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Obstacles Facing Veterans in Applied Sciences Programs at the Community College Level

Alexander B. Neeley
Lindenwood University

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by:

Alexander B. Neeley

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at the Community College Level

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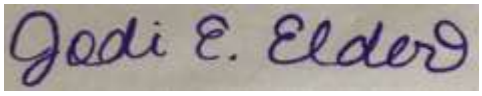

Dr. Jodi Elder, Dissertation Chair — 10/13/2017 Date

Dr. Roger "Mitch" Nasser Jr., Committee Member — 10/16/2017 Date

Dr. Randy Caffey, Committee Member — 10/16/2017 Date

Declaration of Originality

I do hereby declare and attest to the fact that this is an original study based solely upon my own scholarly work at Lindenwood University and that I have not submitted it for any other college or university course or degree.

Full Legal Name: Alexander Borjon Neeley

Signature  Date 09/15/2017

Abstract

The purpose of this study was to determine the presence (or absence) of barriers that hindered the ability of veteran student populations in completing degrees in the applied sciences field. Furthermore, in this study, the researcher sought to identify and to understand any detected barriers. The researcher examined the academic performances of veterans and non-veterans in the environmental science program at a Missouri community college. This study focused on collecting supplemental sources and gathering additional research on veterans pursuing applied science degrees. The researcher analyzed quantitative metrics and qualitative data, as well as compared personal responses from students to determine the leading perceived barriers and, conversely, the strategies most commonly employed to assist veterans in completion of the degree program. Additionally, the researcher compared academic performances of veteran and non-veteran students across multiple categories. The data indicated veteran students performed as well as non-veteran students, overall. However, some factors, such as educational background and military occupational specialties, had a favorable effect on veteran student retention and achievement rates. Based on the data presented, the researcher recommended a future longitudinal study investigating veteran resource center services and the academic performances of the veteran students who utilized them. Findings from such a study would provide valuable information regarding the effectiveness of the veteran resource centers and their ability to help veteran students transition to higher education.

Acknowledgements

The completion of my Doctoral Dissertation in Education was a path I never thought I would take after graduating from Southern Illinois University-Edwardsville with a Master's Degree in Toxicology. To be honest, I never envisioned myself working in the education field at all until my recent positions. That said, there are some people that I would like to thank. First, I would like to thank Dr. Jodi Elder, Dr. Randy Caffey, and Dr. Mitch Nasser for comprising my committee and all the guidance you have provided me to reach this point. I have grown a great deal professionally because of this process and have learned by example the attributes of a great administrator.

Second, I would like to thank the late Dr. Kevin Johnson for believing in me when I was a graduate student without direction. Dr. Johnson provided knowledge and guidance during my graduate school tenure. Admittedly, he was the first person to teach me self-reliance, ownership, and accountability. He taught me that life gets hard sometimes, and you can either quit or force yourself to be successful. He encouraged me to figure problems out independently, and, in turn, I gained greater knowledge and confidence. Finally, I'd like to thank my family, Dave, Inez, and Shanna, whose sacrifices helped me realize my goals.

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Chapter One: Introduction

Between 2000 and 2012, more than 900,000 veterans and service members received some form of educational benefits through the United States Department of Veterans Affairs (VA) (National Conference of State Legislatures, 2014). Since its inception, the VA has provided eligible veterans and service members with education benefits through a variety of funding programs (National Conference of State Legislatures, 2014). Legislators passed the Veterans Educational Assistance Act (VEAA) of 2008 to appropriate funds so veterans received education benefits for enrollment in higher education institutions, thus enhancing job prospects, expanding knowledge, achieving career goals, and facilitating transition to civilian life (López, Springer, & Nelson, 2016). The VEAA was further strengthened by the amended Post-9/11 GI Bill in 2009, which allowed for more than 955,000 eligible veterans to receive up to 36 months of financial aid for tuition and fees at authorized schools (López et al., 2016). In addition, the Department of Defense's Voluntary Education Program reported more than 400,000 active duty service members had taken advantage of educational assistance programs, including tuition assistance, and were currently enrolled in higher education institutions (Olsen, Badger, & McCuddy, 2014). Concurrently, administrators in institutions across the country contributed to the concerted effort to address the growing veteran population by expanding support programs and services specific to veterans (López et al., 2016).

The use of educational benefits to pursue collegiate-level degrees has become a more attractive option for service members in the coming years due to military downsizing and a reduction in the number of forces conducting contingency operations

(Olsen et al., 2014). This nontraditional student population has entered higher education with different life experiences compared to their traditional student counterparts, which has both enriched the veteran students' college experiences and created challenges during veterans' transitions and retention in programs of study (Olsen et al., 2014). In 2012, more than five percent of all United States postsecondary students were veterans or currently serving in the military with 43% of this student population attending community colleges (Ahern, Foster, & Head, 2015). In 2015, more than one million military personnel and veterans attended postsecondary education institutions (Ahern et al., 2015); however, this enrollment only represented about one-third of the total eligible veterans between the ages of 18 to 40 (Ahern et al., 2015). Ahern et al. (2015) added the difficulty in determining specific barriers that prevented eligible veterans from accessing postsecondary education, but some were likely commonplace. For example, student veterans were likely to be older than traditional college students and more likely to have had external obligations, such as being married and/or raising children (DiRamio, Jarvis, Iverson, Seher, & Anderson, 2015). While in many respects, student veterans were similar to other nontraditional students, they have encountered unique challenges that set them apart (DiRamio et al., 2015). These complications also have made it more difficult for student veterans to adequately engage with campus services and successfully complete the intended area of study (DiRamio et al., 2015).

Conceptual Framework

The conceptual framework used in this study was Bolman and Deal's Structural Framework (Bolman & Deal, 2013). Bolman and Deal's (2013) Four-Frame Model facilitated a comprehensive approach to diagnosing organizational needs, identifying

institutional challenges and contexts, and devising appropriate actions. A combination of these four perspectives often has been warranted when implementing a change initiative in organization (McLeod, 2007). McLeod (2007) added, changing institutional structures works best when goals are clear, cause-and-effect relationships are well understood, and there is little conflict, uncertainty, or ambiguity. Structural leadership was defined as changes using an approach focused on structural elements within the organization as well as strategy, implementation, and adaptation (Bolman & Deal, 2013). Structural leadership was shown in the development of courses, hiring of instructors, and program implementation (McLeod, 2007).

Another theoretical framework applied to this study centered around Schlossberg's Transition Theory, a theoretical framework typically used to understand the main aspects the individuals' experiences during transitions (Anderson, Goodman, & Schlossberg, 2012). This transitional model provided decision-makers the abilities to understand individual student needs through an approach of predicting, measuring, and modifying reactions to change (Anderson et al., 2012). Examples of specific transitions of the Schlossberg's Transition Theory ranged from change in employment, death of a loved one, a marriage, transition to a new city, or the entrance or exit from educational institutions (Pellegrino & Hoggan, 2015). Lazarowicz (2015) explained, "There are two levels of appraisals involved for the individual in transition: the primary is how (s)he feels about the transition in general; and the secondary is how (s)he feels about their resources in dealing with the transition" (p. 13). Four major factors were identified by Schlossberg, which were believed to influence a person's ability to cope with transitions,

which are commonly known as the four—S's: a) situation, self, support, and strategies (Anderson et al., 2012).

Situation. As described by Powers (2010), situation was explained as the idea of how the individual in question perceives the transition. Was the timing of the change expected or unexpected in their life? Was the changed viewed as voluntary?
Was the change viewed as a negative or positive and was it permanent or temporary? Were there any other sources of stress for the individual? Who did the individual view as responsible for the change?

Self. As described by Powers (2010), self was defined as the strengths and weaknesses individuals had that led them into the transitions. What previous situation or experience did the individuals have that related to their current situations? Did the individuals feel they had options or control of the situation? Did the individuals' egos or personal outlook on life come into play?

Support. As described by Powers (2010), support was explained as types of support available to the person undergoing a transition. These sources ranged from family members, neighbors, coworkers, partners or spouses, or organizations (Powers, 2010). However, not all support services were noted as positive. Some sources may have provided the individual needs, or they also became distractions to the individuals undergoing transitions (Powers, 2010).

Strategies. As described by Powers (2010), strategies involved practices, such as employing coping strategies to the transitions. Did individuals modify the situations in their minds? Did individuals change the meaning of the problems? Did the individuals control their emotions when dealing with the stress of the transitions?

Purpose of the Study

In 2011, the U.S. Department of Labor initiated the Trade Adjustment Assistance Community College and Career Training (TAACCCT) program which allocated grants to community colleges in an effort to promote programs of study in growing technical fields (U.S. Department of Labor, 2017). As part of the grant requirements, community colleges were required to create technical programs focusing on serving underrepresented populations such as: a) underemployed, b) unemployed, c) low-skilled, d) Trade Adjusted Assistance, and e) veterans (U.S. Department of Labor, 2017). Since 2013, the TAACCCT program has been a nationwide program providing $1.9 billion dollars over four years through 256 different grants impacting 60% of the nation's publicly-funded community colleges (U.S. Department of Labor, 2017). The goal of the TAACCCT program was to help community colleges address the needs of the current workforce by creating industry-aligned programs in manufacturing, healthcare, information technology, energy, transportation and other industries while providing opportunities to underrepresented populations (U.S. Department of Labor, 2017).

With the assistance of the TAACCCT program, community colleges have created more than 2,600 new programs to help underrepresented populations gain the skills to improve job prospects (U.S. Department of Labor, 2017). The newly created programs are aligned to regional job needs and created to allow students to complete industry-recognized credentials more quickly (U.S. Department of Labor, 2017). To complete this task, colleges receiving grant funds were required to create innovative programs implanting techniques such as hybrid practical lectures, prior service credits, online courses, and inclusive advising (U.S. Department of Labor, 2017). As part of the grant,

any curriculum created for these programs must be made available to any other institution for reference through the SkillsCommons.org training providers (U.S. Department of Labor, 2017). Through these actions, the U.S. Department of Labor (DOL) aimed to help improve higher education institutions and provide underrepresented populations the skills to succeed in and ever evolving job market (U.S. Department of Labor, 2017).

Overall, the purpose of this study was to understand if there were barriers to the veteran student populations which significantly impacted the ability to complete degrees in the applied sciences field at the community college level. Jones (2017) emphasized that most military veterans were not adequately examined for psychological or physical well-being following their post 9/11 experiences. Current studies on veterans' transitions to higher education have been inadequate and centered on four-year colleges and universities, resulting in higher education administrators not having the needed information to truly help the veteran student population (Jones, 2017). Furthermore, most research has been centered on the transition process and the associated psychological issues when returning to education, not the specific issues/barriers when attempting to enter education in applied sciences at the community college level (Jones, 2017). This study was focused on collecting more research on veterans pursuing college degrees.

Research Questions and Hypothesis

Research Question 1: Do veteran participants perform as well academically as non-veteran students completing degrees in applied sciences at the community college level?

Research Question 2: Did the following factors affect veteran retention and achievement rates in the environmental science program at the community college level?

a) Military Occupational Specialty (MOS)

b) Disabled Veteran Status

c) Educational background prior to joining the environmental science program

d) Gender

Research Question 3: What obstacles did veterans face in an applied science program at the community college level and what strategies did they employ to overcome the particular barriers?

Hypothesis 1: Veterans will perform as well academically as non-veteran students completing applied sciences degrees.

Hypothesis 2: There is a relationship between certain veterans' MOS and the retention and achievement rates in the environmental science program.

Hypothesis 3: There is a relationship between certain veterans' disabled statues and the retention and achievement rates in the environmental science program.

Hypothesis 4: There is a relationship between participant previous education and the retention and achievement rates in the environmental science program.

Hypothesis 5: There is not a similarity in the retention and achievement rates in the environmental science program between genders.

Hypothesis 6: There are no major obstacles facing veterans in applied science programs at the community college level.

Hypothesis 7: There are no common strategies employed by veteran students in applied science programs at the community college level to overcome perceived barriers.

Limitations

The researcher selected a mixed-method approach to gain an understanding of the veteran student's experience and barriers entering an applied science degree compared to the experience of nonveteran students. The limitations of this study included the following: a) researcher bias, b) reliance of secondary science, c) total veteran participants, d) total completers of the program, and e) completers possibly not finishing their exit interview/surveys.

Reflexivity was defined as the constant process of review by a researcher of their personal values, behavior, presence, or preconceptions and the individuals of the study which can affect the interpretation of responses (Jootun, McGhee, & Marland, 2009). Beginning from the interpretation of a study, reflexivity was considerably present in qualitative research, where it was used to validate and legitimize research (Mortari, 2015). Reflexivity was considered one of the most important aspects of qualitative research due to the amount of influence a researcher can place intentionally or unintentionally on the results (Jootun et al., 2009). This process required the researcher to understand they are part of the social world they intend to study (Jootun et al., 2009). Reflexivity, invoked in almost every qualitative research work, was conceived as a practice that a researcher should carry out to make the politics of research transparent (Mortari, 2015). Due to the nature of qualitative research, this study was subject to reflexivity, and while the researcher attempted to eliminate any reflexivity throughout the data collection and analysis, the possibility for reflexivity was noted.

For data collection purposes, the researcher was provided secondary data from an associated community college, which included a combination of the Entrance Survey (see

Appendix A), TAACCCT Round Three Intake Form (see Appendix B), Data Collection Form (see Appendix C), and Career Education Plan (see Appendix D), materials were completed during entrance, after semester, and exit interview sessions.

Definition of Key Terms

American Council on Education (ACE). The American Council on Education (ACE) was defined as the organization which coordinated the United States higher education institutions (American Council on Education, 2017). This organization, which was responsible for the creation of the military's transfer credit system, represented all types of United States accredited, degree-granting institutions (American Council on Education, 2017). Using the ACE systems, institutions can evaluate service members' JSTs for college credit equivalencies (American Council on Education, 2017).

Academic Achievement. Academic achievement was defined as the process of students achieving satisfactory or superior levels of academic performance as they complete their program of study during their college experience (Cuseo, 2012).

Comorbidity. Comorbidity was defined as two or more diseases or disorders occurring in the same individual, either at the same time or one after the other usually resulting in the illnesses interacting and worsening the symptoms of both (National Institute of Drug Abuse, 2017).

Consumer Price Index (CPI). The Consumer Price Index (CPI) was defined as the weighted average of the cost of consumer good services used for adjusting cost of living and assessing inflation and deflation of the market (Consumer Price Index, 2017). The CPI is calculated by taking the average of the price changes of items from the

industry in question i.e. food (fruits, dry goods, and specialty items) (Consumer Price Index, 2017).

Department of Defense (DoD). The Department of Defense (DoD) was defined as a department of the executive branch of the federal government which was responsible for the creation and implementation of military polices (U.S. Department of Defense, 2017). The DoD has maintained United States military forces and was led by the Secretary of Defense (U.S. Department of Defense, 2017).

Gender. Gender was defined as the state of being male, female, or neutral (American Psychological Association, 2015). When in context of humans, the distinction was divided into two separate parameters, sex and gender (American Psychological Association, 2015).

Gender Identity. Gender identity was defined as how an individual self identifies as male or female (American Psychological Association, 2015). Gender Identity has included two approaches in psychology, one which stated gender identity resides in the individual, while the other suggested evidence supported that gender identity was influenced by both environmental and biological factors (American Psychological Association, 2015).

Joint Services Transcript (JST). A Joint Services Transcript (JST) was defined as a military transcript listing all the military coursework and occupations a service member has had which can equate to college credit (U.S. Department of Defense, 2017). The primary purpose of the JST is to aid a soldier in gaining college credit for the experience they gained while in the military (U.S. Department of Defense, 2017). The JST may be requested by the soldier as an official document to be sent to the desired

institution for use in the credential evaluation process (U.S. Department of Defense, 2017).

Low Skilled. A low skilled individual were defined as individuals who were not ready to enter introductory or 100 level college level courses (U.S. Department of Labor, 2017). Low skilled individuals typically score below the introductory level in one of the following areas: Applied Mathematics, Locating Information, and Reading for Information and begin their college careers in remedial courses to gain the necessary understanding to begin introductory courses (U.S. Department of Labor, 2017).

Military Dependent. Military dependents were defined as family members of active or former members of a uniformed service, are covered under the service members' benefits (Medical and Dental, 2017). Qualifying dependent categories were the following: a) spouses, b) unmarried widows, c) unmarried widowers, or d) child(ren) who were not 21 years of age, or a child in which has not been enrolled full time in a course of study by age 23 by the related service member's death, or person incapable of self-support because of a mental or physical incapacity (Medical and Dental, 2017).

Military Occupational Specialty (MOS). A Military Occupational Specialty (MOS) was defined as the duty or job a military member qualifies to perform based off individual training, prior experience, and skills (U.S. Army, 2017). In the U.S. Army, the MOS is a three-digit code indicating the service members' specialty (U.S. Army, 2017).

Montgomery GI Bill. The Montgomery GI Bill was a legislative act that allowed service members who had two years of active duty or three years of reserve time, the ability to receive educational benefits such as housing allowances and tuition payment (U.S Department of Veterans Affairs, 2017).

Post 9/11 GI Bill. The Post 9/11 GI Bill was an amendment to the Montgomery GI Bill after the events of 9/11 (Veterans Benefits Administration, 2017). Any service member who had served at least 90 days of active duty service after September 10, 2001, actively serving, or was honorably discharged due to service related disability, could receive the GI Bill benefits to advance the individual veteran's education (Veterans Benefits Administration, 2017).

Post-Traumatic Stress Disorder (PTSD). Post-traumatic stress disorder (PTSD) was defined as a mental health condition which can occur in people who have witnessed or experienced traumatic events (National Institute of Mental Health, 2017). The National Institute of Mental Health (2017) explained people suffering from PTSD can have symptoms triggered by everyday stimuli resulting in a fight or flight like response.

Student Retention. Student retention was defined as the process in which students enrolled, remained, and continued their college educations until completion (Cuseo, 2012).

Traumatic Brain Injury (TBI). A Traumatic Brain Injury (TBI) was defined as an injury which occurs from a blow or force to the head resulting in deficiencies in cognitive functions (The Mayo Clinic, 2014).

Underemployed. Underemployment was defined as an individual who is not employed in a position that is either full time, does not incorporate their training, or meet their needs financially (U.S. Department of Labor, 2017).

Veteran. A veteran was defined as a person who served in the active Army, Air Force, or Navy and who was discharged or released under conditions other than dishonorable (Veterans' Authority, 2017).

Summary

While studies on veterans' transitions to institutions of higher education have been completed, they have mainly focused on four-year institutions and the veterans' barriers associated with assimilating back into civilian life after military careers and or deployments (Jones, 2017). As stated earlier, Jones (2017) claimed most veteran studies following September 11, 2001 have experiences that have not been adequately examined and focused on the veterans' transition to four-year institutions and the associated barriers when making the transition back to civilian life. Therefore, the significance of this study was twofold—understanding if veteran students performed as well as nonveteran students in applied sciences fields and if there were any barriers that prevent veteran students from being successful in applied sciences at the community college level. By understanding these issues, community colleges administrators can better understand the needs of student veterans and barriers to the completion of applied science degree programs in higher education.

Chapter Two:

Literature Review

In the literature review, the researcher explored veteran education through recent years. A broad overview provided further insight into veteran education obstacles. In the first section, the researcher considered the history of community colleges and adult learning theory. In the second section, the researcher examined the history of veteran education. In the third section, the researcher elaborated on issues some veterans experienced while attending educational institutions. In the fourth section, the researcher explored institutions' actions or inactions to provide veterans support as they pursued college degrees.

Community College

Community colleges became an innovation to American education at the turn of the century because they provided opportunities for students to bridge the gap between high school and post-secondary education (Phillippe, Sullivan, & American Association of Community Colleges, 2005). In the early 1900s, students only achieved liberal arts educations by applying to private or public universities (Phillippe et al., 2005). However, the private and public institutions had two major issues, not having the capacity to accept and seat all the interested applicants and no technical programs to provide education for workers for emerging industries (Phillippe et al., 2005). These issues paired with the growing Science, Technology, Engineering, Mathematics (STEM) importance spurred the need to establish institutions, known as junior colleges, which could not only provide vocational and liberal arts education, but in an expedited timeframe of two years (Phillippe et al., 2005).

The idea of two-year institutions began to gather support and by 1910, five percent of American 18-year-olds were enrolling in colleges and universities, including the newly created junior colleges (Phillippe et al., 2005). This increase in enrollment led many states to establish two-year institutions, with California leading the way with 21 established public two-year institutions by 1921 (Phillippe et al., 2005). Now, more than 200 public institutions and 300 private two-year institutions have been created with the intention of providing vocational education and becoming a path for unemployed Americans to achieve an education and the skills needed for occupational changes (Ma & Baum, 2016). World War II brought another increase in community colleges' popularity (Phillippe et al., 2005). Due to the creation of the GI Bill, many soldiers were granted opportunities upon their return home and could take advantage of the educational benefits which allowed the soldiers to be retrained for reentry into civilian life (Ma & Baum, 2016). As a result of the increased enrollments, community colleges were able to grow and increase the number of vocational programs (Ma & Baum, 2016). In 1947, the Truman Commission further increased community colleges' roles in higher education, calling for a national network of community colleges to be established to provide universal access to postsecondary education for all Americans (Phillippe et al., 2005).

The idea of college as a cultural norm came about in the 1960s, with many parents feeling college was more a necessity rather than a luxury (Phillippe et al., 2005). This change in thinking, combined with the number of baby boomers reaching college age and educational deferments for fulltime students during the Vietnam War, resulted in one of the largest growths for community colleges in history (Phillippe et al., 2005). During this time, leaders realized the importance of two-year institutions, with more than 450 new

colleges opening and contributing to the 700 existing two-year institutions around the nation serving over one million students (Phillippe et al., 2005).

Today community colleges account for almost half of all student enrollments in higher education with 42% of the total undergraduate enrollments and 25% of all full-time undergraduate enrollments (Ma & Baum, 2016). The largest period of growth of community colleges during this century occurred between 2000-2010 when total community college enrollments increased from 5.7 million to 7.9 million (Ma & Baum, 2016).

Community College Enrollment

Community colleges in the United States experienced record enrollment growth of 15% during the recent Great Recession in 2009 (Hillman & Orians, 2013). According to the American Association of Community Colleges, the rapid loss of employment in the United States led many to enter community colleges resulting in rapid expansions in which many campuses exceeded their service capacity (Hillman & Orians, 2013). The reasons students are choosing to attend community colleges are very diverse (Hillman & Orians, 2013). From the lower cost, ease of access, technical training, proximity to home, flexibility and support services, community colleges provide a starting point to help navigate the way to larger institutions (Phillippe et al., 2005).

The students' goals while attending community college were just as wide ranging (Phillippe et al., 2005). While many students look to transfer to four-year institutions after completing two-year degrees, many look for technical career-focused degrees allowing entry into or becoming more competitive in the job market (Phillippe et al., 2005). Another growing area of community college enrollments come from students who

already hold degrees and newly arrived immigrants (Phillippe et al., 2005). Many degree-holding students are returning to community college. Whether individuals need to advance in current positions or are looking to change careers, community colleges provide the technical skills to achieve specific goals (Phillippe et al., 2005). Most new student immigrants attended community college to gain job skills and improve English-speaking skills (Phillippe et al., 2005). The ease of access and low cost were often the main contributing factors for the decision to attend community colleges (Phillippe et al., 2005). With the ability to provide skill assessments and admissions counseling during enrollment, it has become easier for a student to have a program of study designed to meet goals, as well as fit personal schedules (Phillippe et al., 2005). Many community college administrators have the added benefit of same-day or late enrollments, making the entry process easier as well (Phillippe et al., 2005).

Community colleges have become a more desirable educational destination for many students, due to their lower cost in comparison to four-year institutions and can be completed in a shorter amount of time (Hillman & Orians, 2013). Additionally, community colleges react to the local job market (Hillman & Orians, 2013). An example would be community college enrollments increasing as unemployment rates rise (Hillman & Orians, 2013). With many students personally funding their individual educations, working full or part time, and/or supporting a family, the cost of obtaining an education has been a major concern (Phillippe et al., 2005). The low cost of attendance combined with financial aid, has made obtaining a college education a reality for many low-income students and families and gives the ability to break the cycle of poverty (Phillippe et al., 2005). The reduced cost of community colleges also has affected the middle class

(Hillman & Orians, 2013). Attending community college provided the means for many families to reduce the total cost of education (Hillman & Orians, 2013). By attending community college for the first two years at a reduced cost and taking advantage of articulation agreements with four-year institutions, students have made the transition to four-year institutions much easier (Phillippe et al., 2005). Another added benefit of community colleges has been the proximity to students' homes (Phillippe et al., 2005). This allowed many students to avoid the residential expenses most institutions charge enabling family savings to go further (Phillippe et al., 2005).

Another added benefit of community colleges' ease of access has been the average ages of students. The average age of students attending community college students is 29 (Phillippe et al., 2005). The lower cost and proximity advantages allowed for many baby boomer generation students with families to attend (Phillippe et al., 2005). The female demographic also attributed to the higher average age of community college students (Phillippe et al., 2005). Since 1985, over half of all community college students have been female (Hillman & Orians, 2013). Most female community college students were single mothers, attended part time, and were in the age range of mid- to late 20s (Phillippe et al., 2005). With many support services, such as on-campus child care and tutoring, many female students have found community colleges nonthreatening environments that allowed more comfortable transition into college with a greater chance of academic success (Phillippe et al., 2005).

STEM Education and Attrition

In the United States, STEM education has become a national priority due to the United States' lower world rankings in science, math, and reading education (Chen,

2013). Recently released data from international math and science assessments proved the United States continues to rank behind many other advanced industrialized nations (Chen, 2013). DeSilver (2017) explained the Program for International Student Assessment (PISA) was one of the largest national tests measuring reading ability, math, and science literacy and skills of students 15 years of age in both developing and developed countries. This test has been performed every three years and the most recent 2015 results placed the United States 38th out of 71 countries in math and 24 out of 71 in science (DeSilver, 2017). To remedy this situation, United States lawmakers have decided to target STEM attrition rates in colleges, with the reasoning being that the process of retaining college students in STEM fields while attending college is relatively low cost and provides a faster way to produce STEM professionals that the nation needs (Chen, 2013).

In the 2003-2004 school year, it was found that 28% of bachelor's and 20% of associate's degree seekers entered a STEM field within six years of entering postsecondary education (Chen, 2013). Popularity amongst the fields also varied greatly. At the university level, biology and life sciences were the most popular majors at 11% of students (Chen, 2013). Physical sciences and mathematics were the least popular with three percent of students (Chen, 2013). The most popular STEM major at the associate degree level was computer science at nine percent with all other STEM fields ranging from one to six percent in popularity (Chen, 2013). Although one-third of freshmen expressed interest in STEM majors before starting college, actual STEM enrollment accounted for only 14% of all undergraduate enrollments in the United States in 2007-2008 (Chen, 2013).

A majority of students who enrolled in STEM degrees during this timeframe left the field by either leaving college without finishing or changing majors to non-STEM degrees. Forty-eight percent of students at the bachelor's level and 69% of students seeking STEM-related associate degrees from 2003 to 2009 left the fields by spring 2009 (Chen, 2013). Of the students exiting, nearly half left STEM fields and exited college before earning a degree or certificate, while the other half chose to pursue non-STEM majors (Chen, 2013). Although similar attrition rates were reported in other non-STEM majors, very little research has been done to compare STEM attrition to other non-STEM majors to determine relationships (Chen, 2013).

When reviewing attrition rates from non-STEM fields, the results were as high as or higher than those in STEM fields (Chen, 2013). At the bachelor's level, students in education, health sciences, and humanities majors had a higher attrition rate of 56 to 62% than did STEM majors at 48%, while business and behavioral science majors displayed similar attrition rates at 50 and 45% (Chen, 2013). To expand upon this, students who changed majors in non-STEM degree fields such as education 42% and health sciences 35% were higher than students in STEM majors at 28% (Chen, 2013).

Attrition at the associate's level for STEM majors was also significantly high at 69% and was in line with many non-stem majors (Chen, 2013). Humanities led non-STEM attrition rates at 72%, followed by education at 70%, business at 66%, and health sciences at 57% (Chen, 2013). In regard to student major degree changes, STEM majors led at 33% while business and health sciences, the only other high percentages, came in at 26% and 20% respectively (Chen, 2013).

STEM Attrition Factors

Chen (2013) initiated the idea that many possible factors could cause attrition of students participating in STEM majors. These factors were divided into three areas including: a) student factors, b) non-student factors, and c) non-student perceptions and are provided as possible contributions causing students to lose interest in STEM majors (Chen, 2013). The main contributing student factors were:

- **Underrepresented Populations:** Women, underrepresented minorities, first-generation students, and low-income students from low-income backgrounds leave STEM fields at higher rates than non-underrepresented counterparts.
- **Weaker Academic Backgrounds:** Students with weaker academic backgrounds leave STEM majors at a higher rate than others.
- **Length of Completion:** The time it takes to complete a STEM major is often longer than others.
- **Additional Factors:** Factors such as student motivation, confidence, and capacity to learn material (Chen, 2013).

The non-student factors stated by Chen (2013) were based on factors centering around course specific factors that could cause STEM major attrition. The non-student factors used to explain STEM attrition were:

- **Gatekeeper Courses:** Introductory classes in science and math which convey negative experiences and disinterest in STEM majors.
- **General Education Requirements:** Some degrees may require general education courses to enter STEM specializations within the first two years of college leading to disinterest in the field.

- **Poor Performances:** Students that do not perform well in STEM courses versus non-STEM courses could cause those students to make the decision to enter a major in which the students perform better (Chen, 2013).

The third potential source for STEM attrition centered around student perceptions. Chen (2013) wrote sources of negative perceptions could arise from inadequate academic advising and institutional support. Many students expressed feelings of isolation in STEM majors due to many of their peers pursuing non-STEM majors (Chen, 2013). Also, Chen (2013) said there has been an absence of role models or mentors to underrepresented populations in the field, especially for women and minorities, and a perceived discrimination based on gender or race in the STEM workforce. In combination, these factors have led to negative perceptions of the STEM field and contribute to the growing attrition rates at various times in a student's college career (Chen, 2013).

Environmental Science and Protection Technicians

The U.S. Bureau of Labor Statistics (2017) defined an environmental science and protection technician (ESPT) as someone who both tested and monitored the environment to identify and investigate sources of contamination and/or pollution that can affect public health and safety and prevent environmental violations. Environmental science and protection technicians typically worked under environmental scientists and program managers who direct the technician, review results, and ensure accuracy (U.S. Bureau of Labor Statistics, 2017). Environmental science and protection technicians typically have had a specialization in field sampling or laboratory testing and will work in conjunction with teams of scientists, program managers, and engineers to solve issues related to

contamination in the environment (U.S. Bureau of Labor Statistics, 2017). Environmental science and protection technicians have operated at various levels of industry (U.S. Bureau of Labor Statistics, 2017). At the local and state level, ESPTs typically were used to investigate business and public places for contamination related to air quality, water quality, and food safety (U.S. Bureau of Labor Statistics, 2017). Environmental science and protection technicians were also involved in performing and completing environmental impact studies on new construction projects to ensure environmental compliance or by evaluating the impact of abandoned sites that contaminate the environment (U.S. Bureau of Labor Statistics, 2017). At the consulting level, most ESPTs helped the monitoring process and in the development of cleanup plans of contaminated sites (U.S. Bureau of Labor Statistics, 2017). In Table 1, the researcher highlighted the starting salary, educational requirements, and job outlooks for these positions.

Table 1

Environmental Science and Protection Technician Facts

2016 Median Pay	$44,190 per year $21.25 per hour
Typical Entry-Level Education	Associate's Degree
Work Experience in a Related Occupation	None
On-the-Job Training	None
Number of Jobs, 2014	36,200
Job Outlook 2014-2024	9% faster than the national average
Employment Change, 2014-2024	3,400

Note. Data provided from U.S. Bureau of Labor Statistics (2017).

Environmental Science and Protection Technician Education

An associate's degree in environmental science or closely related field has been the typical requirement for ESPTs (U.S. Bureau of Labor Statistics, 2017). However, due to the wide range of tasks, industries, and environment an ESPT work in, some positions have required a bachelor's degree, while others required no post-secondary education (U.S. Bureau of Labor Statistics, 2017). In most cases, an ESPT has a background in natural sciences with an educational plan that follows the typical science curriculum

(U.S. Bureau of Labor Statistics, 2017). According to U.S. Bureau of Labor Statistics (2017), courses in biology, chemistry, physics, and occupational health were preferred.

Certain skills were also needed to be a successful ESPT (U.S. Bureau of Labor Statistics, 2017). According to the U.S. Bureau of Labor (2017), ESPTs consistently conducted a wide range of tests in the field and/or laboratory. These results were required to be accurate to ensure the technician does not provide a false result to a client or cooperation; therefore, analytical skills have been very important (U.S. Bureau of Labor Statistics, 2017). The ability to clearly communicate and to collaborate with various individuals make communication and interpersonal skills an important quality as well (U.S. Bureau of Labor Statistics, 2017). Due to the fact ESPTs were supervised, the individual must be able to not only work with superiors, but also take directions well and clearly communicate any results (U.S. Bureau of Labor Statistics, 2017).

With community colleges providing the program for environmental studies at a reduced cost and easier route of access, these institutions have become a reliable source for aspiring ESPTs to gain the necessary education to pursue this career field (U.S. Bureau of Labor Statistics, 2017). An added benefit of attending community colleges has been the ability to provide cooperative education programs and internships to provide aspiring ESPTs experience and a way into the industry (U.S. Bureau of Labor Statistics, 2017).

Environmental Science and Protection Technician Pay

As of May 2016, the median annual pay for an ESPT was $44,190 (U.S. Bureau of Labor Statistics, 2017). While the highest 10% earned $75,980 and the lowest 10% earned less than $27,380 (U.S. Bureau of Labor Statistics, 2017). Due to the fact many

ESPTs work outside in various climates, there is the potential that some are seasonal (U.S. Bureau of Labor Statistics, 2017). Travel many also play a factor if an ESPT must travel to meet a client or to a site to perform work which can lead to irregular hours (U.S. Bureau of Labor Statistics, 2017). In Table 2 and Figure 1, the researcher depicted the median pay for ESPTs in all fields in which the profession was employed in 2016, and in comparison, to other occupations with the same credentials (U.S. Bureau of Labor Statistics, 2017).

Table 2

Environmental Science and Protection Technician Median Pay per Industry

Industry	**Average Salary**
Local government, excluding education and hospitals	$47,340
Engineering services	$45,360
Management, scientific, and technical consulting services	$43,400
State government, excluding education and hospitals	$41,980
Testing laboratories	$37,130

Note. Data collected from U.S. Bureau of Labor Statistics (2017).

Environmental Science and Protection Technician Job Outlook

It is projected that, from 2014 to 2024 (see Figure 2), ESPTs employment will grow 9%, which has been predicted to increase faster than the average for all occupations in the United States (U.S. Bureau of Labor Statistics, 2017). Another large contributor to the ESPT job growth is the public interest in public health. With more people inhabiting the planet and the increase in urban sprawl, the public wants to ensure that the areas the communities are being built in are environmentally safe. In addition, many new opportunities will be expected to open as the public sees the baby boomer generation leave the work force (U.S. Bureau of Labor Statistics, 2017).

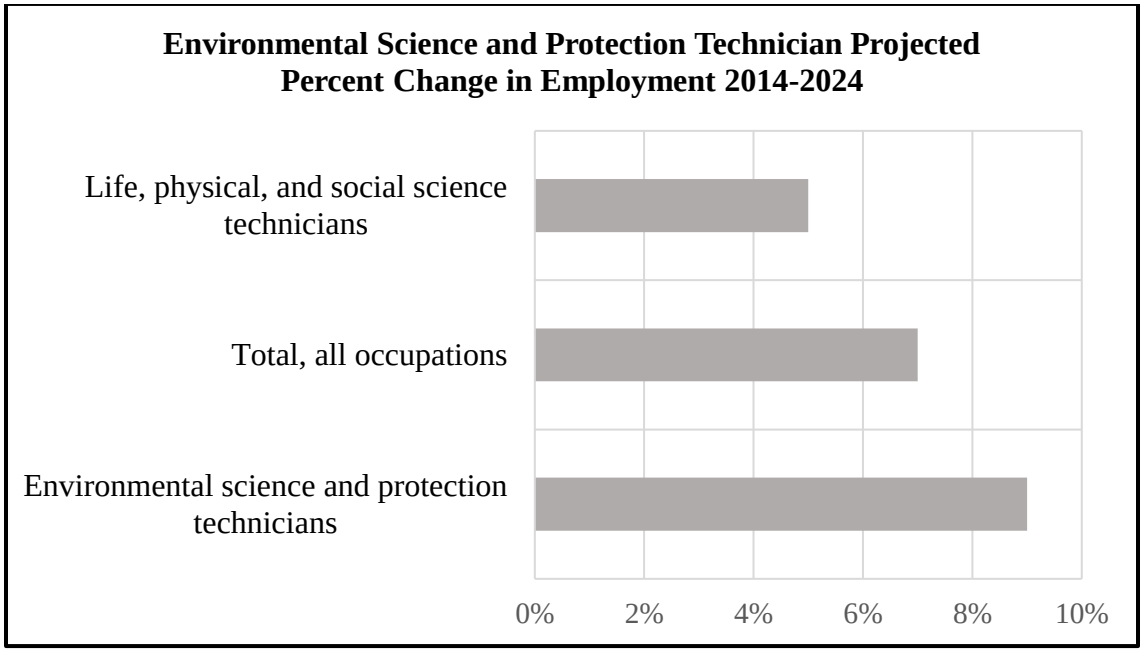

Figure 1. Environmental Science and Protection Technician Projected Job Outlook. Created as a supplemental explanation of employment change (U.S. Bureau of Labor Statistics, 2017).

History of Veteran Education

Veteran education became a United States issue following World War I (WWI) when veterans received a $60 payment and a ticket to return home after the war in 1918 (Bisk Education, 2017). Shortly after, the Great Depression began in 1929, resulting in many veterans having difficulty gaining employment and providing for families (Smiley, 2017). As a response, Congress attempted to intervene by passing the World War Adjusted Act of 1924, which by law provided a bonus based on the total amount of days served (Smiley, 2017). However, the law ended up not providing WWI veterans the intended compensations until 20 years later (U.S. Department of Veterans Affairs, 2012). This mistreatment of the WWI veterans led to a march on Washington, D.C., in 1932 to demand the payment of the promised bonuses (U.S. Department of Veterans Affairs, 2012). The veterans were eventually turned away after a standoff with United States troops and furthered the need for better treatment of veterans by the government (Bisk Education, 2017).

Following World War II (WWII), Congress members had another chance to redeem themselves from the mistakes of WWI (Clark, 2008). In 1944, Congress passed the Servicemen's Readjustment Act of 1944—commonly known as the GI Bill of Rights (Clark, 2008). The GI Bill was legislators' attempt to prevent another Great Depression and social crises and was referred to as one of the most significant pieces of legislation due to its impact on the economy, politics, and public relations (Bisk Education, 2017). However, the GI bill faced several detractors in Congress regarding the provisions of the bill (Bisk Education, 2017). Some Congress members felt the idea of providing payments to unemployed veterans at a rate of $20 a week was not wise as it would

diminish veteran's incentive to seek employment, while others questioned veteran's ability to assimilate into the college setting, which at the time was a privilege of the rich (U.S. Department of Veterans Affairs, 2012). Despite the detractors, all members of Congress agreed something needed to be done to help Veterans assimilate into civilian life (U.S. Department of Veterans Affairs, 2012).

To ensure the law was carried out, the Veterans Administration (VA) was tasked with ensuring veterans received the GI Bills incentives such as education, training, home and business loans, and unemployment pay if needed (U.S. Department of Veterans Affairs, 2012). By 1947, 49% of all higher education institution student admissions were veterans (U.S. Department of Veterans Affairs, 2012). By 1956, 7.8 million WWII veterans had entered higher education or received some sort of training due to the GI Bill (U.S. Department of Veterans Affairs, 2012). In addition to receiving help with education, veterans were provided aid to buy homes (Bisk Education, 2007). The Home Loan Guarantee benefitted millions of veterans from 1944 to 1952 (U.S. Department of Veterans Affairs, 2012).

During this time, the VA backed close to 2.4 million home loans for WWII veterans (U.S. Department of Veterans Affairs, 2012). However, while both educational and home loan benefits were embraced, very few collected unemployment benefits, the main concern of the critics of the GI Bill (U.S. Department of Veterans Affairs, 2012). By the end of the original GI Bill, less than 20% of funds set aside for veteran unemployment were used (U.S. Department of Veterans Affairs, 2012). In 1984, the GI Bill was reformed by Congressman Montgomery of Mississippi (Clark, 2017). The new bill gave veterans and active duty service members expanded educational financial

support and access to more training and educational institutions (Clark, 2017). These added provisions led the newly amended GI Bill to become known as the Montgomery GI Bill (MGIB) (GI Bill Break Pay, 2010). Under the MGIB, the Army, Air Force, Marine Corps, Navy, National Guard, and Reserves were required to provide educational support to any one person who has served three years of active, reserve, or National Guard duty or at least one tour of duty (Clark, 2008). As a requirement to receive MGIB benefits, new recruits agreed to have a small contribution to the MGIB deducted from each month's paycheck (GI Bill Break Pay, 2010).

Veterans using the MGIB were provided up to 36 months or three years of educational benefits to use for higher education, flight training, vocational courses, or technical training and could be used while actively serving or receiving an honorable discharge from the associated branch of service (GI Bill Break Pay, 2010). According to the GI Bill Break Pay (2010), the Consumer Price Index (CPI) is the bar the MGIB uses to adjust its benefits each year and the weighted average of the cost of consumer good services used for adjusting the cost of living and assessing inflation and deflation of the market. The CPI was calculated by taking the average of the price changes of items from the associated industry (GI Bill Break Pay, 2010).

In 2008, the GI Bill was updated once again, giving veterans with active duty service on, or after, September 11, 2001 (see Table 3) enhanced educational benefits which covered more educational expenses, provided a living allowance, provided money for books and the ability to transfer unused educational benefits to family members (U.S. Department of Veterans Affairs, 2012). In Table 4, the researcher displayed another post 9/11 change to the eligibility requirements and extended MGIB to veterans who served at

least 90 aggregate days on active duty after September 11, 2001, or were honorably discharged from active duty for a service-related disability after 30 continuous days of service following September 11, 2001 (O'Herrin, 2011). Since the passing of the Post 9/11 Amendment to the GI Bill, more than $23.6 billion has been paid to more than 860,000 active duty, veterans and dependent students since 2009 (Reynolds, 2013).

Table 3

GI Bill Qualification Chart

Post 9/11 Benefits Qualification Status							
Military Association	Tuition & Fees	Monthly Stipend	Book Stipend	Able to Transfer Benefits	Yellow Ribbon	Relocation Allowance	Licensing & Certification Exams
Active Duty	X			X			X
A Guard or Selected Reserve Member	X	X	X	X	X	X	X
Veteran	X	X	X		X	X	X
Spouse (Active Duty)	X						X
Spouse (Non-Active)	X	X	X		X		X
Dependent	X	X	X		X		

Note. Data collected from Qualification Chart (2017).

Table 4

Post-9/11 Service Chart

Post – 9/11 Service	% of Max Amount of Payable Benefits
At least 36 cumulative months (Include Entry Level and Skill Training Time)	100
At least 30 continuous days on active duty & discharged due to service conned disability (Include Entry Level and Skill Training Time)	100
At least 30 cumulative months (Include Entry Level and Skill Training Time)	90
At least 24 cumulative months (Cannot include Entry level or Skills Training Time)	80
At least 18 cumulative months (Cannot include Entry level or Skills Training Time)	70
At least 12 cumulative months (Cannot include Entry level or Skills Training Time)	60
At least six cumulative months (Cannot include Entry level or Skills Training Time)	50
90 Aggregate Days (Cannot include Entry level or Skills Training Time)	40

Note. Data provided by Veterans Benefits Administration (2017).

Military Occupation Specialty (MOS)

The United States' branches of military have assigned its soldiers specific occupations called a Military Occupational Specialty (MOS) (Military Occupational

Specialty, 2017). While both the U.S. Army and the Marine Corps have used the nine-character MOS code to detail the specific occupation of individual soldiers, other branches such as the Navy and Air Force, have used different MOS acronyms (AR 611-1 Military Occupational Classification Structure Development and Implementation, 1997). In the Navy, the Navy Enlisted Classification System (NEC) was used along with ratings and designators specific to the branch detailing a sailor's occupation (AR 611-1 Military Occupational Classification Structure Development and Implementation, 1997). In the Air Force, an airmen's MOS was categorized by the Air Force Specialty Codes (AFSC) (Military Occupational Specialty, 2017). A soldier's MOS system may also have been structured differently based on enlisted or commissioned officer status and the soldier's skill in a designated specialty (AR 611-1 Military Occupational Classification Structure Development and Implementation, 1997).

U.S. Army Enlisted Personnel MOS. Enlisted personnel's MOS included the nine-digit code to provide details on the specific job functions of an enlisted soldier for the purpose of reports and management systems (Military Occupational Specialty, 2017). The MOS also was used to identify a soldiers' active and reserve records, authorization documents, and retirement information. The specific elements of the MOS system were the following:

- Characters One through Three: These characters were the soldier's actual specialty. The first two chapters were numbers indicating the Career Management Field with the third always being a letter (AR 611-1 Military Occupational Classification Structure Development and Implementation, 1997).

- Character Four: This character represented the skill level, rank, and experience of the solider and was on a 0-6 scale (AR 611-1 Military Occupational Classification Structure Development and Implementation, 1997).
    - Zero: A zero identified a soldier currently in training for an individual MOS
    - One: A one was used to identify a Private through Specialist or Corporal
    - Two: A two identified a soldier as a Sergeant
    - Three: A three identified a soldier as Staff Sergeant
    - Four: A four identified a soldier as Sergeant First Class
    - Five: A five identified a soldier as Master Sergeant or First Sergeant
    - Six: A six identified a soldier as Sergeant Major or Command Sergeant Major
- Character Five: This character was a letter or number and considered a Special Qualification identifier. This character could have been a part of any MOS unless otherwise specified and any solider without a Special Qualification identifier were provided the letter "O" in this place (AR 611-1 Military Occupational Classification Structure Development and Implementation, 1997).
- Character Six and Seven: These characters were used in combination to identify an additional skill identifier (ASI). This combination was associated with specific MOSs. Any soldier who did not possess an ASI were still given

characters in these places usually two zeros as a default (AR 611-1 Military Occupational Classification Structure Development and Implementation, 1997).

- Character Eight and Nine: These characters are used to identify a solider with special language skills. This two-letter code was referred to as a language identification code (LIC). A soldier without any special language skills were provided the default "YY" or Yankee-Yankee (AR 611-1 Military Occupational Classification Structure Development and Implementation, 1997).

United States Army Commissioned Officers. U.S. Army Commissioned Officers have used a different structure to identify a specific MOS (AR 611-1 Military Occupational Classification Structure Development and Implementation, 1997). A new officer did not receive an MOS but a career branch (AR 611-1 Military Occupational Classification Structure Development and Implementation, 1997). This career branch was very similar to the MOS system the enlisted soldiers used (AR 611-1 Military Occupational Classification Structure Development and Implementation, 1997). When an officer was assigned a career branch, there were usually multiple codes available. An example would be Branch 19 (Armor) which had three specialties: a) 19A (Armor, General), b) 19B (Armor), and c) 19C (Cavalry) (Military Occupational Specialty, 2017). Upon completing a fifth year of service, officers became eligible for a more specific job referred to as a functional area designation (Military Occupational Specialty, 2017). A functional area designation indicated the officer had a specific set of skills in which the officer had shown proficiency in and, therefore, changed to a different career branch

designation (AR 611-1 Military Occupational Classification Structure Development and Implementation, 1997).

United States Marine Corps. The United States Marine Corps operated under the MOS codes as well and separated branch designations into jobs called "occupational fields" (OccFld) (Marine Corps Order 1200.17E Military Occupational Specialties Manual, 2013). This OccFld designation provides no distinctions between enlisted and officers, and every field is numbered from 1-99 including all specialty categories (Marine Corps Order 1200.17E Military Occupational Specialties Manual, 2013). Each OccFld had multiple MOSs and were designated by a four-digit indicator and job title (Marine Corps Order 1200.17E Military Occupational Specialties Manual, 2013). A specific example of this designation could have been examined in the infantry field (03) which contained the enlisted classifications: Rifleman (MOS 0311), Riverine Assault Craft (MOS 0312), Light Armored Vehicle Crewman (MOS 0313), Scout Sniper (MOS 0317), Reconnaissance Man (MOS 0321), Machine Gunner (MOS 0331), Mortarman (MOS 0341), Assault man (MOS 0351), Antitank Assault Guided Missileman (MOS 0352), and Infantry Unit Leader (MOS 0369) (Marine Corps Order 1200.17E Military Occupational Specialties Manual, 2013).

For every job in the Marine Corps, there have been authorized ranks (Military Occupational Specialty, 2017). Anyone who has achieved the rank of Private to Sergeant can be a Rifleman (0311) (Military Occupational Specialty, 2017). However, only Marines who ranked from Staff Sergeant to Master Gunnery Sergeant could have been a Unit Leader (0369) (Military Occupational Specialty, 2017). This was due to the belief that the Marine Corps MOS system was designed around increased duties and tasks that

accompany promotions (Marine Corps Order 1200.17E Military Occupational Specialties Manual, 2013). When examining the designations of the characters in the Marine MOS system, the first two characters designated the field of specialty and the last two digits indicated the promotional channel (Marine Corps Order 1200.17E Military Occupational Specialties Manual, 2013).

Traumatic Brain Injuries (TBIs)

The National Institute of Mental Health (2017) defined a Traumatic Brain Injury (TBI) as an injury occurring from a blow or force to the head resulting in deficiencies in cognitive functions. Traumatic Brain Injuries and Posttraumatic Stress Disorder (PTSD) have been the two most commonly diagnosed injuries sustained by veterans during the time of service during Operation Enduring Freedom (OEF) in Afghanistan, and Operation Iraqi Freedom (OIF) in Iraq (Onakomaiya, Kruger, Highland, Kodosky, Pape, & Roy, 2017). Mild traumatic brain injuries (mTBI) seemed to be the most common TBI related injury among servicemen with estimations from 11% to 23% who either screened positive or were diagnosed with a mTBI during a deployment (Brenner, Ivins, Schwab, Warden, Nelson, Jaffee, & Terrio, 2010). Over 330,000 veterans returning home since 2000 were diagnosed with some form of TBI, 82.4% of which were diagnosed as mild traumatic brain injuries, also known as concussions (Onakomaiya et al., 2017). Concussions usually were caused by a violent blow or force to the head and usually result in a loss of consciousness for periods of up to 30 minutes or altering of the level of consciousness of the victim (Onakomaiya et al., 2017). The most common injury sustained by United States military combatants in OEF and OIF have been TBIs caused by blast waves (Warden, 2006). A 2006 survey of over 2,500 United States soldiers

returning from a yearlong deployment echoed that fact. The study reported five percent of soldiers had lost consciousness at least once and 10% reported suffering from altered mental status during a deployment (Hoge, McGurk, Thomas, Cox, Engel, & Castro, 2008).

In 2008, TBIs were again researched by surveying United States soldiers returning from the Iraq War (Hoge et al., 2008). In this example, 44% of the soldiers surveyed reported an instance of loss of consciousness which met the criteria for PTSD, in contrast to the 27% of soldiers which reported experiencing altered mental status, 16% who experienced other injuries, and nine percent of soldiers who reported no injury (Stein & McAllister, 2009). Chronic symptoms, such as memory loss, headaches, and vestibular disturbances, were estimated to have occurred anywhere from 15% to 44% of TBI victims more than three months after the initial injury (Vanderploeg, Curtiss, Luis, & Salazar, 2007). Onakomaiya et al. (2017) added that evidence indicated circumstances leading to a TBI and the physical damage occurring to the brain created a comorbidity between TBI symptoms, the onset of PTSD, and associated symptoms of depression. However, the synergistic relationship between post TBI symptoms and PTSD symptoms is complex and warrants further investigation (Onakomaiya et al., 2017).

Post-Traumatic Stress Disorder

The National Institute of Mental Health (2017) defined Post-Traumatic Stress Disorder (PTSD) as a mental health condition which can occur in people that have witnessed or experienced traumatic events. People suffering from PTSD experienced symptoms triggered by everyday stimuli resulting in a fight-or-flight response (National Institute of Mental Health, 2017). Recent research has shown military personnel

suffering from PTSD were usually caused by physical brain injuries caused by blasts which specifically damaged tissues of the brain (National Institute of Mental Health, 2017). Most people who experienced such injuries usually recovered from the physical injury, however PTSD symptoms can persist and lead to severe depression and anxiety for periods of months or years after the initial injury or event (National Institute of Mental Health, 2017).

A population based survey in 2005 found 7.7 million United States citizens suffered from PTSD (Kessler, Berglund, Demler, Jin, Merikangas, & Walters, 2005). While this number is relatively high, many United States military personnel, returning from deployments are not accurately accounted for in this statistic (Kessler et al., 2005). Among American military personnel, researchers have found self-reporting rates of PTSD ranging from 8% to 16% *(*Sareen, Belik, Afifi, Amundson, Cox, & Stein, 2008). These rates were underestimates due to the issues and barriers military personnel experienced when reporting mental health issues in the military (Sareen et al., 2008). Of the actual veterans who were seeking care at the veterans' hospitals, approximately 15% had been diagnosed with PTSD (Seal, 2007).

Stein and McAllister (2009) stated PTSD prolonged the amount of time post-concussive symptoms affected a person and, in turn, TBIs possibly interfered with the recovery from PTSD. This comorbidity of symptoms has become a significant issue for medical professionals' abilities to diagnose either of the injuries (Stein & McAllister, 2009). Though most medical professionals use neuroimaging and neuropsychological evaluations and techniques, there has been little progress in developing the ability to discriminate between the two injuries (Stein & McAllister, 2009).

Traumatic Brain Injury and Post Traumatic Stress Disorder Comorbidity

Over the past eight years, discussions have continued to grow regarding the comorbidity between PTSD and TBI particularly after the military events in Afghanistan and Iraq (Stein & McAllister, 2009). According to Stein and McAllister (2009), due to the fact most PTSD related issues have been the focus of mental health professionals, TBIs have primarily been the focus of neurologists, neurosurgeons, and rehabilitation specialists, leaving little attention to the potential comorbidity of both. The dividing issue between these professions has been how each defined *trauma* (Stein & McAllister, 2009). Mental health professionals generally have understood trauma to center around an event in which the person associated with harm, extreme fear, or loss of life (Stein & McAllister, 2009). Neurologists, neurosurgeons, and rehabilitation specialists have defined *trauma* as the result of destructive biomechanical force acting on the brain or other parts of the body (Stein & McAllister, 2009).

Although most TBI and PTSD studies have centered around civilians, it was unclear to what extent the findings can be generalized to military personnel (Stein & McAllister, 2009). Many veterans during tours of duty in both Operation Enduring Freedom (OEF) and Operation Iraqi Freedom (OIF) have been exposed to multiple potential TBI causing injuries, including blast injuries, wounds, and loss of comrades (Stein & McAllister, 2009). Any military personnel with TBIs and/or PTSD run the risk of being exasperated or multiplied by repeated deployments and creates additional potential for veterans to be exposed to multiple traumatic events unrelated to the original TBI (Stein & McAllister, 2009). This has created an issue when attempting to make a generalization from civilian studies on comorbidity, due to the fact most comorbid mild

TBI and PTSD occur from a single event in civilians' lives, not multiple instances as in the case of most veterans (Stein & McAllister, 2009). To fully understand the extent of comorbidity of TBI and PTSD in veterans, additional research has been needed to understand the extent to which multiple exposures to traumatic events affected TBI and PTSD (Stein & McAllister, 2009).

Veterans' Transition to Education

Community college students experienced six times the amount of risk factors for dropping out or permanently leaving higher education compared to counter parts attending four-year institutions (Wheeler, 2012). Peggegrino and Hoggan (2015) explained, for veteran students, additional issues, such as the transition from a highly structured and hierarchal environmental of the military to a more autonomous self-driven atmosphere of higher education, can be extremely stressful. Another major issue facing veteran students, veterans have admitted, has been the amount of paperwork and long delays in receiving both educational and healthcare benefits after retirement (Wheeler, 2012). Additionally, veteran students could possibly be coping with mental or physical disabilities and family issues resulting from the transition (Pellegrino & Hoggan, 2015).

These issues facing veteran students relate to the major themes discussed in Schlossberg's Transition Theory or the 4 S's method. As stated previously, Schlossberg's Transition Theory was a framework typically used to understand the main aspects the individuals experience during transitions (Anderson, Goodman, & Schlossberg, 2012). In the case of veteran students, the 4 S's model was used as a conceptual roadmap to understand the issues that arose for veterans when entering higher education.

With OEF and OIF coming to an end, the number of veterans leaving the military to obtain degrees in higher education has greatly increased (Murphy, 2011). With the growing numbers of veterans entering education and the enhancements to the GI Bill, institution officials have expected the largest increase in veteran enrollment since World War II (Military.com, 2017). For many veterans, the transition to higher education has been the most difficult (Ackerman, DiRamio, & Mitchell, 2009). The main sources for veterans' issues on campus ranged from dealing with the Veterans Administration (VA), fitting in with other college students, and attending institutions not having the capabilities or programs in place to help veterans entering higher education adjust to the transition (Ackerman et al., 2009).

In order to help military personnel, once a deployment has ended, the military provides debriefing opportunities as part of the out-processing activities (Ackerman et al., 2009). In a 26-servicemen study, Ackerman (2009) investigated how combat veterans entering college transitioned to campus life, the issues they reported experiencing, and how administrators best supported those veterans. The 26 participating servicemen and women were interviewed while being enrolled full time at four-year universities. Upon examining the effectiveness of the various branches' debriefing sessions, it was apparent the participants' responses to the sessions vary in quality and effectiveness. A National Guard member spoke of the countless debriefing sessions in Iraq, Kuwait, and then stateside (Ackerman et al., 2009). The National Guard member said, "Eighty percent did not apply. You get in the habit of tuning it out since there is so much that does not apply" (Ackerman et al., 2009, p. 9). Another member of the National Guard who was debriefed after returning to the United States shared similar sentiments (Ackerman et al., 2009).

The soldier explained, “These sessions consisted mainly of ‘how are you doing’ questions. They kind of implied to us that if you have problems, you’re going to stay longer; nobody wanted to stay longer” (Ackerman et al., 2009, p. 9). In both instances, the guardsman implied veterans could have received better treatment if they had stated they were not doing well (Ackerman et al., 2009). However, in doing so, the veterans would have risked a delay in returning home to their families (Ackerman et al., 2009).

As part of the debriefing sessions, the VA’s processes and procedures were discussed and stated as the main resource for veterans returning home to obtain educational benefits (Ackerman et al., 2009). However, many of the veterans felt the sessions did not capture veterans’ attention or provide an adequate description of the way to navigate the VA to obtain educational benefits when the decision to attend college was made (Ackerman et al., 2009). In Ackerman’s (2009) study, many veterans echoed issues associated with the VA such as not receiving payment of the educational benefits. One Air Force veteran complained, “It took eight or more weeks to receive benefits” (Ackerman et al., 2009, p. 9). In the meantime, the veteran had to come up with out-of-pocket funds for tuition and related college costs (Ackerman et al., 2009).

Hannan, a 15-year U.S. Marine Corps veteran and student participating in the Experiential Learning for Veterans in Assistive Technology and Engineering (ELeVATE), a summer program to help disabled veterans enter the STEM careers, provided another insight into why veterans have a hard time transitioning to college (Cose, 2016). Hannan stated, “A short career-oriented course offered by the military—with brief instruction on business attire and writing a resume—did little to prepare him for the transition back to civilian life” (as cited in Cose, 2016, p. 16B).

Veterans Attempt to Fit In

During many tours of duty during wartime, numerous veterans were exposed to prolonged periods of hypervigilance, mental and physical trauma, and highly stressful situations (Cose, 2016). Returning to school can lead to difficulties and frustration when attempting to adjust to the demands and stressors of college life (University of Oregon, 2017). Issues can arise from family or interpersonal problems which can prevent proper social functioning, to cognitive and emotional impairments that interfere with the ability to properly focus on the subjects during a chosen course of study (University of Oregon, 2017).

All service members, whether returning from combat or not, have faced major transitions when returning to civilian or college life (University of Oregon, 2017). Some of the major issues veterans faced included difficulty understanding a world without the strict rules and regulations to connecting with traditional college students (University of Oregon, 2017). Generally, veterans who returned to college after a time of military service tended to be older than many of the new students in college and have priorities that differ from non-veteran classmates (University of Oregon, 2017). In addition to age differences, the experiences from combat caused many veterans to feel isolated and sometimes resulted in difficulty relating to their classmates, traditional college students (University of Oregon, 2017). On campuses where antiwar protests occurred, veterans have expressed feeling extremely alienated and that traditional students did not understand the difficulties military members endured while serving their country (University of Oregon, 2017).

Military members have returned from an intense and close community built on common experience (University of Oregon, 2017). Anxiety issues resulting from previous deployment may also have interfered with veterans' comfort levels while transitioning to campus and attempting to build new relationships (University of Oregon, 2017). However, it should not be assumed, all returning veterans have suffered from mental health issues (University of Oregon, 2017). Other veterans may also be making a physical transition and adjusting to learning to live with new disabilities (University of Oregon, 2017). Ackerman et al. (2009) explained that by providing supportive communities and information on the available resources, institutions can ease the transition for these veterans.

In nearly all cases, veterans have made a concentrated effort to not stand out among the student body (Ackerman et al., 2009). When asked about wearing identifying clothing or military garb, most veterans stated a need to blend in and not to draw attention to themselves (Ackerman et al., 2009). Overall, veterans had a concern and made efforts to not reveal themselves as prior military or active military to prevent situations in which individuals would be treated differently and further the feelings of alienation (Ackerman et al., 2009).

Colleges Unprepared to Handle Veteran Students

Many advocates for veterans, state colleges have not been prepared to deal with the varying needs of veteran students (O'Conner, 2013). Many veterans have faced a difficult transition to civilian life, ranging from readjustment issues to physical and mental injury recovery and without special attention will face major obstacles to graduation (O'Conner, 2013). Recent studies indicated certain strategies worked to keep

veterans in school (O'Conner, 2013). The strategies included specialized orientation programs, helping veterans connect with one another, training faculty and staff on challenges veterans face, and offering more counseling and financial aid (O'Conner, 2013). More than 40% of higher education administrators surveyed in an American Council on Education study in 2012 reported opening or planning to establish a veterans' center on their campuses in the next five years, which was an increase from 17% in 2009 (DiRamio, Jarvis, Iverson, Seher, & Anderson, 2015). Of the surveyed administrators, many were making a concerted effort to provide the needed services for the growing veteran student population (DiRamio et al., 2015). However, it has been found many veterans who qualified for these services either did not use them or were unaware of the process to obtain the associated services (DiRamio et al., 2015). Ackerman et al. (2009) shared the sentiments of one veteran who said:

> It would be a great help not to be just thrown into college. All the paperwork and whatnot I have to go through, they could offer a little more help as far as that and other veteran's programs. I'm probably eligible for things I'm not aware of. And I have nobody here to go and talk to [to] find out about [them]. I'd like to see them actually have a Veteran's Department here. Because when I walked in, they just tossed a piece of paper at me and said, 'Oh, here, fill this out.' That does not help. (p. 10)

Tarantino, another advocate for veterans' education and current chief policy officer of the Iraq and Afghanistan Veterans of America, admitted universities and community colleges around the country have not been prepared for this different student population. He wrote:

> If colleges are not prepared to help transition soldiers from combat you do run the risk of losing an entire generation. The GI Bill isn't a 'thank you for your service.' What it really is, is a readjustment benefit. It is giving veterans the opportunity to do something that is constructive for the mind and body. It provides a mission in which allows each to move forward in life. It's a backstop so you're not walking right off the plane from combat in to the civilian world. It was designed to be a soft landing. (as cited in O'Conner, 2013, para. 5).

Current strategies to help veterans' transitions, including student veteran resource centers organizations, veteran specific orientations, and faculty training, have just begun to enter implementation, and research on the topic has been minimal (López, Springer, & Nelson, 2016). According to a 2012 American Council on Education study, PTSD remained central in institutions' efforts to address student veterans' needs (López et al., 2016). As part of this study, the number of student veterans with PTSD or TBI per 100 first-time college students was estimated (López et al., 2016). As the enrollments of student veterans increased from 2009 to 2011, so did the estimates of student veterans with PTSD or TBI (López et al., 2016). In 2011, the estimate of student veterans with PTSD or TBI enrolled in college ranged from 3.7 to 9.4 per 100 first-time college students (López et al., 2016). Thus, faculty instructing a single section of 27 students likely had a minimum of one student veteran with PTSD or TBI per course (López et al., 2016).

To address this challenge for institutions, López (2016) believed part of the challenge was how the faculty translated the course designs to instruction practices. To do so in the most effective way, the study suggested using five principles of effective

instructional practice identified by the National Research Council (NRC) (2000) based on cognitive, developmental, and educational psychology and learning styles to aid in veteran education (López, 2016). The five principles were as follows: a) build on students' previous experiences, b) socialize the classroom learning experience, c) differentiate the instructional context, d) prepare connected, organized, and relevant content, and e) schedule feedback and active evaluation activities.

Build on students' previous experiences. Using short activities or exercises that introduce a new lesson by activating students' prior knowledge familiar to them (López et al., 2016). By introducing new material in a familiar context, the instructor can provide a connection that the student can relate to and interpret the new information (López et al., 2016). An added benefit of this practice is the ability to engage students in the course and as a result, encourage participation (López et al., 2016).

Socialize the classroom learning experience. The NRC stated learning best takes place in a social setting. In this practice, instructors assign in class or discussion assignments allowing students to present and discuss individual findings with the rest of the class (López et al., 2016). Like the buddy system, in which comradery between service members is enforced by working as a team to accomplish the mission, this method is helpful to veteran students (López et al., 2016).

Differentiate the instructional context. Teaching is performed using various methods, by implementing numerous approaches, and it is more likely to help students grasp new concepts (López et al., 2016). All students have a learning style, which refers to the idea that individuals differ regarding what mode of instruction or study, and have a style which is most effective for students (Pashler, McDaniel, Rohrer, & Bjork, 2008).

This method requires instructors to identify students' learning styles and to adjust the instruction accordingly (López et al., 2017). Currently, there have been seven identified learning styles: a) visual; b) interactive; c) auditory; d) print-oriented; e) tactile; f) kinesthetic; and g) olfactory learning styles (López et al., 2016).

Prepare connected, organized, and relevant content. Instructors that use organized, connected, and current material can support student comprehension and help with higher order thinking skills (López et al., 2016). In college level instruction, a well-defined curriculum and sequence allows students to have a guide while progressing through the course (Lopez et al., 2016). This guide connects the learning objectives with the associated topics and content, and allows students to learn each topic on a schedule and stay on track (López et al., 2016).

Schedule feedback and active evaluation activities. Providing feedback and evaluations provides pathways to students' understanding and skill development (López et al., 2016). Feedback plays a vital role in students' understanding of the learning objectives by verifying students are making progress towards grasping the content (López et al., 2016). When instructors use feedback and evaluations, comparisons between the students' performance and the expectations can be made and areas of improvement can be identified (López et al., 2016).

A second study by Kirchner (2015) proposed the onus also fell on the faculty to become familiar with the various resources each campus provides to veterans. Not only did faculty need to be aware of the veterans' services on campus, but also needed to be supportive and establish a safe environment for veterans in the classrooms (Kirchner, 2015). Kirchner (2015) wrote that to provide this environment, institutions with veteran

services usually focused on three main ideas: a) direct support, b) additional support, and c) supportive faculty.

Faculty provided direct support by providing student veteran organizations and veteran resource centers (Kirchner, 2015). These services provided veterans a risk-free atmosphere allowing them to interact with peers who came from similar backgrounds and shared experiences (Kirchner, 2015). Additional campus support was provided by offering orientation sessions and specialized training for advisors outside of resource centers and student-led veteran organizations on campuses (Kirchner, 2015). If trained to provide the right support, advisors could have recognized special needs, offered credit transfer assistance, and explained education assistance programs (Kirchner, 2015). Orientation sessions aimed to meet the needs of student veterans can alleviate some concerns and aid in the veterans' transition from a highly-structured environment to a more open one (Kirchner, 2015).

In order to provide supportive faculty, officials on campuses also could have facilitated training to educate faculty about the needs of active-duty and veteran students (Kirchner, 2015). In most cases, the lack of understanding was sparked by the absence of training (Kirchner, 2015). In 2013, a study at the University of Nevada-Reno found 71% of the general public admitted to knowing little about the military experience, with 72% of participating faculty expressing only knowing student veterans a "little bit or moderately" (Kirchner, 2015, p. 119). If faculty had been properly trained, they were more likely to have identified veteran issues when any signs manifested in the classroom (Kirchner, 2015). This called for the need of universities to provide this type of training to the faculty (Kirchner, 2015). Practices, such as establishing a safe classroom

environment, also have helped veterans feel secure enough to participate in discussions and share individual experiences (Kirchner, 2015). Educators should also consider the comments made by non-military students about wars, government, and the military (Kirchner, 2015). Specifically, people needed to know etiquette when asking or talking about military service (Kirchner, 2015). Understanding available resources and the faculty's role in veteran education is the first step toward enhancing the student experience (Kirchner, 2013). As the realm of veteran services have been increasing, training opportunities for faculty have been increasing as well, with each contributing to the experience current and former service members have while enrolled in college (Kirchner, 2013).

Joint Services Transcript

The Joint Services Transcript (JST) was defined as a description of soldiers' military educations, trainings, and employment histories while serving in their selected branch of service (Chan, 2016). Chan (2016) explained the JST uses civilian language to provide a detailed description of the learning objectives, outcomes, and standards of each course. Courses, training, and specialty schools a soldier attended have been evaluated by the American Council on Education (ACE) to determine if the specific courses and training qualified for semester-hour credits (Chan, 2016). These credits can be classified by ACE as one of the following: a) lower level, b) upper level, c) graduate, or d) vocational equivalents (Chan, 2016). The ACE equivalency program has replaced the military's original Coast Guard Institute's Army/American Council on Education Registry Transcript System (AARTS) and the Sailor/Marine American Council on Education Registry Transcript (SMART) systems (Absher, 2017). The JST has been

accepted by more than 2,300 colleges and universities and has been used as a tool for counselors at colleges and universities to advise and register active duty service members and veterans in college course programs *(*Absher, 2017). The JST also has aided in resume preparation by equating work experience in the various service branches to jobs in the civilian sector (Chan, 2016). This system also benefited soldiers' transitions into higher education by saving time and money by awarding credit for previous experiences equating to less time and finances spent *(*Absher, 2017).

Absher (2017) wrote that any soldiers, including enlisted, officers, warrant officers, active and retired, can request a JST from any branch in which they served by using the form displayed as Figure 5. The information contained on a soldier's JST included:

- Personal Identifying Information – The soldier's personal service member number and identifying information (U.S. Navy, 2017).
- Military Training and Course Completions – Any course in which ACE evaluated and provided a description and college course equivalencies (U.S. Navy, 2017).
- Military Occupations – A full breakdown of the soldier's occupations while in the service. Occupations were fully descripted including duties, skill levels, and the associated course equivalencies are recommended by ACE (U.S. Navy, 2017).
- College Test Scores – College equivalency or entrance exams were recorded such as: Excelsior, CLEP, NCPACE, ACT, SAT, and DSST (U.S. Navy, 2017).

- Other Learning Experiences – Course and occupations in which the soldier completed; however, ACE has not evaluated for college credit (U.S. Navy, 2017).
- Service Member Opportunity Colleges – Provided a summary of course codes for any educational courses completed during a soldier's service (U.S. Navy, 2017).

Chan (2016) added it was not uncommon for some soldiers to be unaware of their official JST, although every soldier who served in the military has a JST on file with the DoD. Absher (2016) explained when a soldier makes the decision to enter or return to education, the soldier may request a JST through paper or electronic means be sent to their school of choice. Upon receiving the request, the DoD sends official transcripts to the institution of choice at no cost to the solider (Chan, 2016). To access a JST, a soldier must register on the DoD's Joint Services Transcript website (Absher, 2016). Soldiers create an account on the website and using the associated links print or request the JST using the official JST Request Form (see Appendix E) (U.S. Navy, 2017).

MOS Job Transfer

Upon completing a career in the military, soldiers seek a college education and career change (Smith-Barrow, 2013). Smith-Barrow (2013) added, however, many have difficulties when attempting to understand how their occupational skills translate to higher education majors. Various skills, developed during their time of service, can aid in the decision of pursuing a major by using the experience gained to figure out what they are passionate about and pursuing a degree field in which incorporates their skills (Smith-Barrow, 2013). This idea was echoed in the statement made by North Carolina A&T

State University director of Veteran and Disability Support Services and retired Lieutenant Colonel Joshua Jones who stated:

> I think there is a higher percentage that you will select a major or pursue your degree in that area of concentration that you've got some experience in. Hands-on experience in a topic can make it more attractive as an academic pursuit. (Smith-Barrow, 2013, para. 4)

Some branches of the military have taken this approach to current soldiers as well (Air University, 2016). The U.S. Air Force, for example, has created the Air University (AU), located in Maxwell Air Force Base where Air University officials play a key role in both enlisted and officer education and has been the center for the Air Force's professional education courses (Air University, 2016). Officer and enlisted personnel in the U.S. Air Force did not attend the same institutions within AU (Air University, 2016). The United States Air Force Air Command and Staff College has become one of the U.S. Air Force professional schools, serving close to 500 residents and over 9,000 nonresident students from various United States branches, federal agencies, and 65 partner nations. Most officers attending this version of AU are completing their Captain's Career Course (Air University, 2016).

Enlisted soldiers in the U.S. Air Force attend a federally-chartered degree-granting institution called the Community College of the Air Force (CCAF) (Air University, 2016). The Community College of the Air Force has created partnerships with more than 108 Air Force schools, more than 1,500 civilian academic institutions, and 82 worldwide Education Service Offices in an effort to serve 300,000 active, guard, and reserve enlisted personnel (Air University, 2016). The goal of CCAF was to serve

the needs of the Air Force's environment while helping servicemen attain their educational goals by taking advantage of the occupational training and educational courses they completed as part of CCAF's flexible degree plans (Air University, 2016). The Community College of the Air Force has awarded more than 22,000 associate in applied science degrees from 68-degree programs a year and is considered one of the largest community college systems in the world (Air University, 2016).

American Council on Education (ACE)

The American Council on Education (ACE) (2017) reported it has been the only higher education body to represent every type of United States accredited community college and private and public institutions. ACE also has acted as the coordinating body for many of these institutions and as the representative of nearly 1,800 college and university presidents and executives at other educational associations (American Council on Education, 2017). Since 1945, in an effort to aid higher education institutions and accrediting associations, ACE has worked with the United States military to establish the Commission on Accreditation of Service Experiences to guide institutions in providing college credit for military occupations and courses completed during a soldier's time of service (American Council on Education, 2017). Renamed the Commission on Educational Credit and Credentials in 1979, ACE published the *Guide to the Evaluation of Educational Experiences in the Armed Services* in 1946 and has continually updated the guide as military occupations were created or changed (*Guide to the Evaluation of Educational Experiences in the Armed Services*, 2004).

Since 1946, the *Guide to the Evaluation of Educational Experiences in the Armed Services* has been updated five times typically due to changes to military educational

legislation and major United States engagements (American Council on Education, 2017). The first update of the publication came after the amendment of the G.I. Bill in 1954 (American Council on Education, 2017). After the Korean War and the resulting increase in college enrollment by many veterans, the need for a new guide arose (American Council on Education, 2017). In 1968, another edition was created due to the anticipated enrollment of veterans after the passing of the Veterans Readjustment Benefits Act, which required postsecondary institutions with federal contracts of $100,000 or more to implement an affirmative action program for disabled veterans who served during wartime (Educational Assistance, 2008). Another factor was the advancements in technology in military training, resulting in the need for new credit recommendations amongst United States institutions (American Council on Education, 2017).

The *Guide to the Evaluation of Educational Experiences in the Armed Services* was again updated in 1974 when ACE made the decision to publish the guide biennially (American Council on Education, 2017). In 1975, ACE implemented a program to evaluate the U.S. Army enlisted personnels' MOSs by providing credit represented by the learning and demonstrated in the occupation (American Council on Education, 2017). As a result of this program, ACE expanded the MOS evaluation to other branches of the military to include: a) Army, Navy, and Coast Guard warrant officer's MOSs, b) Navy general rates, ratings, warrant officers, and limited duty officers, c) Coast Guard enlisted ratings, and d) Marine Corps MOS's (*The 2004 Guide to the Evaluation of Educational Experiences in the Armed Services*, 2004).

In 1994, ACE published the 1954-1989 *Guide to the Evaluation of Educational Experiences in the Armed Services* which contained all the credit evaluations of the

military occupations and training ACE had evaluated from 1954 to 1989 (American Council on Education, 2017). Another significant decision occurred in 1994 when the *Guide* system was digitized and placed in the charge of the Military Evaluations Program staff (American Council on Education, 2017). The final edition of the guide was published in 2005 and was incorporated into the online system. In 2006, the ACE's *Military Guide* had become a main source for all military members to access their MOS and training evaluations for college credit (American Council on Education, 2017).

American Council on Education's Military Guide

The *American Council on Education's Military Guide's* credit recommendations have been regularly used by United States' institutions for accepted course credit (American Council on Education, 2017). The ACE determined military educational credit based on the three key elements various military courses share with traditional higher education programs (American Council on Education, 2017). Military courses that displayed these elements were: a) designed with learning outcomes in which are achieved though the completion of the course, b) instructed by a qualified instructor with subject matter expertise, and c) are designed in a way to reliably assess student learning (American Council on Education, 2017). A soldier or veteran have had the opportunity to search the ACE's Military Guide for the specific courses and occupations they had using an ACE identification number, keywords, course numbers, training location, dates completed, or subjects and levels (see Appendix F) (American Council on Education, 2017). All military courses have been evaluated for college credit by teams of college professors who reach a consensus on the amount and the type of credit to be recommended (*Guide to the Evaluation of Educational Experiences in the Armed*

Services, 2004). The American Council on Education (2017) added it is important to note ACE credit recommendations are strictly recommendations and institutions can provide the amount and type of credit for the military courses they deem fit.

Occupation evaluations were also made by a group of college professors (American Council on Education, 2017). In most cases, college credit recommendations were based on the soldier's or veteran's paygrade or skill level within the occupation (*Guide to the Evaluation of Educational Experiences in the Armed Services*, 2004). Occupation evaluations were used to interpret the skills, knowledge required for the specific occupations, competencies, and the demonstrated learning occupation evaluations (American Council on Education, 2017). Evaluators identified the skills, competencies, and knowledge required of service members in a given occupation and make comparisons to a similar college courses in which comparable understanding is gained (American Council on Education, 2017). Since the comparison was based on learning outcomes, many evaluations do not consider the time served in the specific role to gain occupational proficiency (American Council on Education, 2017). Once determined, occupations evaluations were translated from demonstrated proficiency into higher education systems to interpret the associated college credit (American Council on Education, 2017).

Conclusion

This chapter included a review of literature related to veterans' performance in community colleges, military MOS background, and other topics relevant to the study. In Chapter Three, the researcher will provide an overview of the study, including methodology, participants, instrumentation used, and data analysis. Through this analysis

of the obstacles facing veterans in applied science programs the researcher hopes to contribute to the current knowledge of community college administrators' best practices serving the veteran student population at the community college level.

Chapter Three: Methodology

In this study, the researcher examined the barriers that affected military veterans while they were attempting to complete a degree in applied sciences fields at the community college level. Veteran students who voluntarily joined a community college in a southern Missouri environmental science technology program were provided an entrance assessment, inclusive advising, surveys prior to starting courses and upon graduation, and individual end-of-semester progress meetings with the program director (U.S. Department of Labor, 2017). Course performances, occupations, veteran statuses, and surveys were obtained through entrance assessments and end of semester reports (U.S. Department of Labor, 2017). In this study, the researcher focused on only the issues facing applied sciences education veterans and how the associated or perceived barriers hindered veterans' abilities to proceed or to complete the program. The research design of the study, instrumentation, procedures, data analysis, and protection of human subjects will be discussed in this chapter.

Problem and Purpose Overview

Most research on veteran students returning to education has been examined at the university level and focused on the veterans' disabilities becoming barriers to students assimilating into the college environments (Jones, 2017). Due to community colleges' abilities to be geared towards nontraditional students, these institutions increasingly have become a more attractive option for veterans attempting to transition back to civilian life (Rumann, Rivera, & Hernandez, 2011). A report released by Cook and Kim (2009) provided information regarding the specific types of programs and assistance higher education, including community colleges, provided to aid the veteran student population

in the United States Post 9/11. In this report, 723 higher education institutions were surveyed on the veterans' services and 57% of the responding indicated some sort of program or assistance was provided to student veterans (Cook & Kim, 2009). However, of the 57% of institutions, especially community colleges, which provided some form of veteran services, the services were not provided specifically for veterans or provided by a designated office, often, and also were used to serve typical students (Cook & Kim, 2009).

Many community college administrators have implemented initiatives to assist veteran students, such as orientation courses or veteran centers (Cook & Kim, 2009). However, this finding was not indicative that every institution was fully ready to support the entire veteran student populations (Cook & Kim, 2009). In this study, the researcher examined the barriers that prevented the veteran students from being successful in STEM degrees and the issues veterans faced particularly while attending community colleges rather than universities, since a greater number of veterans enter higher education in this environment (Cook & Kim, 2009).

In 2013, a community college began work on Round Three of the Trade Adjustment Assistance Community College and Career Training (TAACCCT) awarded by the DOL (U.S. Department of Labor, 2017). Trade Adjustment Assistance Community College and Career Training grants are awarded with the intention to help eligible workers and underrepresented populations obtain training to either aid in a career change or gaining employment (U.S. Department of Labor, 2017). Trade Adjustment Assistance Community College and Career Training Grants were the major investments by the DOL to ensure community colleges could train students for the challenges of the ever-evolving

workforce (U.S. Department of Labor, 2017). Per the grant, administrators at the community college decided to create the Environmental Science Technician Program to provide its students a viable career field and to comply with the main standard of TAACCCT grants of providing a program aimed to help eligible workers and underrepresented populations obtain training to either aid in a career change or gaining employment in the local communities (U.S. Department of Labor, 2017). The environmental science technician program met these requirements based on the job descriptions, work environments, education requirements, pay, and employment outlooks (U.S. Department of Labor, 2017).

To complete this study, the researcher selected a mixed-method approach to gather the most comprehensive view of the barriers, if any, that resulted during veteran students' return to higher education and veterans' relative performances compared to non-veteran students (Fraenkel, Wallen, & Hyun, 2015). Fraenkel et al. (2015) defined mixed-methods research as using both qualitative and quantitative methods in a single study. Fraenkel et al. (2015) explained this type of research provided a more complete understanding of the research issues than the use of either qualitative or quantitative methods alone. In order to learn the most from the participants, the researcher chose to collect both quantitative and qualitative data.

Data Collection

First, the researcher requested permission to receive secondary data collected by the community college, which included demographic data from participants in the environmental science program involved in the study. This demographic data included students' genders, occupations, educational backgrounds, veteran statuses (if applicable),

and disability statuses (if applicable). The researcher also requested qualitative secondary data collected by the community college that focused on students' self-perceived barriers and any associated strategies the students felt helped them to overcome the barriers while completing the environmental science program at a community college. The quantitative data collected included the students' post semester grade point averages (GPAs), as well as total GPAs in program specific courses to assess veterans' performances and to detect any major differences in veteran and non-veteran performances in the environmental science program.

To obtain the student data, IRB approval was requested and obtained from the participating community college (see Appendix G). The researcher also submitted for the Lindenwood University IRB's permission to conduct the study. To ensure the information was kept anonymous, information was kept on the community college's campuses in hard and digital files. The researcher received a hard copy of this data with personal identifiers removed for analysis. The researcher entered the data into an Excel spreadsheet for analysis. The information was saved on the researcher's personal computer with a required password to log in. Finally, no personal identifiers were included in the research upon publication, nor would any information attributable to any individual be released.

Research Questions and Hypothesis

Through a comprehensive study of literature and review of student performance in environmental science programs, two major issues arose. The comparative analysis of veteran students' program performances versus non-veteran students', and if veteran performance was affected by certain factors while returning to higher education at the

community college level. Once these issues were identified, the researcher created research questions and hypotheses in order to gain insight into veteran performance and the associated barriers when completing degrees in the applied science field. Research questions were created to assess veteran student performance versus non-veteran student performance in the environmental science program at the community college in questions. Hypotheses were created to identify a potential correlation between specific factors and veteran retention and achievement rates in the environmental science program.

The research questions and hypotheses were listed as follows:

1. Did veteran participants perform as well academically as non-veteran students completing degrees in applied sciences at the community college level?

2. Did the following factors affect veteran retention and achievement rates in the environmental science program at the community college level?

a) Military Occupational Specialty (MOS)

b) Disabled Veteran Status

c) Education background prior to joining the environmental science program

d) Gender

3. What obstacles did veterans face in an applied science program at the community college level and what strategies did veterans say they employed to overcome the particular barriers?

Null Hypothesis 1: There is a no difference between the academic performance of veteran students and non-veteran students completing applied sciences degrees.

Null Hypothesis 2: There is no relationship between certain veterans' MOS and the retention and achievement rates in the environmental science program.

Null Hypothesis 3: There no a relationship between certain veterans' disabled statues and the retention and achievement rates in the environmental science program.

Null Hypothesis 4: There is no relationship between participant previous education and the retention and achievement rates in the environmental science program.

Null Hypothesis 5: There is no difference between gender and the retention and achievement rates in the environmental science program.

Null Hypothesis 6: There are no major obstacles facing veterans in applied science programs at the community college level.

Null Hypothesis 7: There are no common strategies employed by veteran students in applied science programs at the community college level to overcome perceived barriers.

Instrumentation

Four varying forms were used as instrumentation to collect data for this study. To ensure proper data collection, the following forms were used for the advisement of the environmental science program in order to track student progress and access the motivations behind the individual's interest and participation in the program. The Entrance Survey (see Appendix A) and Data Collection Form (see Appendix C) aided in data collection and analysis. The Entrance Survey allowed the researcher the ability to track the source that peaked the participants' interest, contact information, and prior education. The Data Collection Form (see Appendix C) was implemented to track

students' performances while in the environmental science program and act as a quick reference to information on students' files.

The Intake Form (see Appendix B) and Career Education Plan/Exit Survey (see Appendix D) were supplied by the DOL to track student information and ensure grant compliance. The Intake Form was used to track demographic information, to aid GPA performance tracking, to code for participants, and to provide a reference for entry into electronic files. In Appendix D, the Career Education Plan/Exit Survey, was used as an initial entrance and exit survey to assess the barriers participants expressed they faced when initially joining the program, strategies to overcome the identified barriers, and the assessment of the strategies in aiding a participant who completed the program.

Participants

The study took place at a community college in Southern Missouri. For the study to be as generalizable as possible, the entire veteran and non-veteran populations of the environmental science program from years 2014 to 2017 were included, which totaled 111 students. In addition, all individuals who were identified as veterans during this time were used as the comparative population. The total number of veteran participants in the environmental science program was 53. Coercion was reduced due to the fact the study included secondary data provided by the community college. The secondary data, including participants' identifiers (Vet 1, Vet 2, Non-Vet 1, Non-Vet 2), GPA performances, and survey responses, examined were reported directly to the community college as part of the end of semester reporting and provided after a request for the study was received.

Methodology

The first step the researcher took when starting this investigation was to obtain permission from the associated community college's Research, Strategic Planning and Grant Development Department. This department's permission was needed due to the fact the study was completed on the campuses of the institution during the timeframe in question. Once the institution's permission was granted (see Appendix G), the researcher filed for Institutional Review Board (IRB) permission from Lindenwood University's IRB Review Board to perform the study (see Appendix H). Once IRB permission was granted from both participating institutions, the secondary data was provided to the researcher. The environmental science program used the following TAACCCT Grant data collection process to obtain the data provided to the researcher:

1. Upon showing interest in joining the environmental science program at the institution, an initial meeting was scheduled with the program director and recruiting and retention specialist to discuss program entrance criteria (U.S. Department of Labor, 2017).
2. During the initial meeting, once the student confirmed the desire to enter the program, potential participants were provided the Entrance Survey to complete (see Appendix A), TAACCCT Round Three Intake Form (see Appendix B), and the initial portion of the Career Education/Exit Survey (see Appendix D). These files were scanned electronically and digitized on the institution's computers while the physical copies were kept on-site in locked cabinets according to TAACCCT protocols (U.S. Department of Labor, 2017).

3. Participants registered and attended the necessary courses and scheduled meetings as needed with the director and recruiter and retention specialist following each semester or as needed. This meeting was required based on the TAACCCT Grant Compliance protocols (U.S. Department of Labor, 2017).
4. During end-of-semester meetings, students met with the director and recruitment and retention specialist, registered for new classes, reviewed the students' performances in program specific courses, updated information as necessary, and provided feedback on students' individual experiences in the program. This information was collected and noted in the Data Collection Form (see Appendix C) and used for entry into Microsoft Office Excel for record keeping (U.S. Department of Labor, 2017).
5. Once the student successfully met the requirements for graduation, a final meeting was scheduled to come the Career Education Plan/Exit Survey (see Appendix D) and were asked to indicate if the initial meeting's strategies helped overcome the perceived barrier that student had listed (U.S. Department of Labor, 2017). After this meeting, students were contacted by the recruiter and retention specialist to determine if any change in the living situation such as enrolling in a new program, obtaining a job, or receiving a raise occurred (U.S. Department of Labor, 2017).

Data Collection

All secondary participant data was provided to the researcher during this study by the community college. As part of the program's participation requirements, all students signed the TAACCCT Waiver Form to allow the collection of identifying information, program performance, and progress by the institution and the TAACCCT associated

Career Centers. This permission form allowed the community college and Career Centers to share data and to ensure each participant qualified under TAACCCT Grant unrepresented populations. This information was strictly for the use of qualification of each participant to ensure grant funds funded the tuition cost for program specific courses. This waiver form contained identifying information and was not provided to the researcher. Participation in the program was completely voluntary. Participants of this study received no incentives for participating. No sensitive or identifying information was provided during the study, nor will any be disclosed throughout the research process. All information was collected electronically in the Data Collection Form (see Appendix C) for electronic recordkeeping and recorded physically in files stored in secured file cabinets on the campus of the associated community college and then converted into Excel spreadsheets for analysis.

Data Analysis

For this study, the researcher utilized a mixed-method approach, collecting and analyzing both quantitative and qualitative data. First, quantitative data was captured and entered into the Data Collection Form (see Appendix C) through post-semester grade reviews and interviews with environmental science program student completers on the Career Education/Exit Survey (see Appendix D). The students' post-semester GPAs were recorded in a Microsoft Excel file and broken down into students' post-semester GPAs for completed courses and students' total GPAs. The file was data cleaned, removing any zero values used to code for GPAs and using a basic frequency analysis looking for missing values. After running a descriptive statistics analysis for demographic data, a series of analysis of variance (ANOVA), chi-square tests and Independent Samples t-

Tests were run to assess the seven (7) null hypotheses with a confidence level of α=.05. Upon entry into an Excel file, GPAs were compared in the following orders: a) veterans versus non-veteran students, b) disabled veterans versus non-disabled, c) male veterans versus female veterans, d) male veterans versus male non-veterans, and e) female veterans versus female non-veterans. This data was used to determine if specific identifying factors of veterans such as the following: a) MOS, b) disabled veteran status, c) education background, and d) gender exhibit significant differences in veteran performance in applied sciences programs.

Qualitative data was collected using a guided grounded theory analysis. This approach was chosen due to grounded theory's focus on the participant's perspective of the experiences (Glaser, 1967). Grounded theory has considerable significance, because it a) provided explicit, sequential guidelines for conducting qualitative research, b) offered specific strategies for handling the analytic phases of inquiry, c) streamlined and integrated data collection and analysis, d) advanced conceptual analysis of qualitative data, and e) legitimized qualitative research as scientific inquiry (Fraenkel et al, 2015). Qualitative data were coded into themes using Microsoft Excel. Data was exported into a Microsoft Word document, and a latent content analysis was performed, as described by Fraenkel et al. (2015), by reviewing survey responses and determining similar themes or quotations found in participants' responses. Once coded, the data was entered into a Microsoft Office Excel spreadsheet created by the researcher.

Summary

The environmental science program at the associated community college will be investigated using the students' secondary data from the years 2014 through 2017. The

researcher analyzed the program's data to investigate if there were any significant difference between the academic performances of veteran students to non-veteran students and if particular variables, such as MOS, disabled veteran status, previous educational background, and/or gender affected the achievement and retention rates of an applied science degree. Through data collection, the researcher examined both veteran and non-veteran students participating in the environmental science program and determined if there was a significant difference in the specific population's performances in the program and if specific factors affected retention and achievement rates. A mixed-methods approach was utilized between surveys and academic performance data to come to a conclusion and answer the proposed research questions. In Chapter Four, the researcher will provide and explanation of the mixed-methods study.

Chapter Four: Analysis of Data

The proposed topic of this study was to determine the particular barriers and academic performance of veteran students attending applied science programs at the community college level. The focus of the research was to answer if a relationship existed between specific veteran identifying characteristics and their performances in applied science programs in comparison to non-veteran students in the same program. The study's purpose was to gain an understanding of veterans' perceived barriers, if there were any, when returning to higher education and to provide insights to decision makers at the community college level to support this growing student demographic. The study utilized the Structural Conceptual Framework (Bolman & Deal, 2013) and theoretical framework of Schlossberg's Transition Theory (Anderson, Goodman, & Schlossberg, 2012) in order to analyze and interpret the collected data.

In this study, the researcher utilized both quantitative and qualitative methods of analysis. Quantitative data was captured through post-semester reviews and interviews with environmental science program students. The students' post-semester GPAs were recorded in a Microsoft Office Excel file and desegregated into students' post-semester GPAs and total GPA. The file was data cleaned removing any zero values used to code for GPAs, using a basic frequency analysis looking for missing values. After running a descriptive statistics analysis for demographic data, a series of chi-square tests and Independent Samples t-Tests were run for answering the seven (7) null hypotheses, with a confidence level of $\alpha=.05$. Upon entry into a Microsoft Office Excel file, GPAs were compared in the following orders: a) veterans versus non-veteran students, b) disabled veterans versus non-disabled, c) male veterans versus female veterans, d) male veterans

versus male non-veterans, and e) female veterans versus female non-veterans. This data was used to determine if specific identifying factors of veterans such as: a) MOS, b) disabled veteran status, c) education background, and d) gender exhibit significant differences in veteran performance in applied sciences programs.

Qualitative data was collected primarily through the Career Education Plan/Exit Survey (see Appendix D). Participant responses were used to determine if particular barriers were common among veteran participants and if students shared any commonly used strategies to overcome barriers that may have had any effect on their abilities to complete the environmental science program curriculum.

Quantitative Results

The research methodology included a quantitative component to determine if veterans and non-veteran performed differently in applied science degrees. The following research questions guided the quantitative portion of this study:

1. Did veteran participants perform as well academically as non-veteran students completing degrees in applied sciences at the community college level?

2. Did the following factors affect veteran retention and achievement rates in the environmental science program at the community college level?

a) Military Occupational Specialty (MOS)

b) Disabled Veteran Status

c) Education background prior to joining the environmental science program

d) Gender

3. What obstacles did veterans face in an applied science program at the community college level and what strategies do they employ to overcome the particular barriers?

Table 5

Environmental Science Veteran to Non-Veteran Participants

Participant Type	Number of Participants	Population Specific GPA	σ	Variance	Total Program Population GPA	T-Test P-Value
Non-Veteran	58	3.50	0.572	0.327	3.47	N/A
Veteran	53	3.44	0.605	0.366	3.47	N/A
Total	**111**	**N/A**	**N/A**	**N/A**	**3.47**	**6.29^{-1}**

Note. Data collected in study.

Environmental science veteran to non-veteran participants. In Table 5, the researcher displayed an analysis of the total participants' qualification statuses of the environmental science program by veteran and non-veteran categories and students' relative overall GPA performance within the program. The GPAs of individual populations were measured on a 4.0 grading scale and compared against each other to assess the population's performance in the environmental science program to their counterpart and program's population as a whole. The total 111 environmental science program population had a mean GPA of 3.47 and was provided to have a benchmark to

access population specific performance. The largest group within this comparison qualified as non-veteran status. This population accounted for 51.35% (*n*=58) of the students in the program. The average GPA of non-veteran participants was 3.50, higher than the total students' GPAs in the program. Qualifying veterans accounted for 48.65% (*n*=53) of the students in the program. The average GPA of qualifying veteran participants was 3.44, lower than then the non-veteran student's total GPA and the average program GPA of 3.47.

Table 6

Comparison of Veteran and Non-Veteran Male Students

Participant Type	Number of Participants	Population Specific GPA	σ	Variance	Total Population GPA	T-Test P-Value
Veteran Males	42	3.49	0.469	0.220	3.44	N/A
Non-Veteran Males	25	3.43	0.551	0.304	3.44	N/A
Total	**67**	**N/A**	**N/A**	**N/A**	**3.44**	**5.70^{-1}**

Note. Data collected in study.

Comparison of veteran and non-veteran male students. The second comparison reviewed the GPA performance of male veteran and non-veteran participants in the environmental science program. This population accounted for 62.68% (*n*=42) of the male students in the program. The average GPA of male veterans in the program was

3.50, the highest among this comparison and above the entire male population average of 3.44. The non-veteran male population accounted for 37.32% (*n*=25) male program populations. The non-veteran male mean GPA was 3.43, which was lower than both male veteran's GPA and the total male population GPA (see Table 6).

Table 7

Comparison of Veteran and Non-Veteran Female Students

Participant Type	Number of Participants	Population Specific GPA	σ	Variance	Total Program Population GPA	T-Test P-Value	X^2
Veteran Females	12	3.40	0.635	0.403	3.46	N/A	N/A
Non-Veteran Females	32	3.52	0.534	0.285	3.46	N/A	N/A
Total	**44**	**N/A**	**N/A**	**N/A**	**3.46**	**9.32^{-1}**	**1.75^{-3}**

Note. Data collected in study.

Comparison of veteran and non-veteran female students. Table 7 reviewed the GPA performance of female veteran and non-veteran participants in the environmental science program. This veteran female population accounted for 27.27% (*n*=12) of the female participants in the program. The veteran female average GPA was 3.40, the smaller average among this comparison and lower than the entire female population average of 3.46. The non-veteran female population accounted for 72.73% (*n*=32) of the female participants in the program. The non-veteran female mean GPA was

3.52, which was higher than both female veterans' mean GPA and the total female population mean GPA of 3.46. Special attention should be considered among the total number of veterans in each MOS which can alter the immediate reactions to GPA among the veteran population

The Null Hypothesis 1 stated there would be a no difference between the academic performance of veteran students and non-veteran students completing applied sciences degrees. To investigate this hypothesis, Independent Samples t-Test comparing performance of specific veteran and non-veterans student GPAs were conducted (see Tables 5 through 7). Based on the data compiled in Table 5, Null Hypothesis 1 was unable to be rejected.

Table 8

Environmental Science Program Veteran Qualification Information

Veteran Qualification	Number of Participants	%
Retired Veteran	33	62.26
Active Duty Veteran	13	24.52
Military Dependent	7	13.22
Total	53	100

Note. Data collected in study.

Environmental science program veteran qualification information. Table 8 displayed a breakdown of the environmental science program veteran demographic by duty status. Most of the veteran participants in the program were classified as retired

veterans. This population accounted for 62.26% (*n*=33) of the participants in the program. Active duty participants were the second largest veteran status. This population accounted for 24.52% (*n*=13) of the veteran population. Military dependents were the third largest demographic. This population accounted for 13.22% (*n*=7) of the participants in the program.

Table 9

Environmental Science Program Non-Veteran Student Qualification Information

Non-Veteran Qualification	Number of Participants	%
Under Employed	31	53.44
Unemployed	15	25.87
Low Skilled	12	20.69
Total	**58**	**100**

Note. Data collected in the study.

Environmental science program non-veteran student qualification information. Table 9 displayed a breakdown of the qualification statuses of all non-veteran students in the environmental science program. Most of the non-veteran participants in the program were classified as under employed. This population accounted for 53.44% (*n*=31) of the total qualifying non-veteran students. Unemployed participants were the second largest non-veteran status. This population accounted for 25.84% (*n*=15) of the total non-veteran population.

Non-veterans who qualified under the Low Skilled category was the third largest qualification status. This population accounted for 20.69% (n=12) of the total program non-veteran population.

Table 10

Veteran GPA Data by Military Occupational Specialty

Veteran Military Occupational Specialty	Number of Participants	Grade Point Average	σ	Variance	ANOVA p-value	X^2
Engineer	16	3.44	0.642	0.412	N/A	N/A
Infantry	13	3.27	0.732	0.536	N/A	N/A
Chemical	10	3.69	0.502	0.252	N/A	N/A
Drill Sergeant/Trainer	8	3.29	0.393	0.154	N/A	N/A
Mechanic	4	3.72	0.501	0.251	Not Enough Values	N/A
Medical	1	4.0	Not Enough Values	Not Enough Values	Not Enough Values	N/A
Information Technology	1	3.79	Not Enough Values	Not Enough Values	Not Enough Values	N/A
Total	**53**	**N/A**	**N/A**	**N/A**	**3.70^{-1}**	**1.16^{-1}**

Note. Data collected in the study.

Veteran GPA data by military occupational specialty. Table 10 displayed a breakdown of the GPA data sorted by MOS of all veteran students in the environmental

science program. The environmental science program contained seven MOSs with varying total populations and GPAs. These GPAs were measured on a 4.0 grading scale and were compared to assess MOS performance in the environmental science program. The total veteran population GPA of 3.44 was also provided for comparison. The total veteran population's GPA was provided to have a benchmark to assess how an individual MOS performed relative to the total population's GPA.

The largest group of veteran participants in the program were classified as Engineers. This population accounted for 30.18% (*n*=16) of the veteran population and averaged a GPA of 3.44 the fifth highest among program MOSs and equal to the average GPA of the total veteran population. The Infantry MOS was the second largest veteran population. This population accounted for 24.52% (*n*=13) of the total veteran population. Infantry MOS's average GPA was 3.27 lowest among program MOSs and below the average performance of the total veteran population. The Chemical MOS was the third largest veteran population. This population accounted for 17.85% (*n*=10) of the total veteran population. Chemical MOS's average GPA was 3.69 fourth highest among program MOSs and below the average performance of the total veteran population.

The Drill Sergeant/Trainer MOS was the fourth largest veteran population. This population accounted for 15.09% (*n*=8) of the total veteran population. Drill Sergeant/Trainer MOS's average GPA was 3.29, the sixth highest among program MOSs and below the average performance of the total veteran population. The Mechanic MOS was the fifth largest veteran. This population accounted for 7.54% (*n*=4) of the total veteran population. Mechanic MOS's average GPA was 3.72, which was the third highest among program MOSs and above the average performance of the total veteran

population. The Medical and Information Technology MOSs tied for the lowest veteran population totaling (n=1) 1.78% of the total veteran population. Medical and information technology MOS's average GPA was 4.0, highest GPA among program MOSs and 3.79 the second highest GPA both above the average performance of the total veteran population. Special attention should be considered among the total number of veterans in each MOS which can alter the immediate reactions to GPA among the veteran population.

Null Hypothesis 2 stated there was no relationship between certain veterans' MOS and the retention and achievement rates in the environmental science program. To investigate this hypothesis, ANOVA analysis compared the performance of specific veteran students MOS's. Due to low quantities of certain MOSs, they were not included in the ANOVA table (see Table 10). Based on the data compiled in Table 10, Null Hypothesis 2 was rejected.

Table 11

Veteran GPA Data by Disabled Status

Disability Classification	Number of Participants	Grade Point Average	Total Veteran Grade Point Average	σ	Variance	T-Test P-Value
Disabled Veterans	18	3.39	3.44	0.536	0.287	N/A
Non-Disabled Veterans	35	3.50	3.44	0.523	0.274	N/A
Total	**53**	**N/A**	**3.44**	**N/A**	**N/A**	**4.46^{-1}**

Note. Data collected in the study.

Veteran participants' disability statuses and performances. The researcher displayed an analysis of the performance of the disabled and non-disabled veterans in the environmental science program in Tables 11 through 14. The total populations of disabled and non-disabled veteran GPAs were analyzed over five different comparisons to determine if recognized disabilities affected veteran performance versus their non-disabled counterparts. Students' GPAs were measured on a 4.0 grading scale and the total veteran population mean GPA of 3.44 was also provided to have a benchmark to assess how disabled and non-disabled veterans performed relative to the total veteran population's GPA.

In Table 11, the researcher included a comparison between the total disabled and non-disabled veteran populations. Disabled veterans accounted for 33.96% (n=18) of the total veteran population and averaged a GPA of 3.39 which was below the average veteran GPA of 3.44. Non-disabled veterans accounted for 66.04% (n=35) of the total veteran population and averaged a GPA of 3.50, which was above the average veterans' GPA of 3.44 and the disabled veterans' average GPA of 3.39.

Table 12

Total Disabled Program Veterans

Disability Classification	Number of Participants	Grade Point Average	σ	Variance	T-Test P-Value	X^2
Disabled Veteran Males	16	3.45	0.430	0.185	N/A	N/A
Disabled Veteran Females	3	3.06	1.00	1.01	N/A	N/A
Total	**19**	**N/A**	**N/A**	**N/A**	**5.79^{-1}**	**2.86^{-3}**

Note. Data collected in the study.

Total disabled program veterans. Table 12 included a comparison between only the disabled veteran population in the environmental science program. Total male disabled veterans accounted for 84.21% (*n*=16) of the total veteran population, and averaging a GPA of 3.45, which was above the 3.05 average GPA of disabled female veterans and the total veteran GPA of 3.44. The non-disabled female veteran population was the smaller of the two populations. This population accounted for 15.79% (*n*=3) of the total disabled veteran population. The disabled female veteran population account for three participants, totaling 15.79% of the population and averaging a GPA of 3.06 coming in below their male disabled counterparts' GPA of 3.45 and the total veteran GPA of 3.44.

Table 13

Total Non-Disabled Program Veterans

Disability Classification	Number of Participants	Grade Point Average	σ	Variance	T-Test P-Value	X^2
Non-Disabled Veteran Males	28	3.53	0.436	0.190	N/A	N/A
Non-Disabled Veteran Females	7	3.38	0.822	0.676	N/A	N/A
Total	**35**	**N/A**	**N/A**	**N/A**	**8.50^{-1}**	**6.06^{-2}**

Note. Data collected in the study.

Total non-disabled program veterans. In Table 13, the researcher made the comparison between non-disabled veteran populations in the environmental science program. Total male non-disabled veterans accounted for much of this group with 28 participants, accounting for 80% of the total non-disabled veteran population and averaging a GPA of 3.53, which was above the average total veteran GPA of 3.44. The non-disabled female veteran population accounted for seven participants, totaling 20% of the population and averaging a GPA of 3.38 coming in below their male non-disabled counterpart's GPA of 3.24 and the total veteran GPA of 3.44.

Table 14

Veteran Participants' Disability Status by Gender

Disability Classification	Number of Participants	Grade Point Average	σ	Variance	T-Test P-Value	X^2
Comparison of Disabled and Non-Disabled Male Veterans						
Disabled Veteran Males	16	3.45	0.430	0.185	N/A	N/A
Non-Disabled Veteran Males	28	3.53	0.436	0.190	N/A	N/A
Total	**44**	**N/A**	**3.44**	**N/A**	**5.32^{-1}**	**5.01^{-6}**
Comparison of Disabled and Non-Disabled Female Veterans						
Disabled Veteran Females	3	3.06	3.44	1.01	N/A	N/A
Non-Disabled Veteran Females	7	3.38	0.82	0.676	N/A	N/A
Total	**10**	**N/A**	**N/A**	**N/A**	**6.57^{-1}**	**5.01^{-6}**

Note. Data collected in the study.

Veteran participants' disability statuses by gender. Table 14 included two comparisons between disabled and non-disabled veterans in the environmental science program based on gender. In comparison one, total male non-disabled veterans were smaller populations of this group. This population accounted for 36.36% (*n*=16) of the total male veteran population and averaged a GPA of 3.45, which was below the 3.53 average GPA of non-disabled veterans and the total veteran GPA of 3.44. The non-disabled male veteran population accounted for 63.64% (*n*=28) of the total male veteran population and averaged a GPA of 3.53 coming in above their male disabled counterpart's GPA of 3.46, but above the total veteran GPA of 3.44.

The second comparison made in Table 14 was between the disabled and non-disabled female veteran populations in the environmental science program. The total female disabled veterans accounted for 30% (*n*=3) of the total female veteran population, and averaged a GPA of 3.06 lower than the non-disabled female average and the total veteran average GPA.

The non-disabled female veterans made up 70% (*n*=7) of the entire female veteran population and averaged a GPA of 3.38, above the disabled female veteran average but below the total veteran GPA average of 3.44. Special attention should be considered among the total number of participants in each educational background which may have altered the immediate reactions to GPA among the veteran population.

Null Hypothesis 3 stated there was not a relationship between certain veterans' disabled statues and the retention and achievement rates in the environmental science program. To investigate this hypothesis, Independent Samples t-Test and chi-square tests comparing performance of disabled veteran status and GPA performance (see Table 11-

14). Based on the data compiled in Table 11, Null Hypothesis 3 was unable to be rejected.

Table 15

Background Education Comparison of the Environmental Science Program

Background Education Classification	Number of Participants	Population Grade Point Average	σ	Variance	ANOVA P-Value	X^2
GED	8	2.97	0.474	0.225	N/A	N/A
High School Diploma	62	3.36	0.598	0.358	N/A	N/A
Some College	36	3.74	0.428	0.183	N/A	N/A
College Degree	5	3.71	0.362	0.131	N/A	N/A
Total	**111**	**3.44**	**N/A**	**N/A**	**2.60^{-4}**	**2.60^{-16}**

Note. Data collected in the study.

Students' educational background comparison of the environmental science program. Tables 15, 16, and 17 displayed a breakdown of the GPA data sorted by the educational background of all participants in the in the environmental science program. This table provided the total GPA of each category's entire population for comparison of non-veteran to veteran specific educational backgrounds as displayed in Table 11. The environmental science program contained four educational backgrounds with varying total populations and GPAs. These GPAs were measured on a 4.0 grading scale and were

compared to assess how different educational backgrounds may affect performance in the environmental science program.

Table 15 displayed a comparison of all educational backgrounds in the environmental science program based on the identified educational backgrounds. The first educational background in the program were classified as student who have achieved a GED. This was the third largest population and accounted for 7.20% (*n*=8) of the total program population. This population averaged a GPA of 2.97 the lowest among program educational backgrounds. Participants who have achieved a high school diploma was the largest populations accounting for 55.85% (*n*=62) of the total population.
This population averaged a GPA of 3.36, third highest among educational backgrounds. Students who have had some college experience were the second largest group accounting for 32.43% (*n*=36) of the total population. This population averaged a GPA of 3.75 the highest among educational backgrounds. The fourth educational background of participants was degree holding participants. This population accounted for 4.50% (*n*=5) of the total population and was the third highest population. This population averaged the second highest educational background GPA at 3.71. Special attention should be considered among the total number of participants in each educational background which can alter the immediate reactions to GPA among the veteran population.

Background education of non-veteran student comparison. Table 16 displayed a breakdown of the GPA data sorted by the educational background of all non-veteran participants in the in the environmental science program. This table provided the

total GPA of each category for non-veteran participants for comparison of non-veteran and veteran educational backgrounds performances in Tables 17-20.

Table 16

Background Education of Non-Veteran Students Comparison

Background Non-Veteran Education Classification	Number of Participants	Population Grade Point Average	σ	Variance	ANOVA P-Value	X^2
GED	2	3.50	0.005	5.00^{-5}	N/A	N/A
High School Diploma	42	3.39	0.585	0.343	N/A	N/A
Some College	13	3.74	0.465	0.216	N/A	N/A
College Degree	1	4.0	Not Enough Values	Not Enough Values	N/A	N/A
Total	**58**	**3.49**	**0.571**	**0.326**	**2.11^{-1}**	**2.62^{-16}**

Note. Data collected in the study.

The first educational background in the program was classified as students who had achieved GEDs. This population accounted for 3.44% (*n*=2) of the total non-veteran population, the third smallest population, and averaged a GPA of 3.50, which was the third highest among non-veteran educational backgrounds. Non-veteran participants who had achieved a high school diploma was the largest population accounting for 72.42%

(*n*=42) of the total non-veteran population. This population averaged a GPA of 3.39, which was the lowest among non-veteran educational backgrounds. Non-veteran populations who had some college experience were the second largest group accounting for 22.42% (*n*=13) of the total population. This population averaged a GPA of 3.74 the second highest among educational backgrounds. The fourth educational background was that of non-veteran participants already holding a college degree. This population was the smallest population accounting for 1.72% (*n*=1) of the total population and averaged the highest educational background GPA at 4.0. Special attention should have been considered among the total number of participants in each educational background which could have altered the immediate reactions to GPAs among the veteran population.

Background education of veteran student comparison. Table 17 displayed a breakdown of the GPA data sorted by the educational background of all veteran participants in the in the environmental science program. This table provided the total GPA of each category, veteran populations for comparison to non-veteran, and veteran specific educational backgrounds in Table 18 through Table 21. The first educational background in the program was classified as veteran students who achieved their GEDs. This population accounted for 11.11% (*n*=6) of the total veteran population, the third largest population, and averaged a GPA of 2.80 the lowest among program veteran educational backgrounds. Veteran participants who had achieved a high school diploma was the second largest population. This population accounted for 38.89% (*n*=21) of the total population. This population averaged a GPA of 3.24, third highest among educational backgrounds. Veteran participants who had college experience accounted for 42.60% (*n*=22) of the total population.

Table 17

Background Education of Veteran Students Comparison

Background Education Classification	Number of Participants	Population Grade Point Average	σ	Variance	ANOVA P-Value	X^2
GED	6	2.80	0.409	0.167	N/A	N/A
High School Diploma	21	3.24	0.682	0.465	N/A	N/A
Some College	22	3.74	0.359	0.129	N/A	N/A
College Degree	4	3.76	0.392	0.153	N/A	N/A
Total	**53**	**3.44**	**0.603**	**0.364**	**5.16^{-4}**	**1.19^{-4}**

Note. Data collected in the study.

This population averaged a GPA of 3.74, the highest among veteran educational backgrounds. The fourth educational background was that of veteran participants holding college degrees. This population was the smallest population accounting for 7.40% (*n*=4) of the total veteran educational background populations and had the highest average GPA at 3.76. Special attention should be considered among the total number of participants in each educational background which can alter the immediate reactions to GPA among the veteran population.

Table 18

Non-Veteran and Veteran GED Comparison

Background Veteran Education Classification	Number of Participants	Population Grade Point Average	σ	Variance	Total Population Grade Point Average	T-Test P-Value	X^2
Non-Veteran GED	2	3.50	5^{-3}	5^{-5}	2.97	N/A	N/A
Veteran GED	6	2.80	0.409	0.167	2.97	N/A	N/A
Total	**8**	**N/A**	**N/A**	**N/A**	**2.97**	**8.81^{-3}**	**1.57^{-1}**

Note. Data collected in the study.

Non-veteran and veteran comparison. Tables 18 through 21 displayed a breakdown of the performance of the non-veteran versus veteran participants in the environmental science program based on their educational background. The total populations of specific educational background population's GPAs were analyzed over four different comparisons to determine if specific educational background affected veteran performance. Grade Point Averages were measured on a 4.0 grading scale and the total population GPA of each specific education background was also provided to have a benchmark to assess how veterans performed relative to the entire population for the specific educational background and their non-veteran counterparts.

Non-veteran and veteran GED comparison. The comparison in Table 18 focused on the population of students in the environmental science program who entered the program with GEDs. The non-veteran population was the smaller population with two participants. This population accounted for 25% (*n*=2) of the total GED population and averaged a GPA of 3.50, higher than both the veteran counterpart GPA and the total GPA of the entire GED population. The veteran GED population was the larger population and accounted for 75% (*n*=6) of the total population in the program and averaged a GPA of 2.80, lower than both the non-veteran counterpart GPA and the 2.97 total GPA of the entire GED population.

Table 19

Non-Veteran and Veteran High School Diploma Comparison

Background Education Classification	Number of Participants	Population Grade Point Average	σ	Variance	Total Population Grade Point Average	T-Test P-Value
Non-Veteran High School Diploma	41	3.39	0.593	0.351	3.36	N/A
Veteran High School Diploma	21	3.24	0.682	0.465	3.36	N/A
Total	**62**	**N/A**	**N/A**	**N/A**	**3.36**	**3.83^{-1}**

Note. Data collected in the study.

Non-veteran and veteran high school diploma comparison. Table 19 focused on the comparison of veteran and non-veteran participants in the environmental science program in which entered with only a high school diploma. The non-veteran population was the larger population and accounted for 66.13% (*n*=41) total category's participants. This population averaged a GPA of 3.39 higher than both the veteran counterpart GPA and the total GPA of the total high school diploma population. The veteran participants with a high school diploma accounted for 33.87% (*n*=21) of the category's population. Non-veteran high school graduated averaged a GPA of 3.24, lower than both the veteran counterpart GPA and the total 3.36 GPA of the entire high school graduate total population.

Table 20

Non-Veteran and Veteran with College Experience Comparison

Background Education Classification	Number of Participants	Population Grade Point Average	σ	Variance	Total Population Grade Point Average	T-Test P-Value	X^2
Non-Veteran College Experience	13	3.74	0.465	0.216	3.74	N/A	N/A
Veteran College Experience	23	3.74	0.375	0.140	3.74	N/A	N/A
Total	**36**	**N/A**	**N/A**	**N/A**	**3.74**	**9.71^{-1}**	**1.28^{-1}**

Note. Data collected in the study.

Non-veteran and veteran with college experience comparison. Table 20 focused on the veteran and non-veteran participants in the environmental science program in which entered with college experience. The non-veteran population was the smaller population and accounted for 36.11% (*n*=13) of the total population and averaged a GPA of 3.74, which was tied with veteran GPA in this category as well as the total GPA of the entire college experienced population. The population of veterans with college experience was the larger population accounting for 63.89% (*n*=23) of the total population. This population averaged a GPA of 3.74, tied with the non-veteran counterpart GPA and the 3.74 total GPA of the entire college experienced population.

Table 21

Non-Veteran and Veteran College Degree Comparison

Background Education Classification	Number of Participants	Population Grade Point Average	σ	Variance	Total Population Grade Point Average	T-Test P-Value
Non-Veteran College Degree	1	4.0	Not Enough Values	Not Enough Values	3.71	Not Enough Values
Veteran College Degree	4	3.76	0.392	0.153	3.71	Not Enough Values
Total	**5**	**N/A**	**N/A**	**N/A**	**3.44**	**Not Enough Values**

Note. Data collected in the study.

Non-veteran and veteran college degree comparison. Table 21 consisted of a comparison focused on the veteran and non-veteran participants in the environmental science program in which entered with completed college degree. The non-veteran population was the smaller population accounting for 20% (n=1) of the total category's population. The non-veteran degree holding GPA was 4.0, which was higher than both the veteran counterpart GPA and the total GPA of the category's population. The veteran degree holding population was the larger population accounting for 80% (n=4) of the category's total population. This population averaged a GPA of 3.71, lower than both non-veteran counterpart GPA and the 3.71 total GPA of the entire college experienced population. Special attention should be considered among the total number of participants in each educational background which can alter the immediate reactions to GPA among the veteran population.

Null Hypothesis 4 stated there was no difference between educational background and the retention and achievement rates in the environmental science program. To investigate this hypothesis, ANOVA analysis, Independent Samples t-Tests and chi-square tests comparing performance of disabled veteran status and GPA performance were performed (see Table 17-21). Based on the data compiled in Tables 17, Null Hypothesis 4 was rejected.

Table 22

Total Participants Gender Performance Comparison

Gender	Number of Participants	Percentage of Total Enrollment	Population Grade Point Average	σ	Variance	T-Test P-Value
Males	67	60.36	3.44	0.572	0.327	N/A
Females	44	36.64	3.46	0.597	0.357	N/A
Total	**111**	**100**	**N/A**	**N/A**	**N/A**	**5.39^{-1}**

Note. Data collected in the study.

Total participants gender performance comparison. Table 22 displayed a breakdown of the performance of the male and female student populations based on gender in the environmental science program. The total populations of the gender specific population's GPAs were analyzed over four different comparisons to determine if gender affected veteran performance. GPAs were measured on a 4.0 grading scale and the total veteran population GPA of 3.44 was also provided to have a benchmark to assess how male and female veterans performed relative to the total veteran population's GPA and their non-veteran counterparts.

The comparison in Table 22 is between the total male and female populations in the environmental science program. The male population was the larger of the two populations accounting for 60.36% (n=67) of the total participants. This population averaged a GPA of 3.44 less than the average GPA of the total female population. The

total female population accounted 39.64% (*n*=44) of the total population and averaged a GPA of 3.46, which was higher than the average GPA of the male population in the program.

Table 23

Veteran Versus Non-Veteran Gender Performance Comparison

Gender	Number of Participants	Percentage of Total Enrollment	Population Grade Point Average	σ	Variance	ANOVA P-Value	X^2
Veteran Males	42	37.84	3.49	0.469	0.220	9.28^{-1}	8.82^{-4}
Non-Veteran Males	25	22.52	3.40	0.579	0.336	9.28^{-1}	8.82^{-4}
Veteran Females	11	9.90	3.40	0.635	0.403	9.28^{-1}	8.82^{-4}
Non-Veteran Females	33	29.73	3.52	0.534	0.285	9.28^{-1}	8.82^{-4}
Total	**111**	**100**	**N/A**	**N/A**	**N/A**	**9.28^{-1}**	**8.82^{-4}**

Note. Data collected in the study.

Veteran versus non-veteran gender performance comparison. Table 23 consisted of a breakdown and comparison of veteran and non-veteran participants centered based on gender in the environmental science program. The veteran male population was the largest population and accounted for 37.84% (*n*=42) of the total program population. The veteran male average GPA was 3.49, the second highest among this comparison and higher than they non-veteran male population average GPA of 3.40.

The non-veteran male population was the second largest population accounting for 22.52% (*n*=25) of the total program population. The non-veteran male GPA was 3.40, which was tied for the third highest average GPA, and was lower than then the veteran male average of 3.49. The veteran female population was the smallest population accounting for 9.90% (*n*=11) of the total program population.

The veteran female average GPA was 3.40, which was tied for the third highest average GPA with the non-veteran male population and was lower than the non-veteran female population of 3.52. The non-veteran female population was the second largest population and accounted for 29.73% (*n*=33) of the total program population. The non-veteran female average GPA was 3.52, which was the highest average GPA amongst this comparison category and higher than the veteran female population average GPA of 3.40.

Environmental science program comparison of male and female veterans. Table 24 focused on male and female veteran participants in the environmental science program. The veteran male population was the largest population and accounted for 79.25% (*n*=42) of the category's population. The veteran male averaged a GPA of 3.49, higher than the female veteran counterpart's average GPA of 3.40. The female veteran population was the smaller population and accounted for 20.75% (*n*=12) of the total category's population. The veteran female average GPA was 3.40, which was lower than the male counterpart's average GPA of 3.49 in this comparison.

Table 24

Environmental Science Program Veteran Gender Performance Comparison

Gender	Number of Participants	Percentage of Total Enrollment	Population Grade Point Average	σ	Variance	T-Test P-Value	X^2
Veteran Males	42	79.25	3.49	0.471	0.222	N/A	N/A
Veteran Females	11	20.75	3.40	0.635	0.403	N/A	N/A
Total	**53**	**100**	**N/A**	**N/A**	**N/A**	**9.74^{-1}**	**6.79^{-5}**

Note. Data collected in the study.

Table 25 consisted of a comparison of non-veteran male and female participants in the environmental science program. The non-veteran male population was the largest population accounting for 43.86% (*n*=25) of the total population in this comparison. The veteran male population averaged a GPA of 3.40, lower than the female non-veteran counterparts 3.52 average GPA. The female veteran population was the smaller population accounting for 72.73% (*n*=32) of the total participants in this comparison. The veteran female average GPA was 3.52, which was higher than the male counterpart's average GPA of 3.40 in this comparison.

Table 25

Environmental Science Program Non-Veteran Gender Performance Comparison

Gender	Number of Participants	Population Grade Point Average	σ	Variance	T-Test P-Value
Non-Veteran Males	25	3.40	0.579	0.336	N/A
Non-Veteran Females	33	3.52	0.526	0.276	N/A
Total	**58**	**N/A**	**N/A**	**N/A**	**5.47^{-1}**

Note. Data collected in the study.

Null Hypothesis 5 stated there was no difference between gender and the retention and achievement rates in the environmental science program. To investigate this hypothesis, ANOVA analysis, Independent Samples t-Test, and chi-square tests compared performance of disabled veteran status and GPA performance (see Tables 22-25). Based on the data compiled in Tables 22 through 25, Null Hypothesis 5 was unable to be rejected.

Environmental science program completers. Tables 26 and 27 displayed a breakdown of the total completers of the environmental science program by gender, veteran, and non-veteran categories and their relative GPA performance within the program. GPAs were measured on a 4.0 grading scale and compared to assess the population's performance in the environmental science program to their counterparts. Of the total 111 environmental science program population, only 11 participants had

completed the course of study by January 2017. The total completer population averaged a final GPA of 3.69 is the benchmark in which to access individual population specific performance.

Table 26

Environmental Science Program Completers Gender Comparison

Completer Category	Number of Participants	Population Grade Point Average	σ	Variance	Total Completer GPA	T-Test P-Value	X^2
Male	8	3.60	0.330	0.108	3.69	N/A	N/A
Female	3	3.93	0.063	0.004	3.69	N/A	N/A
Total	**11**	**N/A**	**N/A**	**N/A**	**3.69**	**2.93^{-2}**	**1.32^{-1}**

Note. Data collected in the study.

Environmental science program completers gender comparison. Table 26 consists of a comparison of the GPA performance of male and female completers in the environmental science program. The male population was the larger population with and accounted for 72.73% (*n*=8) of the total completer enrollment. The male completer average GPA was 3.60, lower than the female completer average of 3.93 and the total completer GPA of 3.69. The female completer population accounted for 27.27 of the comparison's total population. This population averaged a GPA of 3.93 higher than the male completer average GPA of 3.60 and the total completer GPA of 3.69.

Environmental science program completer veteran and non-veteran comparison. Table 27 consisted of a comparison of the GPA performance of veteran and non-veteran completers in the environmental science program. The veteran population was the larger population with and accounted for 72.73% (*n*=8) of the total completer enrollment. The veteran completer average GPA was 3.70, higher than the non-veteran completer average of 3.67 and the total completer GPA of 3.69. The non-veteran completer population accounted for 27.27% (*n*=3) of the comparison's total population. This population averaged a GPA of 3.67 lower than the male completer average GPA of 3.70 and the total completer GPA of 3.69.

Table 27

Environmental Science Program Completer Veteran and Non-Veteran Comparison

Completer Category	Number of Participants	Population Grade Point Average	σ	Variance	Total Completer GPA	T-Test P-Value	X^2
Veteran	8	3.70	0.352	0.124	3.69	N/A	N/A
Non-Veteran	3	3.67	0.256	0.066	3.69	N/A	N/A
Total	**11**	**N/A**	**N/A**	**N/A**	**3.69**	**8.99^{-1}**	**1.32^{-1}**

Note. Data collected in the study.

Environmental science program completer successful implemented strategies. Table 28 displayed a breakdown of the total completers of the environmental science program by responses to the exit interview. Of the total 111 environmental

science program population, only 11 participants had completed the course of study by January 2017. The successful strategy of budgeting time accounted for 90.90% (*n*=10) of the total population of this comparison. One completer (*n*=1) accounted for 10.10% of the total completer population who did not complete the exit interview.

Table 28

Environmental Science Program Completer Successful Implemented Strategies

Completer Category	Number of Students	%
Budgeting Time	10	90.9
No Response	1	10.1
Total	11	100

Note. Data collected in the study.

Environmental science program completer change in living situation. Table 29 displayed the change in participants living situation post-graduation from the environmental science program. Both enrollment into four-year institutions and obtaining a higher paying job accounted for 18.18% (*n*=2) of the total completer changes in living situations total populations. No change in current situations accounted for 63.64% (*n*=7) of the total completer population. Special attention should be considered among the total number of completer participants in each comparison which can alter the immediate reactions to the success of completers post-graduation.

Table 29

Environmental Science Program Completer Change in Living Situation

Completer Category	Number of Students	%
Enrolled in a Four-Year Institution	2	18.18
Obtained a Higher Paying Job	2	18.18
No Change Reported	7	63.64
Total	11	100

Note. Data collected in the study.

Qualitative Data

The research methodology included a qualitative component to provide a better understanding of the issues and to add insight to the research questions focused on the barriers facing veteran students while enrolled in applied sciences degrees. The following research question guided the qualitative portion of this study: What obstacles (based on the Education Plan) do veterans face in an applied science program at the community college level and what strategies (based on the Career Education Plan) do they employ to overcome the particular barriers? The qualitative portion of this study involved reviewing the responses of an Entrance Survey (see Appendix A) and the Career Education Plan Survey (see Appendix D) provided to the 111 participants, 53 veterans and 58 non-veterans, enrolled in the environmental science program from 2014-2017; the same veteran and non-veteran participants were used in the quantitative portion of this

study. Both surveys were provided to each participant upon enrollment into the environmental science program with the Career Education Plan being presented again upon completion of the program. The entrance survey consisted of seven items requesting participants to provide their student identification number, method of recruitment to the program, a contact email, level of education, and marital status to be used in part in the quantitative results section.

Table 30

Environmental Science Program Responses Regarding Perceived Barriers

Perceived barrier	Number of students	%
Time Management	46	41.45
Financial Issues	26	13.51
Cognitive Issues	15	23.43
Returning to Education	3	2.70
No Barriers Reported	21	18.91
Total	111	100

Note. Data collected in the study.

Career Education Plan

The Career Education Plan was comprised of six items which asked students to provide their educational goals, their perceived barriers to completing their goals,

strategies to overcome their barriers (entrance interview), the success of their devised strategies (exit interview), and status upon graduating the program. The Implementation of these surveys served three purposes: (a) to assess the perception of common barriers both veteran and non-veteran students felt they faced completing an applied science program; (b) to identify specific barriers veteran students in applied science programs face; (c) to gain insight into any common strategies veterans use to overcome their perceived barriers while in applied science programs.

In addition to follow up questions after a participant had graduated from the program, the Career Education Plan consisted of four open ended questions used for the purpose of collecting qualitative data and to further explore the research questions. Questions located in the Initial Meeting section were the open-ended survey questions, which allowed participants to share their goals, the barriers in which they felt would prevent each from achieving their goals, and the strategies they felt they could use to overcome their barriers. The responses to the survey were coded by identifying commonly cited responses in the data and representing the findings supported by the evidence and substantiated with quotes from the survey participants.

The question located in the Completion Interview section focused on the participants' assessments of the strategies each student proposed in the initial meeting while entering the program. The responses were used to identify if the participant's proposed strategies were successfully utilized while completing the program. Both the Initial Meeting and Completion Interview numerical results were discussed in the quantitative section. The Follow Up section contained information regarding post program completion participant data. This information was used to identify if participants

who had gained new employment or continued their education in environmental science at the bachelor's level.

Four Major Barriers Identified by Participants

Qualitatively the Career Education Plan yielded useful information (see Table 30). Using the comments provided by the participants, four major barriers emerged. The four major barriers in which emerged from the open-ended survey responses: a) time management, b) financial concerns, c) cognitive issues resulting from injuries, and d) ability to return to school after a prolonged period of time. Twenty-one participants did not feel they had any barriers preventing them from being able to complete the program listed in the quantitative data.

Time management. The most prevalent responses in the open-ended comments regarded the barrier of time management veterans experienced while in the program. Major concerns centered around managing family obligations and budgeting time for coursework in the program while working full time.

Managing family obligations. One of the major areas of concern regarding time management expressed by the participants was trying to manage their courseloads with family obligations. One participant explained his active family were involved in many sporting and school events that took place during scheduled course times and, therefore, affected his ability to keep up with the coursework. Another example of family obligation came from a single mother within the program who stated taking college classes were difficult with her "working seven days a week and taking care of my baby by myself."

Budgeting time. Another area of concern of time management expressed by participants was how to budget time from coursework while maintaining a full-time job. One veteran student stated:

> My current and largest barrier is that I am currently active duty military. I feel it will be very hard to work and keep my chain of command informed of my school obligations, if I fall behind its going to be hard to catch up.

Another participant referenced budgeting time as a major area of concern stated, "Having my own business, I have to schedule my work around class times." Other statements made by participants ranged from one-word answers such as "scheduling" to "Procrastination and time management skills."

Financial concerns. The second most prevalent responses in the open-ended comments regarded the barrier of financial responsibilities while in the program. Major concern centered around finding sources of funding for non-tuition waived courses. Many of the program specific courses had tuition covered under the TACCCAT Grant, allowing many students to enter a program at a significantly lower cost. One student cited, "The barrier that could prevent me from achieving my goals is insufficient financial resources to pay for non-tuition waived courses." Other statements varied from simple statements such as, "Money for school" to statements about work status, "I am working full time to support myself and it is hard to come up with student funds" and "I work two jobs to support myself as well as attend school, sometimes finding time or being under stress is hard to handle."

Cognitive issues resulting from injuries sustained in military. The third most prevalent responses in the open-ended comments regarded the barrier of disabilities

resulting from sustained injuries. Major concern centered around cognitive issues resulting from injuries while serving a tour of duty. The major area of concern dealing with disabilities resulting from sustained injuries centered around participants' decreased cognitive abilities. Many participants who were identified as disabled were concerned their memories would not allow them to be successful in the program. One veteran explained, "Due to an IED blast in Afghanistan, I have some issues with retaining new information. I can form new memories it just takes longer." Another veteran student wrote the same experience, stating, "It's really hard for me to get things quickly after coming back home" and "my mild traumatic brain injury may cause some issues."

Returning to education. The fourth most prevalent responses in the open-ended comments regarded the barrier of returning to education after a major period of time. Major concerns centered around attempting to acclimate to the education setting.

Acclimating to an education setting. The major area of concern dealing with returning to education focused on the attempts to acclimate to an education setting. Many participants felt an extended amount of time away from an educational setting was detrimental as they would have to relearn how to study and attend scheduled classes. A participant explained, "Being that I have been out of school for a long time, I will have to adjust to maintaining good study habits and managing my responsibilities." The second veteran in this theme stated, "The transition from the military" as their biggest obstacle. While the third participant's answer was "coming back to school." Null Hypothesis 6 stated there are no major obstacles facing veterans in applied science programs at the community college level. After reviewing the qualitative data compiled in Table 30, four major barriers affecting veterans emerged: a) time management, b) financial concerns, c)

cognitive issues resulting from injuries, and d) ability to return to school after a prolonged period of time, based on this information this hypothesis is rejected.

Successful Strategies of Completers

The Completion Interview section provided qualitative data concerning how successful completers of the program strategies felt the strategies presented in the initial meeting, were aiding in the completion of the program and if any participant's situations changed since completion of the program. Upon review, one strategy emerged as commonality between completers: budgeting time. Regarding changes in participant's current situation two results emerged: (a) obtained a higher compensation job and (b) attending a four-year institution to complete a bachelor's degree (see Table 29). However, the total completer population must be noted as a limiting factor, due to the fact only 11 participants in the environmental science program had completed the program as of January 2017. Of the 11 completers, one participant did not complete the exit survey and five participants reported no change in their employment or educational status after completion in the program.

Budgeting time. The most prevalent responses in the open-ended comments regarded the success of a participants proposed strategies to overcome was budgeting time correctly. Many of the completers felt they could set aside certain times during the week to allow them to complete their assignments and study. This strategy was echoed by the statement by a veteran completer:

> By setting aside time I was able to realize I could learn anything if I put for the effort and time. This was a huge step for me. I have a better sense of accomplishment and feel better about takin on new challenges.

Changes in participants' situations. The two most prevalent responses in the open-ended questions regarding how their current situations have changed since completing the program was: (1) enrolling a four-year institution upon completion of the program and (2) obtaining a higher paying job in the environmental field. Four total completers reported changes in their current situation after completion of the program. Two participants reported taking advantage of the program's articulation with area four-year institutions to complete their bachelor's degrees while the remaining two reported obtaining higher paying jobs in the environmental field. One participant stated, "Thanks to the program, I was able to gain a better job in the environmental field." Null Hypothesis 7 stated there were no common strategies employed by veteran students in applied science programs at the community college level to overcome perceived barriers. After reviewing the qualitative data compiled in Table 28, one strategy emerged as commonality between completers: budgeting time, based on this data this hypothesis is rejected.

Summary

The mixed-methods results from this study were presented in Chapter Four. The quantitative data and descriptive statistics were reported in tables, and the qualitative data were reported in categories determined from the responses to the qualitative survey response throughout the data analysis process. Chapter Five includes a summary of the findings, conclusions, recommendations for further research, and implications for practice.

Chapter Five: Summary and Conclusions

The purpose of this study was to determine the presence (or absence) of barriers that hindered the ability of veteran student populations to complete degrees in applied sciences field, as well as to identify and understand any detected barriers. The study examined the scholastic performances of veteran and non-veteran participants enrolled in the environmental science program at the participating community college to determine if veteran participants perform, as well as their non-veteran counterparts in applied science programs. The research process was divided into two sections. The veteran and non-veteran academic performances were assessed through a series of ANOVA analysis, chi-square tests and Independent Samples t-Test comparisons. Qualitative data was reviewed for common themes utilizing a latent content analysis approach.

Findings

Research Question 1. *Do veteran participants perform as well academically as non-veteran students completing degrees in applied sciences at the community college level?*

Upon review of the academic assessments of veteran and non-veteran participants, the researcher concluded that there was not a significant difference in performance between veteran and non-veteran students in the environmental science program. Quantitative data review of the 111 environmental science participants supported this conclusion as the average GPA performance of 53 veteran participants and 58 non-veteran students were 3.44 and 3.50 respectively. While the veteran participants achieved slightly higher grade point averages, the 0.06 GPA disparity was not indicative of a significant difference in academic performance. This conclusion was tested further

with two additional data analysis comparisons—male veterans versus male non-veterans and female veterans versus female non-veterans.

The second comparison reviewed the GPA performance of male veteran and male non-veteran participants. The veteran male population was the larger population with 42 participants, which averaged a GPA of 3.49. The male non-veteran population contained 25 participants and averaged a 3.43 GPA. Similar to the large group comparison, the 0.06 difference in GPA was not an indicator of superior performance. The third comparison reviewed the GPA performance of female veteran and non-veteran participants. The veteran female population of 12 participants averaged a GPA of 3.40. The non-veteran female population included 32 participants and average GPA was 3.52, a 0.12 difference. Upon review of the data, an observation was made that male veterans performed better scholastically than non-veteran males, while non-veteran female performed better than veteran females. However, the difference between the average GPAs was not significant enough to denote a major difference in veteran to non-veteran performance in the environmental science program.

Research Question 2. *Did the following factors affect veteran retention and achievement rates in the environmental science program at the community college level?*

a) *Military Occupational Specialty (MOS)*

b) *Disabled Veteran Status*

c) *Education background prior to joining the environmental science program*

d) *Gender*

Upon review of veteran retention and achievement rates in the environmental science program, certain significant differences in the performance of veteran students based on MOS, disability status, education background, and gender were determined.

Military Occupation Specialty. The comparison of the MOSs in the environmental science program contained seven specialties to include: a) engineer, b) infantry, c) chemical, d) drill sergeant/trainer, e) mechanic, f) medical, and g) information technology, all with varying total group populations and GPA's. The specific MOS GPA's were compared against each other and the average veteran GPA of 3.44 to provide a benchmark to assess how individual MOS groups performed relative to the total veteran population.

Sixteen engineers made up the largest group of veteran participants in the program. Engineers averaged a GPA of 3.44, which was the fifth highest among program MOSs, 0.56 below the highest MOS GPA in the Medical field, and equal to the average GPA of the total veteran population. Infantry was the second largest veteran population with 13 participants. Infantry veterans averaged a GPA of 3.27, which was the lowest among program MOSs, 0.73 below the Medical MOS, and 0.17 below the 3.44 total veteran GPA. The Chemical MOS was the third largest veteran population with 10 participants. The Chemical MOS averaged a 3.69 GPA, which was fourth highest among program MOSs, 0.31 below the Medical MOS, and 0.25 above the average performance of the total veteran population.

The Drill Sergeant/Trainer MOS was the fourth largest veteran population with eight participants. The Drill Sergeant/Trainer MOSs averaged a GPA of 3.29, which was sixth highest among program MOSs, 0.71 below the Medical MOS, and 0.15 below the

average performance of the total veteran population. The Mechanic MOS was the fifth largest veteran population with four participants. Mechanic MOSs average GPA was 3.72, third highest among program MOSs, 0.28 below the Medical MOS, and 0.28 above the average performance of the total veteran population. The Medical MOS was tied for the sixth lowest veteran population with the information technology MOS which had one participant. The Medical MOS averaged the highest GPA in the comparison at 4.0, 0.56 above the total veteran average. The Information Technology MOS averaged a GPA of 3.79 the second highest GPA, 0.21 below the Medical MOS, and 0.35 above the average performance of the total veteran population.

The metrics for MOS groups indicated certain MOSs displayed better achievement and retention rates than others within the environmental science program. Of the seven MOSs, five MOSs had higher GPAs than the total veteran average, one equal to the total average, and one below the average. With a majority of MOSs performing better than the total veteran population GPA, it suggests that certain MOSs have better retention and achievement rates in applied science programs. This determination was further supported by the range between the highest and lowest performing MOSs. The highest performing MOS, Medical, averaged a GPA of 4.0, while the lowest performing MOS, Infantry, averaged 3.27 with a significant difference of 0.73 in comparison with certain MOSs.

Disability status. Upon review of the veteran students' disability statuses, data indicated it did not significantly affect veteran retention and achievement rates in the environmental science program. Quantitative data review of the 53 veteran participants of the program supported this conclusion as the average GPA performance of 18 disabled

veteran participants and 35 non-disabled veteran participants were 3.39 and 3.50 respectively. When compared to the average GPA of the total veteran population, disabled veterans' 3.39 GPA was 0.04 points lower than the total veteran population of 3.44. The 0.11 and 0.05 variances were not significant enough to indicate a difference in veteran retention and achievement rates based on disability status. Four additional comparisons were also used to further this conclusion centering on disabled males versus females, male to female non-disabled, disabled to non-disabled male, and disabled to non-disabled female veterans.

The second comparison reviewed the GPA performance of the total disabled veteran by the gender of the participants. The disabled veteran male population consisted of 16 participants, which averaged a GPA of 3.45. The female disabled veteran population included three participants and averaged a 3.06 GPA. In the comparison, the 0.39 was not significant enough to indicate a major difference in performance. The third comparison reviewed the GPA performance of the total non-disabled veteran population by the gender of the participants. The non-disabled veteran male population consisted of 28 participants, which averaged a GPA of 3.53. The female non-disabled veteran population consisted of seven participants which averaged a 3.38 GPA. In the comparison, the 0.15 was not significant enough to indicate a major difference in performance.

The fourth comparison reviewed the GPA performance of the male disabled and non-disabled veterans. The disabled veteran male population consisted of 16 participants, which averaged a GPA of 3.45. The male non-disabled veteran population consisted of 28 participants and averaged a 3.53 GPA. In the comparison, the 0.08 was not significant

enough to indicate a major difference in performance. The final comparison reviewed the GPA performance of the female disabled and non-disabled veterans. The disabled veteran female population consisted of three participants, which averaged a GPA of 3.06. The female non-disabled veteran population consisted of seven participants and averaged a 3.38 GPA. In comparison, the 0.32 was not significant enough to indicate a major difference in performance.

Upon review of the data, a conclusion was made that disability statuses had little effect on the achievement and retention rates in the environmental science program. When evaluating individual populations, the total disabled veteran population's GPA of 3.39 was 0.05 below the total veteran population's average GPA of 3.44. The largest difference in disabled veteran specific categories and total veteran population GPA occurred in disabled female veterans at 0.32. Though this value was larger than others, it was taken into account the total number of participants (n=3), which altered the results. However, this value was not large enough to conclude disability status had a significant effect on veterans in retention and achievement rates.

Prior background education. The comparison of the four-identified prior background education categories in this study indicated a significant effect on veteran performance in the environmental science program. The individual education background categories were compared against each other and the average veteran GPA of 3.44 to assess the particular educational background's performance to the entire veteran population. The first educational background included in the program was classified as veterans who have only completed a GED. This population accounted for six of the total veteran population, averaged a GPA of 2.80, and was 0.64 below the total veteran GPA.

Veteran participants who have achieved a high school diploma consisted of 21 participants of the veteran population and averaged a GPA of 3.24, third highest among educational backgrounds, and 0.20 below the total veteran GPA. Veterans with some college experience were the largest veteran population with 23. This population averaged a GPA of 3.74, the highest among veteran educational backgrounds, and 0.30 points higher than the total veteran population average. The fourth educational background consisted of veteran with an earned college degree. This population was the smallest population with four participants, averaged the highest GPA at 3.76 which was higher than the total veteran population GPA by 0.32.

Upon review of the data an observation can be made that certain educational backgrounds displayed better achievement and retention rates than others within the environmental science program. Of the educational backgrounds, two performed better in average GPA then the total veteran average and two below. Veteran with some college or college degrees performed significantly better than students with high school diplomas or GEDs. This indicated veterans who have experienced college in some fashion perform better than those who have not. This is further evidenced by the range from the higher performed education background, college degrees who 3.76 GPA was 0.96 higher than the lowest performing educational background, GEDs, at 2.80.

Gender. Upon review, gender did not significantly affect veteran retention and achievement rates in the environmental science program. Quantitative data review of the 111 program participants supported this conclusion as the average GPA performance of 67 male participants and 44 female participants was 3.44 and 3.46 respectively, a non-significant difference between the total gender populations of the program. To analyze

veteran specific populations, three additional comparisons were made: a) male and female veterans versus male and female non-veterans, b) male veterans to female veterans, and c) male non-veterans to female non-veterans. The second comparison reviewed the GPA's veterans and non-veterans based on gender. The veteran male population consisted of 42 program participants. The veteran male average GPA was 3.49, 0.09 above the 25 participant non-veteran male population GPA of 3.40, and 0.05 above the total veteran population GPA of 3.44. The veteran female population consisted of 11 participants, of the total program enrollment. The veteran female average GPA was 3.40, 0.12 below the 3.52 GPA average of non-veteran females, and 0.04 below the total veteran population GPA of 3.44.

The third comparison focused on the difference in gender population performances of the veterans in the environmental science program. The veteran male population was the larger population with 42 participants, and averaged a GPA of 3.50, 0.10 higher than the female veteran counterparts 3.40 average GPA, and 0.06 above the total veteran average. The female veteran population was the smaller population with 11 participants, and averaged a GPA was 3.40, 0.04 below the total veteran population average GPA. The fourth comparison focused on the difference in gender population performances of the non-veteran populations in the environmental science program. The female non-veteran population consisted of 33 participants, averaged a GPA of 3.52, was higher than the male counterpart's average GPA, and 0.08 above the total veteran population GPA. The non-veteran male population consisted of 25 participants. The averaged GPA was 3.40, 0.12 below the female non-veteran population, and 0.04 lower than the total veteran population GPA of 3.44.

Upon review of the data, the conclusion can be made that gender does not affect veteran achievement and retention rates within the environmental science program. When evaluating gender populations, every individual population based on gender were within 0.1 of the total veteran population's GPA of 3.44. These values are not large enough to conclude gender has a significant effect on veteran in retention and achievement rates.

Research Question 3. *What obstacles do veterans face in an applied science program at the community college level and what strategies do they employ to overcome the particular barriers?*

Veteran participants in the environmental science program perceived numerous barriers and employ associated strategies to overcome each in the environmental science program. Reviewing the comments provided by program participants, four major barriers emerged: time management, financial responsibilities, cognitive issues, and returning to an educational setting, as well as a group who did not feel they had any barriers. However, due to the small numbers of completers (11) at the time of this study, there was limited the amount of successful strategies employed. Quantitative results indicated 46 participants felt time management was a barrier, 26 stated financial issues, 15 stated issues associated with cognitive issues, three commented on the transition back into education, and 21 did not identify any barriers.

Of the 11 successful program completers, ten participants commented on "time management" as their main barrier and employed a budgeting time strategy to overcome the barrier. This population consisted of eight veterans and three non-veteran participants, and one did not list a barrier or successful strategy. Upon review of the data,

it can be concluded the main barrier while in the environmental science program centered on "time management" and by employing successful "time budgeting" strategies veterans can overcome barriers and become successful in applied sciences degrees.

Hypothesis

Null Hypothesis 1. *There is a no difference between the academic performance of veteran students and non-veteran students completing applied sciences degrees.* Based on the data collected, there was not enough evidence to reject Null Hypothesis 1. Therefore, evidence was unable to reject there was no correlation between academic performance and veteran and non-veteran status of students completing applied sciences degrees.

Null Hypothesis 2. *There is no relationship between certain veterans' MOS and the retention and achievement rates in the environmental science program.* Based on the data collected, there was enough evidence to reject Null Hypothesis 2. Therefore, evidence suggested there was a correlation between veterans' MOS identifiers, retention rates, and achievement rates in the environmental science program.

Null Hypothesis 3. *There is no relationship between certain veterans' disabled statues and the retention and achievement rates in the environmental science program.* Based on the data collected, there was not enough evidence to reject Null Hypothesis 3. Therefore, evidence was unable to reject there was no correlation between veterans' disability status and retention and achievement rates in the environmental science program.

Null Hypothesis 4. *There is no relationship between participant previous education and the veteran retention and achievement rates in the environmental science*

program. Based on the data collected, there was enough evidence to reject Null Hypothesis 4. Therefore, evidence suggested there was a correlation between previous education and the veteran retention and achievement rates in the environmental science program.

Null Hypothesis 5. *There is no difference between veteran genders and the retention and achievement rates in the environmental science program.* Based on the data collected, there was not enough evidence to reject Null Hypothesis 5. Therefore, evidence was unable to reject there was no correlation between veterans' genders and retention and achievement rates in the environmental science program.

Null Hypothesis 6. *There are no major obstacles facing veterans in applied science programs at the community college level.* Based on the data collected, there was enough evidence to reject Null Hypothesis 6. Therefore, evidence suggested there were major obstacles veterans faced when completing applied science programs at the community college level.

Null Hypothesis 7. *There are no common strategies employed by veteran students in applied science programs at the community college level to overcome perceived barriers.* Based on the data collected, there was enough evidence to reject Null Hypothesis 7. Therefore, evidence suggested that there were common strategies employed by veteran students in applied science programs at the community college level to overcome perceived barriers.

The data produced by this study provided invaluable insights into the overall academic performances of veterans in applied science programs. The researcher was able to gain and understanding of the perceived barriers and associated strategies to utilized by

veteran students to ensure success. With the veteran student enrollments constantly rising in higher education, institutions will continually need to improve their veteran services departments to ensure the success of this growing population.

Data Analysis

Many advocates for veterans in state colleges have not been prepared to deal with the varying needs of veteran students (O'Conner, 2013). Many veterans have faced difficult transitions to civilian life, ranging from readjustment issues to physical and mental injury recovery and without special attention, they have faced major obstacles to graduation (O'Conner, 2013). Many of these issues facing veteran students exhibited the major themes discussed in Schlossberg's Transition Theory or the 4 S's method. Typically, Schlossberg's Transition Theory is a framework typically used to understand the main aspects the individuals experience during transitions (Anderson et al., 2012).

The analysis of veteran and non-veteran academic performances in the environmental science program indicated veteran students perform as well academically than non-veteran students in applied sciences programs. These findings suggest that the barriers veteran students identify as obstacles to their completion of applied sciences degrees are similar to non-veterans and can be overcome to successfully transition to higher education.

The analysis of the GPA data of veteran and non-veteran performance indicated veteran students performed as well as non-veteran students. However, upon review, there were factors that affected the academic performance of veteran students. Educational background and MOS seemed to have a correlation to performance of veterans in applied science program as they revealed a significant difference in academic performance when

compared to each other. In contrast, disability status and gender did not display a significant difference in academic performance of veteran participants. However, it was important to note though there was a significant difference based on educational background and MOSs, the populations were not large enough to display a significant effect on overall veteran academic performance.

The analysis of the qualitative data displayed a correlation of veteran barriers and Schlossberg's Transition Theory. As stated, there are four major factors identified by Schlossberg which influence a person's ability to cope with transitions, which are: situation, self, support, and strategies (Anderson et al., 2015). In this study veteran students stated particular barriers that correlate with the 4 S's model during their transition into the environmental science program. The most prevalent responses to the barriers veterans felt affected their ability to be successful were the following: a) time management, b) finances, c) cognitive issues, and d) returning to education. These responses were similar to the 4S's model in the aspect of time management and returning to school correlating with self, cognitive issues correlating with support, and finances correlating with situation. The strategies employed by successful completers of the program all fell under budgeting time, correlating with the strategy aspect the Schlossberg's Transition Theory. Therefore, in order for veteran students to be successful in their transition to higher education, they must spend time planning how to create time to complete their work and address their barrier of time management. When time is invested into preparation of a plan by the veteran, its seems they feel more in control of their situation, similar to the structure they were accustomed to in the military and can lead to success higher education.

Recommendations for Future Studies

This study used a mixed-method approach; however, there were drawbacks and limitations to the design, such as total veteran participants and program completers. The total veteran participants accounted for 47.75% (*n*=53) of the total environmental science program population. While this number of the targeted population was sufficient for analysis at the time of this study, only 9.9% (*n*=11) of the total program population, which included 72.72% (*n*=8) veterans and 27.28% (*n*=3) non-veterans, participants fully completed the program. While the total number of veteran participants allowed for quantitative analysis, a larger completer sample size would have yielded results that were more qualitatively generalizable. In the future, collecting more exit interviews with environmental science program completers would provide a more in-depth view of their perceptions of the barriers and successful strategies.

In addition, future research investigating the effectiveness of veteran resource centers, orientation programs, and services on community college campuses may benefit the current level of understanding for the topic. For example, performing a longitudinal study investigating veteran resource center services and the academic performance of veteran student who utilize them would provide valuable information about the effectiveness of the veteran service centers and their ability to help veteran students transition to higher education. In addition, performing an investigation into what subjects provide the most challenge to veteran students completing applied science program would further validate this study's findings.

Limitations

Initially, the researcher determined five limitations which could affect the outcome of this research. The initial limitations of this study included the following: a) researcher bias, b) reliance of secondary science, c) total veteran participants, d) total completers of the program, and e) completers possibly not finishing their exit interview/surveys. Though each limitation had a slight effect on this research the total veteran population provided the largest obstacle. Fifty-three veterans participated in the environmental science program. Though counting for 48% of the total population this total was not able to provide large quantities of specific populations for comparisons (MOS, educational backgrounds, completers, etc.). This led to some populations being excluded from ANOVA analysis, Independent Sample t-test and chi-square results. This must be taken into account when data was analyzed.

Implications for Practice

The purpose of this study was to understand if there were barriers to the veteran student populations which significantly impacted the ability to complete degrees in the applied sciences field at the community college level. Jones (2017) emphasized that most military veterans were not adequately examined for psychological or physical well-being following their post 9/11 experiences. Current studies on veterans' transitions to higher education have been inadequate and centered on four-year colleges and universities, resulting in higher education administrators not having the needed information to truly help the veteran student population (Jones, 2017). This study was focused on collecting more research on veterans pursuing college degrees.

The research performed in this study indicated veterans enrolled in applied science degrees at the community college level have three factors which can affect the ability to complete. The three factors included: a) MOS, b) Educational Background, and c) time management. These results indicate areas in which institutions can focus to aid in the veteran population's transition to college through creation of veteran services department and intrusive advising

Military Occupational Specialties displayed the largest difference in veteran performance in the environmental science program. Grade point average performances of combat MOSs such as Infantry (3.27) and Drill Sergeant/Trainer (3.29) were significantly below the performance of technical/scientific MOSs of Chemical (3.69) and Medical (4.0). Occupational skill sets paired with the factor of combat tours may affect certain combat focused MOSs ability to transition to higher education. Another factor to consider is the actual training each MOS received, with Infantry and Drill Sergeant/Trainer focusing less on technical skills and more on combat, the veterans are less likely to be taught or use technical and critical thinking skills that are more prevalent in MOSs such as Chemical and Medical. After interpreting this data, the researcher suggests community colleges create veteran resource centers, provide veterans intrusive advising as well as opportunities to enter transition courses which focus on building critical skills needed to be successful in their transition to higher education.

Educational Background exhibited another significant difference in veteran performance. General Equivalency Diploma (2.80) and high school graduates (3.24) average GPAs were significantly lower than veteran with some college experience (3.74) and degree holding veterans (3.76). This indicated veterans who have experienced

college in some fashion perform better than those who have not. Factors in which may play role in these results may be in the state each veteran is in the transition process. Veterans who have already been exposed to college in some form performed better. The exposure to the college atmosphere over time may have conditioned these veterans to the demands of the environment and led to better preparation and execution of the environmental science program requirements. Effective preparation is imperative the veterans' transition to higher education. The researcher would suggest community college create a bridge program within the veteran resource center, to allow veterans who are attempting to transition into college the ability to acclimate to the college lifestyle. These courses could focus on introducing campus resources to the veterans and provide small tasks that would simulate deadlines, assignments, and studying techniques to aid the veterans once they begin courses.

Perceived obstacles were the final factor the research found to be significant was the obstacles veterans felt they encounter while attending the environmental science program. Using the responses provided by the veteran participants, four major barriers emerged. The four major barriers which emerged from the open-ended survey responses included: a) time management, b) financial concerns, c) cognitive issues resulting from injuries, and d) ability to return to school after a prolonged period of time. These particular barriers that correlate with the Schlossberg's Transition Theory's 4 S's model the aspect of time management and returning to school correlating with self, cognitive issues correlating with support, and finances correlating with situation. The strategies employed by successful completers of the program predominantly consisted of budgeting time, correlating with strategy. This indicates to the researcher, in order for veteran

students to be successful in their transition to higher education, they must designate time to complete their work and address time management. Community colleges can aid in this ability by providing intrusive advising in which counselors are able to identify, inform, and direct the veteran students to the specific resources/departments. This requires that institutions provide staff training on veteran needs and the available resources to address them.

As stated before, much of the research on veterans' transitions to higher education have been inadequate and centered on four-year colleges and universities, resulting in higher education administrators not having the needed information to truly help the veteran student population (Jones, 2017). With larger populations and resources many four-year institutions have the ability to address a problem with greater resources than available at the community college level.

The research suggested community colleges need to establish a veteran resource center. By creating a centralized location with veteran specific resources, veteran resource centers can become a location where veterans can associate with others who understand them and obtain the needed resources such as transition materials, meet with counselors, discuss financial aid, and register/attend transition courses in one location. The second approach suggested by the researcher would be to create transition courses tailored to veteran students. Transition courses would focus on the life skills such as time management, research practices, and basic concepts for introductory courses. Courses could be conducted over the summer to create a bridge program or a few weeks prior to each semester to allow veterans the ability to acclimate to the college lifestyle. Utilizing

these implications and practices community colleges can provide this growing population a smooth transition and aid in their academic success.

Conclusions

Veteran students have endured unique challenges when entering or returning to higher education, transitioning from highly structured systems to institutions without the strict rules and regulations. This change can affect veterans' transitions as they are no longer provided the structure they have become accustomed to, and the change can affect their academic performance as they attempt to acclimate to their new situations. In this study, the researcher investigated if there were barriers to the veteran student populations which significantly impacted their abilities to complete degrees in the applied sciences field. With the findings in this study, community college administrators can be better equipped to aid veteran student transitions to community colleges and be academically successful.

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Appendices

Appendix A: Entrance Survey

TACCCAT Round III Grant Student Entrance Survey

Student Identification Number_____

How did you hear about the OTA Program? _____

_____

How did you hear about the grant opportunity for the OTA Program? _____

_____

Alternate email, other than OTC email: _____

What is your highest level of Education? (Please Circle)

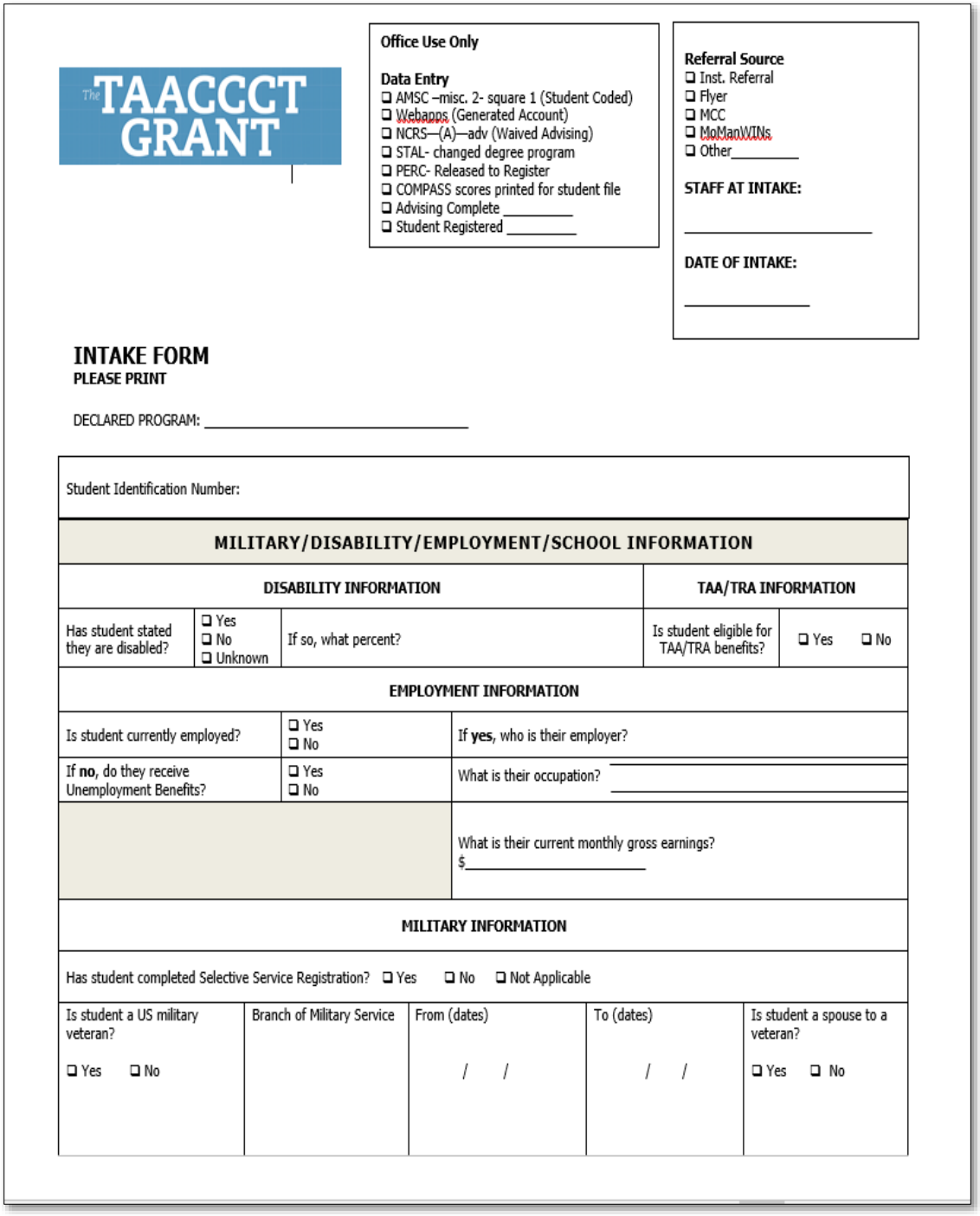
HS Diploma GED 2 Year Degree 4 Year Degree Other_____

How do you prefer to be contacted about grant and OTC updates? (Please circle)

Phone Email Either

Marital Status (please circle): Single Married Other_____

Appendix B: TAACCCT Intake Form



The TAACCCT GRANT

Office Use Only

Data Entry
- ❑ AMSC –misc. 2- square 1 (Student Coded)
- ❑ Webapps (Generated Account)
- ❑ NCRS—(A)—adv (Waived Advising)
- ❑ STAL- changed degree program
- ❑ PERC- Released to Register
- ❑ COMPASS scores printed for student file
- ❑ Advising Complete _____
- ❑ Student Registered _____

Referral Source
- ❑ Inst. Referral
- ❑ Flyer
- ❑ MCC
- ❑ MoManWINs
- ❑ Other_____

STAFF AT INTAKE:

_____

DATE OF INTAKE:

_____

INTAKE FORM

PLEASE PRINT

DECLARED PROGRAM: _____

Student Identification Number:

MILITARY/DISABILITY/EMPLOYMENT/SCHOOL INFORMATION

DISABILITY INFORMATION			**TAA/TRA INFORMATION**	
Has student stated they are disabled?	❑ Yes ❑ No ❑ Unknown	If so, what percent?	Is student eligible for TAA/TRA benefits?	❑ Yes ❑ No

EMPLOYMENT INFORMATION

Is student currently employed?	❑ Yes ❑ No	If **yes**, who is their employer?
If **no**, do they receive Unemployment Benefits?	❑ Yes ❑ No	What is their occupation? _____ _____
		What is their current monthly gross earnings? $_____

MILITARY INFORMATION

Has student completed Selective Service Registration? ❑ Yes ❑ No ❑ Not Applicable

Is student a US military veteran?	Branch of Military Service	From (dates)	To (dates)	Is student a spouse to a veteran?
❑ Yes ❑ No		/ /	/ /	❑ Yes ❑ No

OFFICE USE ONLY		
Acceptance Date to MMW Program:		
Credit accepted for prior learning: ❑ Yes ❑ No Credits:		
COMPASS SCORES- (SEE ATTACHED)	**Post** WorkKeys Assessment Date Taken:	
	Applied Math	Score: ❑ 3 ❑ 6 ❑ 4 ❑ 7 ❑ 5
	Reading for Information	Score: ❑ 3 ❑ 6 ❑ 4 ❑ 7 ❑ 5
	Locating Information	Score: ❑ 3 ❑ 6 ❑ 4 ❑ 7 ❑ 5

Appendix C: Data Collection Form

Worksheet for TAACCCT Round 3 Data Elements for Individual level Data Collection

Student Identification Number: _____

Date of Enrollment: _____
MM/DD/YYYY

Start Session Cohort: (Circle Semester Start)

14/FA 15/SP 15/SU 15/FA 16/SP 16/SU 16/FA

Number of Credit Hours Completed (per semester):

14/FA	*15/SP*	*15/SU*	*15/FA*	*16/SP*	*16/SU*	*16/FA*	*17/SP*	*17/SU*

G.P.A. (per semester):

14/FA	*15/SP*	*15/SU*	*15/FA*	*16/SP*	*16/SU*	*16/FA*	*17/SP*	*17/SU*

End Session (*CT* or *AS* or *Exit*):

14/FA	*15/SP*	*15/SU*	*15/FA*	*16/SP*	*16/SU*	*16/FA*	*17/SP*	*17/SU*

Student was an Exiter: YES NO

Completer was an Incumbent Worker: YES NO UKN

Continued Enrollment in Another Grant-Funded Program: YES NO Notes:

Continued Enrollment in Other Education: YES NO Notes:

Completer Cumulative GPA at Completion: _____

Completer Credit Hours at Completion: _____

Completer Entered Another Education Program: YES NO Notes:

Completer Employed After Program: YES NO Date of Placement into Employment: _____

Completer Entered Employment: YES NO

Completer Retained in Employment: YES NO

Wage Increase for Incumbent Workers: YES NO

Gender: M F Not Disclosed

Race (*check one that applies***):**

Hispanic /Latino	American Indian / or Alaskan Native	Asian	Black or African American	Native Hawaiian or other Pacific Islander	White	More than one Race	Did not disclose

Student Status: Full time Part Time

Incumbent worker: YES NO Not Disclosed

D.O.B.: _____
MM/DD/YYYY

Eligible Veteran Status: YES NO

Individual with a Disability: YES NO Not Disclosed

Pell-grant Eligible: YES NO Not Disclosed

TAA Eligible: YES NO

MO Career Certification (*check one that applies***):**

Veteran	Unemp.	Underemp.	Low Skilled

MTH Course Grades:

MTH 050	*Grade:*				
	Attempt:				
MTH 110:	*Grade:*				
	Attempt:				
MTH 128:	*Grade:*				
	Attempt:				
MTH 130:	*Grade:*				
	Attempt:				
MTH 210:	*Grade:*				
	Attempt:				

Appendix D: Career Education Plan/Exit Survey

Career/Education Plan

Student Identification Number_____

INITIAL MEETING

GOALS: What are your educational and career goals (short term? long term?)

_____
_____
_____

BARRIERS: What barriers could prevent you from achieving your goals?

_____
_____
_____

STRATEGIES: What strategies could help overcome those barriers?

_____
_____
_____

COMPLETION INTERVIEW

After revisiting your goals/barriers/strategies from our first meeting, has anything changed?

_____
_____
_____
_____
_____

Program Start Date:_____ End Date:_____

FOLLOW UP

Continue Education

Type of Degree _____ School _____
Program _____ Location _____

Employment

Employer Name _____ Job Title _____
Location _____ Salary _____
Date of Employment _____

Appendix E: Official JST Request Form

SPECIAL MAIL REQUEST
JOINT SERVICES TRANSCRIPT

OFFICIAL **JST** OFFICIAL

Complete Form, Provide Signature, then E-Mail/Fax :	Mailing Address:
E-mail: jst@doded.mil Fax: 850.473.6013	Commanding Officer NETC JST Technology Operations Center 6490 Saufley Field Road Pensacola, FL 32509

INFO on JST and other Voluntary Education Programs, go to website: https://jst.doded.mil

Signature (NOTE: Must have signature in order to process)	DATE:

PRIVACY ACT INFORMATION – PLEASE TYPE OR PRINT LEGIBLY

"For Official Use Only – Privacy Sensitive – Any misuse or unauthorized disclosure may result in both civil and criminal penalties."

NAME (LAST, FIRST, MI) *Name you served under

SSN (Last Four Digits ONLY)	RATE/RANK	BRANCH OF SERVICE:	CURRENTLY ACTIVE DUTY?

YOUR CONTACT INFORMATION:

E-mail: Phone:

SEND OFFICIAL JST TO THE FOLLOWING ORGANIZATION – NO ABBREVIATIONS PLEASE

NOTE: Official JSTs CANNOT be sent to individuals or Military Education Centers

Name of Organization/Institution

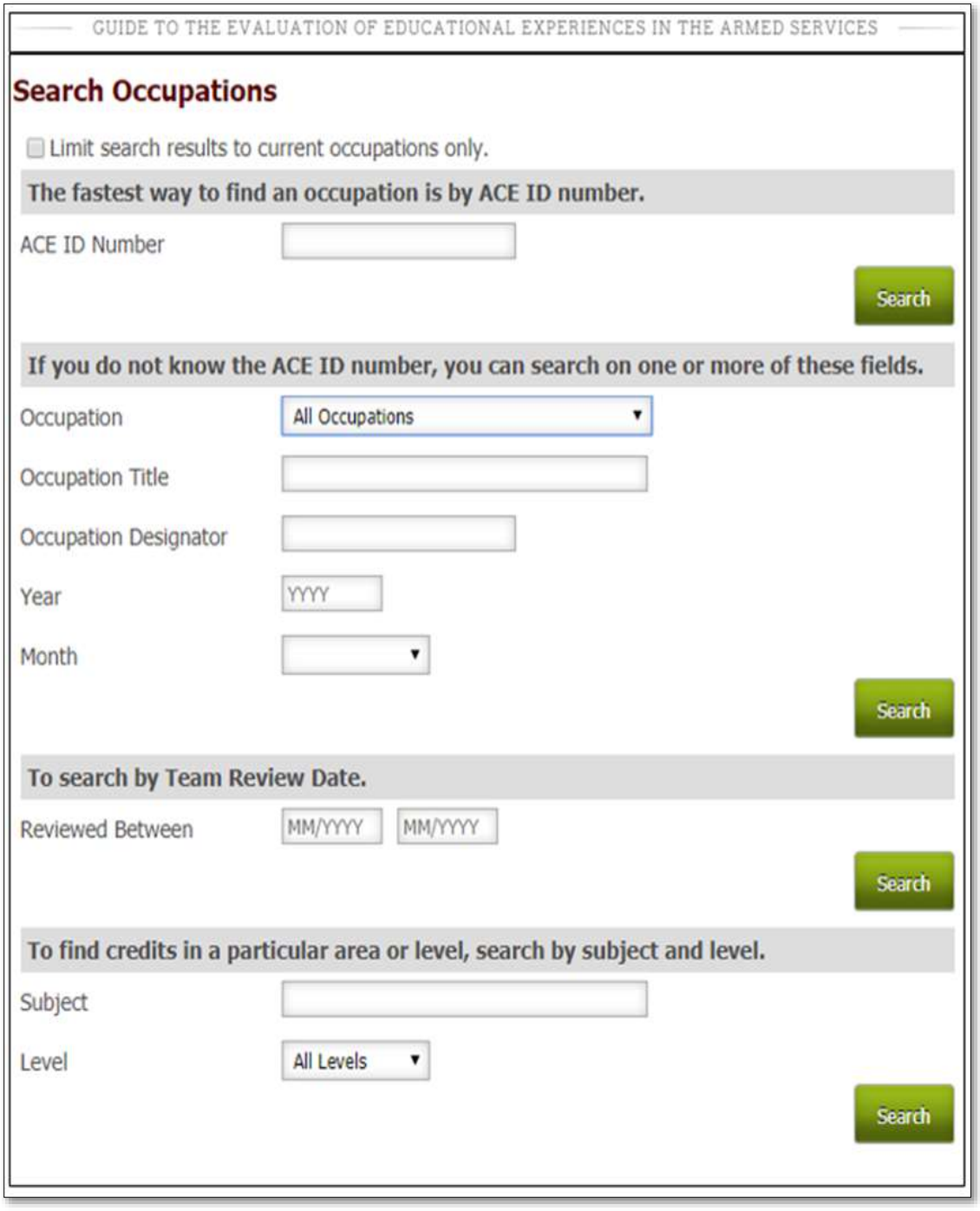
Street Address:	
City, State, Zip:	

POC NAME:	POC PHONE:

POC E-MAIL:

NEED A PERSONAL (UNOFFICIAL COPY)? Please go to the JST website to generate and print your personal copy https://jst.doded.mil	**DATA REQUIRED BY THE PRIVACY ACT OF 1974** **AUTHORITY:** 10 USC, Section 4302 **PRINCIPAL PURPOSES:** To enable the JST system to access its computerized files, retrieve data, and produce a transcript for forwarding to educational institutions designated by the individual. **DISCLOSURE:** Voluntary. Failure to provide required information will complicate, delay, and/or prevent administrative actions needed to produce the transcript and forward it to desired institution. **ELIGIBLE:** 1. Active Duty and Reserve Coast Guard 2. Coast Guard Veterans

Appendix F: ACE's Military Guide



Appendix G: OTC IRB Approval

RE: Alexander Neeley Dissertation Forms

SIMPSON, MATTHEW E.

Thu 5/11/2017 7:11 AM

To: NEELEY, ALEXANDER B. <neeleya@otc.edu>;

Your application to examine barriers for veteran students returning to community college in STEM fields has been approved.

Please let me know of any questions and have a great day,

Matt Simpson
College Director of Research, Strategic Planning and Grant Development
Ozarks Technical Community College
1001 East Chestnut Expressway
Springfield, Missouri 65802
simpsonm@otc.edu
417-447-2648
Information Commons 205I

From: NEELEY, ALEXANDER B.
Sent: Friday, May 5, 2017 9:40 AM
To: SIMPSON, MATTHEW E. <simpsonm@otc.edu>
Subject: Alexander Neeley Dissertation Forms

Matthew,

Thanks for the reply. I have attached copied over the information from the website as well as attached the completed documents to this email. Please let me know if there is anything else I need to provide to complete this review process.

Best Regards,

Alexander Neeley

Project Personnel - Lead Investigator Name *Alexander Neeley

Principal Investigator E-Mail Address *

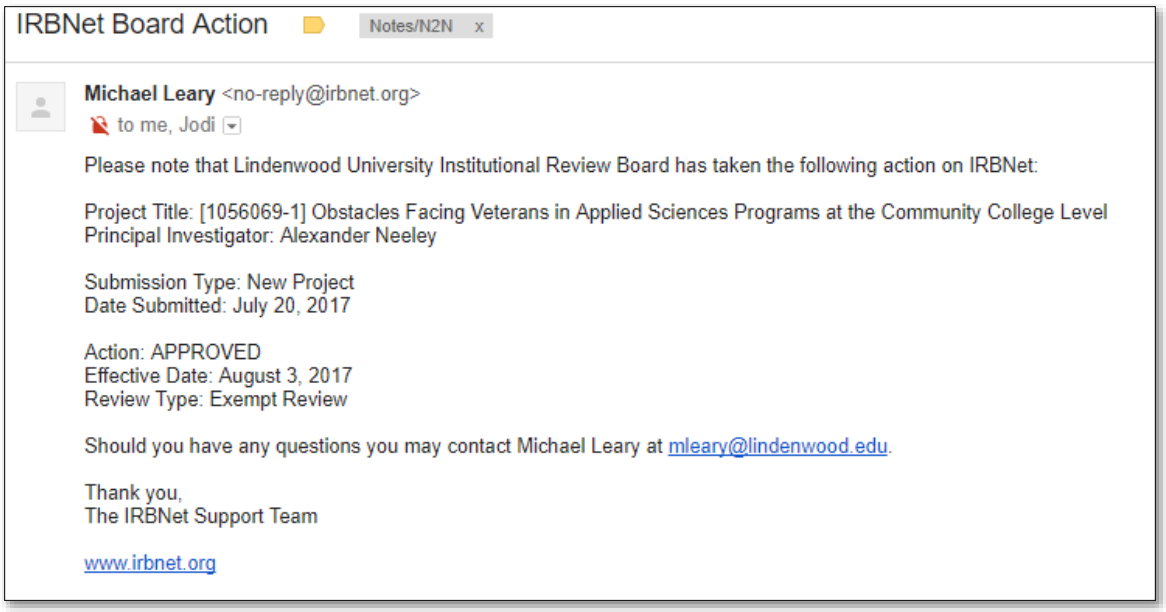
aneeley113@gmail.com

Division (if OTC employee)Environmental Science

Department (if OTC employee)Life Science

Project Title *Obstacles Facing Veterans Entering the Science, Technology, Engineering, and Mathematics (STEM) Field at the Community College Level

Appendix H: Lindenwood IRB Approval



IRBNet Board Action Notes/N2N x

Michael Leary <no-reply@irbnet.org>
to me, Jodi

Please note that Lindenwood University Institutional Review Board has taken the following action on IRBNet:

Project Title: [1056069-1] Obstacles Facing Veterans in Applied Sciences Programs at the Community College Level
Principal Investigator: Alexander Neeley

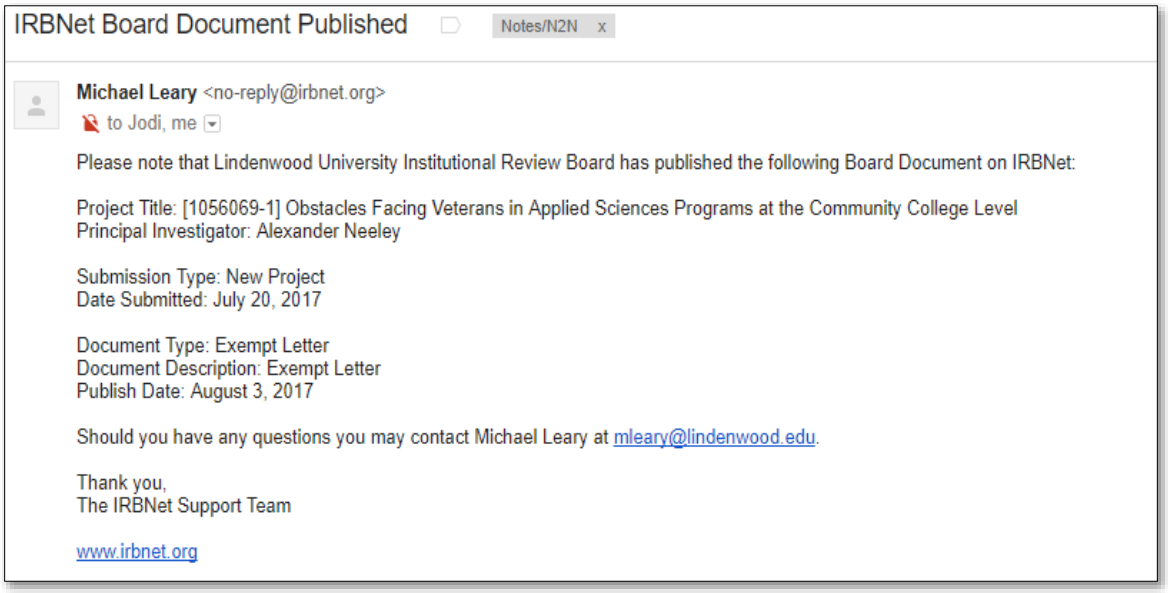
Submission Type: New Project
Date Submitted: July 20, 2017

Action: APPROVED
Effective Date: August 3, 2017
Review Type: Exempt Review

Should you have any questions you may contact Michael Leary at mleary@lindenwood.edu.

Thank you,
The IRBNet Support Team

www.irbnet.org



IRBNet Board Document Published Notes/N2N x

Michael Leary <no-reply@irbnet.org>
to Jodi, me

Please note that Lindenwood University Institutional Review Board has published the following Board Document on IRBNet:

Project Title: [1056069-1] Obstacles Facing Veterans in Applied Sciences Programs at the Community College Level
Principal Investigator: Alexander Neeley

Submission Type: New Project
Date Submitted: July 20, 2017

Document Type: Exempt Letter
Document Description: Exempt Letter
Publish Date: August 3, 2017

Should you have any questions you may contact Michael Leary at mleary@lindenwood.edu.

Thank you,
The IRBNet Support Team

www.irbnet.org