kend;
      ods output BestSubsets=Best_Subsets;
*ods output parameterestimates = logparmsMI;
run;
*/
proc sql noprint;
    select (nobs - delobs) into: num
    from dictionary.tables
    where libname = 'WORK'
    and memname = "BEST_SUBSETS";
%let num=&num;
quit;

* for a given imputation number, extract all possible subsets and fit logistic regression using all possible variables ;
%do i=1 %to &num;
    data _null_; 
    set Best_Subsets;
    if _N_ = &i;
    call symput('list', VariablesInModel);
    run;

* fit logistic regression model using the select covariates;
proc logistic data = &data (where = (_imputation_ = &j));
    model reenroll(event='1') = &list;
    ods output FitStatistics = bestSubsetFit_&i;
run;

* delete log likelihood statistic;
data bestSubsetFit_&i;
    set bestSubsetFit_&i;
    if Criterion='\-2 Log L' then delete;
run;
%end;

* combine the fit statistics together;
data bestSubsetFit_All;
    set bestSubsetFit_1;
run;
%do i=2 %to &num;
    proc append base = bestSubsetFit_All data = bestSubsetFit_&i;
    run;
%end;

* find min SC among all possible subsets;
proc sql;
    create table bestSubsetFit_minSC as
    select *
    min(InterceptAndCovariates) as minSC format = 8.3
    from bestSubsetFit_All (where = (Criterion='SC'))
    quit;

* merge subsets dataset with fit statistics;
data bestSubsetVariablesAndFit;
merge
  Best_Subsets (drop = control_var NumberOfVariables ScoreChiSq)
  
  bestSubsetFit_minSC (drop = Criterion InterceptOnly);
run;

* find covariate corresponding to min. SC value;
data bestSubsetVariables_&j;
  set bestSubsetVariablesAndFit;
  if InterceptAndCovariates = minSC;
run;
%end;

* combine selected variables together;
data bestSubsetVariables_All;
  set bestSubsetVariables_&imputeStart;
run;
%do i=(&imputeStart+1) %to &imputeEnd;
  proc append base = bestSubsetVariables_All data = bestSubsetVariables_&i;
run;
%end;

*** split strings and convert to long format;

* split names of selected variables;
data bestSubsetVariables_AllWide;
  set bestSubsetVariables_All;
  x1 = scan(VariablesInModel, 1, ' ');
  x2 = scan(VariablesInModel, 2, ' ');
  x3 = scan(VariablesInModel, 3, ' ');
  x4 = scan(VariablesInModel, 4, ' ');
  x5 = scan(VariablesInModel, 5, ' ');
  x6 = scan(VariablesInModel, 6, ' ');
  x7 = scan(VariablesInModel, 7, ' ');
  x8 = scan(VariablesInModel, 8, ' ');
  x9 = scan(VariablesInModel, 9, ' ');
run;

* convert to long format;
data bestSubsetVariables_AllLong;
  set bestSubsetVariables_AllWide;
  array xvars[9] x1-x9;
  do i=1 to 9;
    Variable = xvars[i]; observation = i; output;
  end;
run;
* remove blank observations and unneeded variables;
data bestSubsetVariables_AllLong;
   set bestSubsetVariables_AllLong (drop = x1-x9 i);
   if Variable = '' then delete;
run;

*** summarize which variables were selected ;
* determine how many times each variable was selected;
proc freq data = bestSubsetVariables_AllLong;
   tables Variable / out = bestSubsetVariables;
run;

* calculate percents;
data bestSubsetVarsFFSupportComp;
   set bestSubsetVariables;
   *if Variable = 'Intercept' then delete;
   PERCENT = (COUNT/&numImputations)*100;
   if PERCENT < 50 then delete;
run;

%MEND;

* use macro to extract variables identify by combo procedure;
%ComboExpandedFFSupportComponents(sizes=combo2_k_SC,
data=multipleImputationClean, imputeStart=1, imputeEnd=40);

* save the rest of the output to html;
ods html path ="output\round2" file = "multipleImputationClean_ComboExpanded_FFSupportComponents.htm";

* Final Estimation using selected variables;
title1 'Logistic Regression - Combo Variable Selection - Final Estimation';
title2 'Expanded Variables - FFSupport Components';
%MISELECT(bestSubsetVarsFFSupportComp);

* calculate averages for model output of interest;
%MISELECTAVERAGES

* close ods for saving output to html;
ods _all_ close;
ods html;
ods results on;
Appendix O

SAS Macros for Performing Variable Selection

* macro for using selected variables on imputed datasets for final estimates;
%MACRO MISELECT(Variables);

%let varlist =;
data _null_; set &Variables;
call symput('varlist',trim(resolve('&varlist'))||' '||trim(Variable)); run;
%put &varlist;

proc logistic data = multipleImputationClean;
  by _imputation_;
  model reenroll(event='1') = &varlist;
  ods output parameterestimates = parmsMISELECT;
  ods output fitstatistics = fitstatsMISELECT;
  ods output OddsRatios = orMISELECT;
  ods output GlobalTests = globalMISELECT;
run;
%MEND;

* macro for using output from MISELECT and averages over imputation number;
%MACRO MISELECTAVERAGES;

*** global hypothesis tests ***;
* sort datasets by variable of interest;
proc sort data = globalMISELECT;
  by Test;
run;

* calculate means over imputation number;
proc means data = globalMISELECT noprint;
  by Test;
  var ChiSq DF ProbChiSq;
  output out = globalAverages(drop=_FREQ_ _TYPE_) mean = /autoname;
run;

* print averages;
title 'Global Tests (Averaged over imputation number)';
proc print data = globalAverages; run;
*** fit statistics (-2 Log L, AIC, SC) ***;
* sort datasets by variable of interest;
proc sort data = fitstatsMISELECT;
   by Criterion;
run;

* calculate means over imputation number;
proc means data = fitstatsMISELECT noprint;
   by Criterion;
   var InterceptAndCovariates;
   output out = fitstatsAverages(drop=_FREQ_ _TYPE_)  mean = Average;
run;

* print averages;
title 'Fit Statistics (Averaged over imputation number)';
proc print data = fitstatsAverages; run;

*** odds ratios ***;
* sort datasets by variable of interest;
proc sort data = orMISELECT;
   by Effect;
run;

* calculate means over imputation number;
proc means data = orMISELECT noprint;
   by Effect;
   var OddsRatioEst LowerCL UpperCL;
   output out = ORAverages(drop=_FREQ_ _TYPE_)  mean = /autoname;
run;

* print averages;
title 'Odds Ratios (Averaged over imputation number)';
proc print data = ORAverages; run;
%MEND;
Appendix P

SAS Commands to Calculate Summary Statistics for Multiple Imputation Dataset

* load data file;
PROC IMPORT OUT= WORK.multipleImputationClean
   DATAFILE= "multipleImputationClean.csv"
   DBMS=CSV REPLACE;
   GETNAMES=YES;
   DATAROW=2;
RUN;

*** Means ***;
* calculate means for each imputated dataset;
proc means data = multipleImputationClean noprint;
   by _Imputation_;
   var Age; *** specify variables of interest ***;
   output out = averagesByImputation(drop= _TYPE_) mean = stddev = min
   = max = /autoname;
run;

* average across imputation numbers;
proc means data = averagesByImputation noprint;
   output out = averagesAcrossImputation(drop= _FREQ_ _Imputation__Mean
   _TYPE_) mean = /autoname;
run;

* print averages;
title1 'Multiple Imputation Averages';
title2 'Averages Across Imputations';
proc print data = averagesAcrossImputation; run;

*** Frequencies ***;
* calculate frequencies (counts) and percents for each imputated dataset;
proc freq data = multipleImputationClean noprint;
   by _Imputation_;
   tables Gender / out = frequenciesByImputation; *** specify variables
   of interest ***;
run;

* sort by variables of interest;
proc sort data = frequenciesByImputation;
   by Gender; *** specify variables of interest ***;
run;

* average across imputation numbers;
proc means data = frequenciesByImputation;
   by Gender; *** specify variables of interest ***;
output out = frequenciesAcrossImputation(drop= _FREQ_ _Imputation__Mean _TYPE_ ) mean = /autoname;
run;

* print averages;
title1 'Multiple Imputation Frequencies';
title2 'Averages Across Imputations';
proc print data = frequenciesAcrossImputation; run;
Appendix Q

SAS Commands to Create Logistic Regression Report for the Study’s Original Model

* load data file;
PROC IMPORT OUT= WORK.multipleImputationClean
   DATAFILE= "multipleImputationClean.csv"
   DBMS=CSV REPLACE;
   GETNAMES=YES;
   DATAROW=2;
RUN;

/*
title 'Cleaned Multiple Imputation Dataset';
proc print data = multipleImputationClean (obs=30); run;
*/

*******************************************************;
**** Logistic Regression Results using Study’s Model ****;
*******************************************************;

* fit logistic regression on each imputed dataset;
title1 'Logistic Regression - Full Model - Janice Variables - FSupport';
proc logistic data = multipleImputationClean;
   by _imputation_;
   model reenroll(event='1') = GPA AGE STATUS GENDER RACE HSCOLL ACTIVE DEPLOYMENTS
      WORK MARRIED CHILDREN CARE FFSupport
      SS4I SS5I SS8I SS10I SS12I SS14I / rsquare;
   ods output parameterestimates = parmsMISELECT;
   ods output fitstatistics = fitstatsMISELECT;
   ods output OddsRatios = orMISELECT;
   ods output GlobalTests = globalMISELECT;
   ods output RSquare = rsquareMISELECT;
RUN;

*** combine results from imputed datasets ***;

** parameter estimates **;
proc mianalyze parms=parmsMISELECT;
   modeleffects intercept GPA AGE STATUS GENDER RACE HSCOLL ACTIVE DEPLOYMENTS
      WORK MARRIED CHILDREN CARE FFSupport
      SS4I SS5I SS8I SS10I SS12I SS14I;
RUN;

** global hypothesis tests **;
* sort datasets by variable of interest;
proc sort data = globalMISELECT;
   by Test;
run;
* calculate means over imputation number;
proc means data = globalMISELECT noprint;
  by Test;
  var ChiSq DF ProbChiSq;
  output out = globalAverages(drop=_FREQ_ _TYPE_) mean = /autoname;
run;

* print averages;
title 'Global Tests (Averaged over imputation number)';
proc print data = globalAverages; run;

** fit statistics (-2 Log L, AIC, SC)**;
* sort datasets by variable of interest;
proc sort data = fitstatsMISELECT;
  by Criterion;
run;

* calculate means over imputation number;
proc means data = fitstatsMISELECT noprint;
  by Criterion;
  var InterceptAndCovariates;
  output out = fitstatsAverages(drop=_FREQ_ _TYPE_) mean = Average;
run;

* print averages;
title 'Fit Statistics (Averaged over imputation number)';
proc print data = fitstatsAverages; run;

** odds ratios **;
* sort datasets by variable of interest;
proc sort data = orMISELECT;
  by Effect;
run;

* calculate means over imputation number;
proc means data = orMISELECT noprint;
  by Effect;
  var OddsRatioEst LowerCL UpperCL;
  output out = ORAverages(drop=_FREQ_ _TYPE_) mean = /autoname;
run;

* print averages;
title 'Odds Ratios(Averaged over imputation number)';
proc print data = ORAverages; run;

** pseudo R-squared **;
* calculate means over imputation number;
proc means data = rsquareMISELECT noprint;
    var nValue1; * corresponds to the pseudo R-square;
    output out = RsquareAverages(drop=_FREQ_ _TYPE_) mean = Average;
run;

title 'pseudo R-squared (Averaged over imputation number)';
proc print data = RsquareAverages; run;

ods _all_ close;
ods html path="%sysfunc(pathname(WORK))";
## Logistic Regression Report for the Study’s Original Model

The MIANALYZE Procedure

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pseudo R-squared (Averaged over imputation number)

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Appendix S

SAS Commands to Create Logistic Regression Report for the Study’s Revised Model

* load imputed data file;
PROC IMPORT OUT= WORK.multipleImputationClean
    DATAFILE= "multipleImputationClean.csv"
    DBMS=CSV REPLACE;
GETNAMES=YES;
DATAROW=2;
RUN;

/*
title 'Cleaned Multiple Imputation Dataset';
proc print data = multipleImputationClean (obs=30); run;
*/

*******************************************************;
**** Logistic Regression Results using Expanded Model ****;
*******************************************************;

* fit logistic regression on each imputed dataset;
title1 'Logistic Regression - Full Model - Janice Variables - FFsupport';
proc logistic data = multipleImputationClean;
    by _imputation_; 
    model reenroll(event='1') = GPA AGE STATUS GENDER RACE HSCOLL ACTIVE
        DEPLOYMENTS
        WORK MARRIED CHILDREN CARE FFSupport
        SS1I SS2I SS3I SS4I SS5I SS6I SS7I SS8I SS9I SS10I SS11I SS12I
        SS13I SS14I / rsquare;
    ods output parameterestimates = parmsMISELECT;
    ods output fitstatistics = fitstatsMISELECT;
    ods output OddsRatios = orMISELECT;
    ods output GlobalTests = globalMISELECT;
    ods output RSquare = rsquareMISELECT;
run;

*** combine results from imputed datasets ***;

** parameter estimates **;
proc mianalyze parms=parmsMISELECT;
    modeleffects intercept GPA AGE STATUS GENDER RACE HSCOLL ACTIVE
        DEPLOYMENTS
        WORK MARRIED CHILDREN CARE FFSupport
        SS1I SS2I SS3I SS4I SS5I SS6I SS7I SS8I SS9I SS10I SS11I SS12I
        SS13I SS14I;
run;
** global hypothesis tests **;
* sort datasets by variable of interest;
proc sort data = globalMISELECT;
   by Test;
run;

* calculate means over imputation number;
proc means data = globalMISELECT noprint;
   by Test;
   var ChiSq DF ProbChiSq;
   output out = globalAverages(drop=_FREQ_ _TYPE_) mean = /autoname;
run;

* print averages;
title 'Global Tests (Averaged over imputation number)';
proc print data = globalAverages; run;

** fit statistics (-2 Log L, AIC, SC) **;
* sort datasets by variable of interest;
proc sort data = fitstatsMISELECT;
   by Criterion;
run;

* calculate means over imputation number;
proc means data = fitstatsMISELECT noprint;
   by Criterion;
   var InterceptAndCovariates;
   output out = fitstatsAverages(drop=_FREQ_ _TYPE_) mean = Average;
run;

* print averages;
title 'Fit Statistics (Averaged over imputation number)';
proc print data = fitstatsAverages; run;

** odds ratios **;
* sort datasets by variable of interest;
proc sort data = orMISELECT;
   by Effect;
run;

* calculate means over imputation number;
proc means data = orMISELECT noprint;
   by Effect;
   var OddsRatioEst LowerCL UpperCL;
   output out = ORAverages(drop=_FREQ_ _TYPE_) mean = /autoname;
run;

* print averages;
title 'Odds Ratios(Averaged over imputation number)';
proc print data = ORAverages; run;
** pseudo R-squared **;
* calculate means over imputation number;
proc means data = rsquareMISELECT noprint;
  var nValue1; * corresponds to the pseudo R-square;
  output out = RsquareAverages(drop=_FREQ_ _TYPE_) mean = Average;
run;

title 'pseudo R-squared (Averaged over imputation number)';
proc print data = RsquareAverages; run;

ods _all_ close;
ods html path="%sysfunc(pathname(WORK))";
Appendix T

Logistic Regression Report for the Study’s Revised Model

### Logistic Regression - Expanded Model

The MIANALYZE Procedure

#### Model Information

**PARMS Data Set**  WORK.PARMSMISELECT

**Number of Imputations**  40

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