FACTORS INFLUENCING VETERANS' ATTRACTION TO IMMERSIVE MATHEMATICS INSTRUCTION

by

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ABSTRACT

The current study explored factors that impact mathematics performance and the mathematics course type and instructional method preferences among 35 student veterans at MTSU. Data was collected in the form of a survey to glean information regarding math history, metacognition, self-efficacy, and their preferences for a variety of evidence-based instructional techniques. Metacognition and self-efficacy were measured using the Motivated Strategies for Learning Questionnaires. Data revealed student veterans prefer taking mathematics courses during traditional semesters instead of during accelerated semesters. Their instructional method of preference was instructor lectures as opposed to online courses and computer-assisted instruction. Additionally, there was not a significant difference between the metacognition and self-efficacy of student veterans who enrolled in college soon after high school graduation and those who enrolled more than 3 years later. Finally, GPA was found to be predicted by both metacognition and self-efficacy.

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LIST OF ABBREVIATIONS

AACU	Association of American Colleges and Universities
ACE	American Council on Education
CAI	Computer-Assisted Instruction
CLEP	College Level Examination Program
GPA	Grade Point Average
MAI	Metacognitive Awareness Inventory
MSLQ	Motivated Strategies Learning Questionnaires
MTSU	Middle Tennessee State University
NCES	National Center for Education Statistics
NCSL	National Conference of State Legislatures
NEA	National Education Association
NVEST	National Veteran Education Success Tracker
SREB	Southern Regional Education Board
SVA	Student Veterans of America
VA	U.S. Department of Veterans Affairs

CHAPTER I: INTRODUCTION

Overview

Success within the academic arena is sought by many. According to the National Center for Education Statistics (Ginder, Kelly-Reid, & Mann, 2017), 1,920,472 bachelor's degrees were awarded by postsecondary institutions in the United States during the 2015-2016 academic school year. Additionally, the NCES projected approximately 20.5 million students would enroll at postsecondary institutions in Fall 2016. Given the immense college enrollment rate, academic success is heavily pursued, therefore peaking the interest of many researchers (Hannon, 2014; Kitsantas, Winsler, & Huie, 2008; Petty, 2014; Saklofske, Austin, Mastoras, Beaton, & Osborne, 2012; Trapmann, Hell, Hirn, & Schuler, 2007).

According to the National Conference of State Legislatures (NCSL, 2014), an increase of 42% was seen in military service members and veterans receiving education benefits through the U.S. Department of Veterans Affairs (VA) subsequent to passage of the Post 9/11 GI Bill in 2008. Today, more than one million veterans and military families are utilizing the GI Bill in pursuit of higher education (NCSL, 2014), comprising approximately 5% of all postsecondary students in the U.S. (McCaslin et al., 2014). As U.S. forces continue to be withdrawn around the world (Kane, 2016), data support the belief that a significant number of returning veterans will pursue their degrees in higher education (Griffin & Gilbert, 2012).

Colleges and universities have a duty to effectively educate and support student veterans. While an abundance of information details ways in which postsecondary institutions can assist these individuals financially, socially, and emotionally, minimal to no research exists demonstrating how to support them academically at the classroom level. Considering the increase in enrollment of student veterans at postsecondary institutions (NCSL, 2014), it is necessary to explore methods and strategies to effectively educate this population and to support their academic success at the classroom level.

Traditional vs. Nontraditional Students

Traditional Students. Society's definition of a *college student* changes depending upon who is asked. Ritt (2008) recognized a traditional student as an individual 18-22 years of age enrolled in an undergraduate program full time while living on campus. The NCES supports defining traditional students as those who enroll at a postsecondary institution immediately after attaining their high school diploma, are financially dependent upon their parents, and do not work full time or at all while enrolled in classes (Choy, 2002). Traditional students also attend classes on a full-time basis until they graduate.

Nontraditional Students. Among the nontraditional student population, age has commonly been used as the defining characteristic (Bean & Metzner, 1985). Additional factors to include delayed enrollment, part-time enrollment, military service, having a full-time job, being financially independent, being a single parent, and not attaining a standard high school diploma are used to define adult learners (Schreyer Institute for Teaching Excellence, 2007). The NCES provides additional factors that have been noted when classifying nontraditional students: enrollment patterns (e.g., students who do not enroll immediately after graduating from high school), financial and family status (e.g., students who have children or dependents other than their spouse, are raising a child alone, work full time while taking classes, and/or do not rely on their parents financially), and high school graduation status (e.g., students who received a certificate of high school completion in lieu of a standard high school diploma).

Student Veterans as Nontraditional Students. Student veterans clearly are a part of the nontraditional student population. Cate (2016), with the Student Veterans of America (SVA), reported that many of these individuals have spouses and dependents and are employed, which are characteristics of nontraditional students. The enrollment pattern of student veterans is another characteristic that parallels that of nontraditional students. The traditional population enrolls immediately after graduating from high school, while generally a student veteran is any person pursuing a degree after fulfilling their military obligations. Being an older student is yet another characteristic shared by nontraditional students and student veterans. Considering these factors, student veterans have more in common with nontraditional students than with traditional students.

Student Veterans as Adult Learners. Students are classified as nontraditional for a variety of reasons, although age is used to define adult learners in postsecondary institutions (Schreyer Institute for Teaching Excellence, 2007). Not all nontraditional students are classified as adult learners, but all adult learners are considered nontraditional students. The Southern Regional Education Board (SREB) defines adult learners as a group of students with a variety of educational and cultural backgrounds, adult obligations, and job experiences. These individuals normally do not follow traditional enrollment patterns and are working toward degree completion at 25 years of age or older. Student veterans can be considered adult learners, as the majority is above age 25. According to the American Council on Education (ACE, 2013), the average age of student veterans attending 4-year colleges and universities is 33 years. Cate (2016) reported similar findings; 80.4% of his sample were over 25 years of age.

Utilizing the distinction among traditional students, nontraditional students, and adult learners discussed previously, student veterans are nontraditional students and adult learners. Therefore, it stands to reason that research on these groups can be applied to student veterans.

Academic Success of Student Veterans

Multiple national organizations, such as the Department of Veterans Affairs (VA), Association of American Colleges and Universities (AACU), National Conference of State Legislatures (NCLS), and National Education Association (NEA), distribute information emphasizing the importance of enhancing veteran success in higher education. These organizations, among others, urge colleges and universities to prioritize the success of student veterans. A few strategies they suggest are collaboration among service providers, training administrators, faculty, and staff to be culturally sensitive, and providing access to faculty members who have a sound knowledge and understanding of military culture. In general, these and other national organizations acknowledge the growing number of these individuals on campuses and express the need for colleges and universities to become better equipped to support the academic success of this unique population.

Moreover, studies have indicated the importance of positioning veterans for academic success on college campuses by hosting orientations, educating advisors and staff (Kirchner, 2015), and having either a resource center or at least one full-time employee available to assist veterans with their specific needs on campus (Ford, Northrup, & Wiley, 2009; Kirchner, 2015; Rumann & Hamrick, 2009). These and other studies typically endorse the need for additional resources to support the academic success of veterans as they work toward completing their college degree.

The Student Veterans of America, in conjunction with its partners, initiated the National Veteran Education Success Tracker (NVEST) project, which provides an in-depth look at the academic success of student veterans using the Post-9/11 GI Bill (Cate, Lyon, Schmeling, & Bogue, 2017). Data from this project were recently published and revealed that veterans using the Post-9/11 GI Bill perform better than their peers and are more likely to graduate. While the data collected by the NVEST project shine a positive light on the accomplishments of this population and allow policymakers to make informed decisions, it does not provide postsecondary institutions with the guidance needed to best educate student veterans at the classroom level.

Predictors. Research has explored predictors of academic success among college students. For example, academic self-efficacy, epistemic belief of learning, and high-knowledge integration are crucial factors that contribute to grade point average (GPA) and course grades (Hannon, 2014). Kitsantas et al. (2008) found self-efficacy and time management strategies to be predictors of academic success. Additionally, York, Gibson, and Rankin (2015) believed persistence is a predictor of academic success, while Beghetto (2004) asserted motivation possibly contributes the most to the academic success of students. Last, past research has affirmed the notion that intelligence is the most widely supported predictor of academic achievement and success among students (Di Domenico & Fournier, 2015; Duckworth, Matthews, Kelly, & Peterson, 2007).

Risk Factors. In addition to predictors of academic success, an abundance of risk factors exist that can hinder the success of students at the college level. Horton (2015) identified characteristics and factors that cause academic delay, difficulties, or deficits among college students (see Table 1). When examining Horton's list, it is obvious student veterans are an at-risk population. Multiple risk factors provided by Horton relate to the nontraditional student classification provided by the NCES, specifically being an older student, transportation time and costs, socioeconomic status, and childcare responsibility.

Whereas Horton's (2015) list of risk factors applies to all college students, Ritt (2008) identified academic risk factors and barriers specific to adult learners (see Table 2). According to Ritt, these barriers present themselves as personal, professional, and institutional. Considering the majority of student veterans are adult learners, they potentially will encounter many obstacles in the pursuit of their higher education degree.

Additional risk factors to academic success include time transpired since last formal education, lack of self-confidence, and low self-efficacy. For many adult learners, student veterans included, considerable time has passed since they were in a formal educational setting. During this time away from the classroom, they were not necessarily acquiring academic skills (Jameson & Fusco, 2014; Kenner & Weinermann, 2011; Zacharakis, Steichen, Diaz de Sabates, & Glass, 2011). Many also experience an initial lack of self-confidence and self-efficacy in regard to their academic abilities when compared to traditional students who did not take time off from school (Bishop-Clark & Lynch, 1992; Jameson & Fusco, 2014; Lynch & Bishop-Clark, 1994; MacDonald &

Stratta, 1998; Ross-Gordon, 2003). The lack of self-confidence can make the transition from the military to the classroom even more difficult.

Table 1

Characteristics and Factors that Cause Academic Delay, Difficulties, or Deficits Among College Students

Background Characteristics	
Older student	Minority group
History of academic failure	Family issues; parenting deficiencies
Academic unpreparedness	Sibling dropped out of high school
Socioeconomic status	Financial constraints; poverty
Physically challenged	Non-supportive home environment
Emotionally impaired; domestic violence	Homelessness/Transiency (migrant worker families)
Cultural/language barriers	Incarceration
Technology skill limitation	Lack of knowledge of college admissions/matriculation
Study behaviors	
First-generation college student	
Individual Characteristics	
Task values (interests, importance, utility)	Serious health or substance abuse issues
Unrealistic goals; lack of goal clarity	Lack of school engagement
Personal autonomy or independence	Limited communication skills
Self-confidence (insecure public speaker)	Emotional, psychological, or behavioral problems
Low level of self-respect or self-esteem	Passive aggressive attitude
Weak self-concept (judgmental; afraid of failure)	Lack of strong role models/mentors
Social competence; limited key social skills	Lack of self-discipline
Self-efficacy	Low academic demand expectation (fixed mindset; unchallenged)
Lack of motivation for performing well	Teacher pleasure
Lack of strong support group	Childcare responsibility
Learning or physical disabilities (diagnosed or undiagnosed)	Negative social network (friends) or cultural norms
Underprepared for current academic challenges (memorization, knowledge transfer, metacognition)	Lack understanding of available financial resources
	Procrastination

(Continued)

Table 1 (cont.)

Environmental Factors	
Transportation time and costs	Internships and field placements
College financial cost	Negative peer culture (ostracizes successful students)
Study environment	Racism or sexism
Student support services (access and under-utilization)	College evaluation culture bias; poor academic fit
Advisor advice and support	No individual guidance or mentoring
Course offerings (remedial; flexible)	Broken college relationships
Adequate facilities	Workforce issues (short or long term)

Note. Adapted from "Identifying at-risk factors that affect college student success," by J. Horton, 2015, *International Journal of Process Education, 7,* 83 - 101.

Table 2

Academic Risk Factors and Barriers Specific to Adult Learners

Personal Barriers	Professional Barriers	Institutional Barriers
• Geographic location • Personal commitments • Family commitments • Work and family schedules • Previous experiences in college • Lack of adequate and consistent childcare services • Financial limitations • General fear of returning to school	(Professional barriers are typically found in the workplace) • Inability to attain release time to attend school in the evenings or on the weekends • No tuition reimbursement from employers • Job positions that do not require a college degree make it difficult to justify going back to school.	(Institutional barriers impose restrictions that are outside a student's or adult educator's circle of influence) • Limited or no access • High costs • Diminished affordability

Note. Adapted from "Redefining tradition: Adult learners and higher education," by E. Ritt, 2008, *19*, 12-16.

Mathematics and Student Veterans

The successful completion of a mathematics course is a requirement at many universities (Bryk & Treisman, 2010). Mathematics also is a subject that adult learners find more difficult compared to their younger classmates (Josiah & Adejoke, 2014). Research demonstrating effective instructional methods for teaching mathematics to student veterans is nonexistent; studies comparing the mathematics achievement of student veterans to nonveterans is sparse, inconsistent, and outdated. In 1949, Norman Frederiksen investigated the relationship between status (veteran or nonveteran) and achievement in mathematics at Princeton University. The *Cooperative Survey Test in Mathematics* was administered to 500 students during the first week of class and was utilized as the basis for the study. Scores from the *Special Aptitude Test,* the *Special Aptitude Test for Veterans,* and school grades also were used. Success was determined by the students' final grades in the courses. Data were collected to include age, high school graduation year, mathematics classes previously taken, academic status (i.e., freshman, sophomore, junior, senior), and whether the student was a veteran or nonveteran. The Frederiksen study revealed the mean final grade for nonveteran students was higher than that of veteran students in mathematics, which could potentially be explained by differences in preparation and aptitude.

Frederiksen and Schrader (1952) conducted a later research study that explored the difference between the academic success of veterans and nonveterans. Thirty-six colleges were contacted to participate; of the 26 willing colleges, 17 were selected. From those institutions, 25 groups were formed. Each institution was a separate group, with some being broken down by college. Grades of veterans and nonveterans were compared only for those earned at the same time, same institution, and same university division. Veterans who possessed basic academic training during their time in the military were not included, as well as students who had transferred colleges. The data from 16 institutions were used in conducting the statistical analyses; one college was eliminated due to a lack of students. Of the 20 comparisons, the academic achievement of veteran students was greater in 16, and the academic achievement of nonveteran students was greater in 4. The results of this research are contradictory to Frederiksen's 1949 study, resulting in the already limited research pool being inconsistent (Frederiksen, 1949).

Mathematics and Student Veterans at Middle Tennessee State University. As recommended by multiple national organizations, Middle Tennessee State University (MTSU) created the Charlie and Hazel Daniels Veteran and Military Family Center, solely dedicated to addressing the needs of student veterans. The center, commonly referred to as the Daniels Center, opened its doors on November 5, 2015, and boasts the largest and most comprehensive center for student veterans among all Tennessee universities. Housing nine full-time employees, 2 of which are VA employees, dedicated to ensuring the success of MTSU's student veterans, it is a one-stop shop for assisting them in areas such as admissions, GI Bill, selecting a major, personal well-being, professional career counseling, VA benefits, and more. The center hosts an orientation each semester specifically for student veterans and military family members and has multiple events throughout the year to promote involvement on campus.

Numerous degree tracks at MTSU require students to complete college algebra, and some require more difficult mathematics courses (Middle Tennessee State University, 2017). While tutoring services are readily available on campus, student veterans make requests in the Daniels Center for tutoring in mathematics more frequently than any other subject. In an attempt to provide them with a more solid mathematics foundation, the Daniels Center worked with two highly qualified professors to design a mathematics course specifically for student veterans. The course was to occur during 3 weeks in May, Monday through Friday, from 8 a.m. to 4 p.m. Student veterans would utilize a self-paced computer program that was supplemented with professor support. In taking this course, student veterans could potentially earn 9 hours of mathematics credit–3 hours from the summer course and possibly 6 additional hours after completing tests from the College Level Examination Program (CLEP). The summer mathematics course was advertised utilizing fliers and social media; however, the course was cancelled due to lack of enrollment.

While the Daniels Center attempted a solution in creating a veteran-only mathematics course, it was unsuccessful. Additionally, research lacks best practices for teaching mathematics to student veterans. Considering the lack of relevant research, little interest in the summer mathematics course, and a high rate of requests for mathematics tutoring, a needs assessment was conducted to aid in the development of programs specifically designed to effectively teach mathematics to student veterans.

Needs Assessment

According to Owen (2007), a needs assessment is possibly the best known approach to conducting a form of proactive program evaluation. A need, as defined by McKillip (1998), is a “value judgment that some group has a problem that can be solved” (as cited by Nagle & Gagnon, 2014, p. 316). Based on this definition, multiple considerations can be made. First, needs are a matter of perception, which can vary by individuals experiencing the same need. Perceptions also can be different among those observing. Second, needs can arise in particular groups, implying that environmental factors are at play. Third, a problem indicates a gap between what is and what should be. Fourth, recognizing a need exists suggests an assumption that identified problems can be solved.

The purpose of a needs assessment can vary depending upon the situation. Regardless of the purpose, a needs assessment involves three phases: (a) preassessment, (b) assessment, and (c) postassessment. The preassessment phase consists of establishing a needs assessment team, planning (e.g., budget, time line), selecting methods, and selecting participants. The assessment phase involves data collection and analysis. The postassessment phase includes communicating the needs assessment findings, establishing priorities, implementing the proposed solutions, and monitoring/evaluating the program.

Factors Impacting Mathematic Performance

In establishing a program to effectively teach mathematics to student veterans, it is important to consider the previously discussed risk factors they face in returning to college and those that impact mathematics performance. While multiple factors affect mathematics performance, the focus for the current study involves instructional methods and practices, metacognitive strategies, and self-efficacy.

Instructional Methods and Practices. Zannou, Ketterlin-Geller, and Shivraj (2014) reviewed multiple meta-analyses in their research of evidence-based practices for high-quality algebra instruction. Their review of the literature revealed explicit and systematic instruction (e.g., teacher demonstration, guided practice, presentation of multiple examples, student verbalization, and corrective feedback), visual representation (e.g., graphical models and manipulatives), and cooperative learning are quality instructional methods and practices for teaching mathematics.

Li and Edmonds (2005) examined the use of computer-assisted instruction (CAI). In their study, CAI was considered a supplemental component of teacher-directed instruction. Two classes of at-risk adult learners served as the experimental group, and a third class that took the same course in a previous term served as the control group. The experimental group received the CAI and the control group did not. The results revealed the following benefits of utilizing CAI as a supplemental form of instruction for adult learners: (a) increased confidence level; (b) increased satisfaction; (c) transformation of knowledge, skill, and ability; (d) online and in class complement each other; and (e) technology is helpful for diverse learners.

Metacognitive Strategies. In simple terms, metacognition is defined as thinking about one’s thinking (Flavell, 1976). Researchers have found that the utilization of metacognitive strategies leads to improved performance in mathematics. A study conducted by Bayat and Tarmizi (2010) explored the relationship between metacognitive strategies and the algebra problem-solving abilities of first-year college students. There were 86 participants in two courses who completed the Metacognitive Awareness Inventory (MAI), a self-report of their metacognitive activities, and who took an algebra test to measure their mathematics problem-solving ability as a part of the study. The results revealed a statistically significant correlation between metacognitive strategies and algebra problem solving.

Flavell (1976) noted that self-regulation, which involves regulating one's cognitive abilities, plays a large role in metacognition. A review of research conducted by Montague (2008) explored the use of self-regulation strategies for math problem solving. Montague's review consisted of seven studies and 142 students, many of whom were identified as having learning disabilities. The result of the review revealed the use of self-regulation strategies led to improvement in the participants' mathematics problem-solving abilities.

Self-efficacy. One's level of self-efficacy can impact performance (Schunk, 1984, 1989b; Zimmerman, Bandura, & Martinez-Pons, 1992) and the amount of persistence and effort an individual is willing to expend (Bandura, 1977). As a result, an increase in one's self-efficacy also increases the effort and persistence they exert (Schunk, 1991). According to Zimmerman (1995), "perceived academic self-efficacy is defined as personal judgments of one's capabilities to organize and execute courses of action to attain designated types of educational performance" (p. 203). This definition of academic self-efficacy also is supported by researchers such as Bandura (1977) and Schunk (1989a).

Many researchers have found that self-efficacy plays a crucial role in the mathematics success of adult learners. Johnson and O'Keeffe (2016) addressed Ireland's issue with mathematically unprepared college students, specifically adult learners. Their research evaluated the Head Start Maths program at the University of Limerick in examining the program's effects on self-efficacy and the retention rates of adult learners. The Head Start Maths program is designed to bridge the gap between current math knowledge and the skills needed to be successful in a major. To measure self-efficacy, the researchers used a revised version of The Mathematics Self-Efficacy Scale (Betz & Hackett, 1993). The program occurred over a 2-week period, and the revised scale was given to the participants at the beginning and end of each week. Week 1 generally consisted of students who had chosen degree programs that require minimal mathematical skills, while the students who typically attended Week 2 had chosen degree plans that require an intensive amount of mathematics (e.g., engineering or science). Of the 53 adult learners who participated in the program and took the survey, 29 attended Week 1 (Cohort 1), 17 attended Week 2 (Cohort 2), and 7 attended both weeks (Cohort 3).

Based on the data, Johnson and O'Keeffe (2016) reported the average self-efficacy scores over time increased for students in all three cohorts. The scores of Cohort 3 showed the most improvement; however, the authors advised against drawing substantial conclusions from that data due to the small sample size ($n = 7$). Despite the small sample size, the authors recognized the suggestive finding that students will see a greater gain in their self-efficacy as they spend more time in the program.

Peters (2013) conducted a study exploring the relationship among classroom climate, self-efficacy, and achievement in mathematics at the undergraduate level. The participants consisted of 15 college-level mathematics instructors and 326 students enrolled in the professors' algebra classes. The mean age of the instructors was 38.3, and the mean age of students was 23.4. The instructors completed the Principles of Adult Learning Scale (PALS) at the beginning of the semester, and the students completed the Mathematics Self-Efficacy Scale-Revised (MSES-R) and a final algebra examination at the end of the semester. The results revealed a statistically significant relationship between mathematics self-efficacy and mathematics achievement. As the mathematics self-efficacy of the students in this study increased, mathematics achievement increased as well.

Jameson and Fusco (2014) conducted research exploring the levels of math anxiety, self-efficacy, and self-concept of adult learners compared to traditional undergraduate students. The 226 undergraduate student participants self-reported their mathematics self-efficacy on the Mathematics Self-Efficacy Scale (MSES). Participants were classified as traditional (n = 55), traditional age with nontraditional characteristics (n = 118), and nontraditional (n = 45). The results of this study showed that nontraditional students reported significantly lower mathematics self-efficacy than traditional students and traditional age students with nontraditional characteristics.

Summary

A postsecondary institution's purpose is to provide all student populations with a quality learning experience; however, educators face challenges as they attempt to meet the classroom demands of today's student veterans. As more veterans enroll in postsecondary institutions, the need to understand ways to better educate this group of students continues to grow. Current research discusses the success of student veterans in terms of GPA, dropout rates, and graduation rates compared to their traditional and nontraditional student peers (e.g., Bryan, Bryan, Hinkson, Bichrest, & Ahern, 2014; Cateet al., 2017; Semer & Harmening, 2015). Although data on those areas have assisted in the identification of an existing problem, they do not identify a solution.

Students veterans continually reach out to the Daniels Center for mathematics tutoring, which serves as another indicator that a problem exists. As mathematics is a general education requirement at MTSU and many other postsecondary institutions, and student veteran enrollment rates continue to rise, research is needed to understand how to effectively educate and serve this distinct population in mathematics courses.

Purpose of Current Study

The purpose of the current study was to conduct a needs assessment to assess factors that related to mathematics performance and to explore mathematics course type and instructional method preferences among student veterans. Data were collected from student veterans at MTSU in the form of a survey to glean information regarding student veterans' math history, self-efficacy, metacognition strategies used, as well as their preferences for a variety of evidence-based instructional techniques. By gathering this information about student veterans, it is hoped that the research can be used to inform the design of a program that could be implemented to provide them with a more solid mathematics foundation.

Hypotheses

Hypothesis 1. Student veterans were anticipated to prefer taking mathematics courses during a traditional academic semester (i.e., fall and spring semesters) versus taking mathematics courses during an accelerated semester (i.e., summer sessions). For the evaluation of Hypothesis 1, a Wilcoxon signed rank test was used to compare participants' preference score for traditional semesters to their preference scores for shortened semesters.

Hypothesis 2. Student veterans were expected to prefer mathematics courses taught via instructor lectures versus mathematics courses taught online. For the evaluation of Hypothesis 2, a Wilcoxon signed rank test was used to compare participants' preference score for lecture courses to their preference scores for online courses.

Hypothesis 3. Student veterans were hypothesized to prefer classes taught via instructor lectures versus classes taught utilizing computer-assisted instruction (CAI). For the evaluation of Hypothesis 3, a paired samples *t* test was used to compare participants' preference score for lecture courses to their preference scores for CIA.

Hypothesis 4. A statistically significant difference was expected in mathematics metacognitive strategies used between student veterans who enrolled in college 3 or fewer years after graduating from high school and those who enrolled in college more than 3 years after graduation. An independent samples *t* test was used to evaluate Hypothesis 4. The independent variable was the time lapse between high school graduation and college enrollment (≤ 3-year time lapse and > 3-year time lapse), and the dependent variable was mathematics metacognition. The Motivated Strategies Learning Questionnaires (MSLQ) was used to measure mathematics metacognitive strategies (Pintrich, Smith, Garcia, & McKeachie, 1991).

Hypothesis 5. A statistically significant difference was expected in mathematics self-efficacy scores between student veterans who enrolled in college 3 or fewer years after graduating from high school and those who enrolled in college more than 3 years after graduation. An independent samples *t* test was used to evaluate Hypothesis 5. The independent variable was the time lapse between high school graduation and college enrollment (≤ 3-year time lapse and > 3-year time lapse), and the dependent variable was mathematics self-efficacy. The Motivated Strategies Learning Questionnaires (MSLQ) was used to measure mathematics self-efficacy (Pintrich et al., 1991).

Hypothesis 6. Student veterans' grade point average (GPA) was expected to be significantly predicted by the metacognitive strategies they use and their self-efficacy. A multiple linear regression analysis was used to evaluate Hypothesis 6. The independent variables were mathematics metacognition and self-efficacy, and the dependent variable was GPA. The Motivated Strategies Learning Questionnaires (MSLQ) was used to measure mathematics metacognition and self-efficacy, and GPA was self-reported.

CHAPTER II: METHOD

Participants

Student veterans were recruited at Middle Tennessee State University utilizing a listserve provided by the Charlie and Hazel Daniels Veterans and Military Family Center. The survey was created in Qualtrics and distributed via email to the listserve. All participants provided electronic consent and confirmation they were 18+ years of age and a currently enrolled student veteran at MTSU. There was a total of 81 participants; however, only 35 completed the entire survey. The sample (N = 35; 10 females and 25 males) consisted of student veterans from the following military branches: (a) 57.1% Army (n = 20); (b) 22.9% Navy (n = 8); (c) 17.1% Marines (n = 6); and (d) 2.9% Coast Guard (n = 1). Based on students' report of their age, 22.9% were 18-24 years (n = 8), 45.7% were 25-29 years (n = 16), 22.9% were 30-39 years (n = 8), and 8.6% were 40-49 years (n = 3).

Materials

A survey was utilized to assess factors that impact mathematics performance and to explore mathematics course preferences among student veterans. The survey was intended to measure self-efficacy, utilized metacognitive strategies, and preference for instructional methods, and practices related to mathematics from student veterans' perspectives. The survey also collected information on mathematics background and polled opinions on new ideas and potential services to be offered by the Daniels Center.

Demographic Information. The survey included 12 background and demographic items. Information was collected regarding personal demographics (i.e., gender, race/ethnicity, age, marital status, and children), military demographics (i.e., branch of military service and date exited from the military), and academic demographics (i.e., high school graduation date, first semester at MTSU, college major, class status, and GPA).

Instructional Methods and Practices. Based on previous research (Gersten, et al., 2009; Gersten, Chard et al., 2009; Rakes, Valentine, McGatha, & Ranau, 2010; Slavin, Lake, & Groff, 2009; Zannou et al., 2014), author-created items were combined with questions from the attitudinal survey developed by the Assessment and Evaluation Center for Inquiry-Based Learning in Mathematics (Laursen, Hassi, Kogan, Hunter, & Weston, 2011) to measure instructional methods and practices. Participants were asked: "I learn mathematics best when…" and were given six scenarios to rate on a 5-point Likert scale (1 = *not at all true of me*; 5 = *very true of me*).

Motivated Strategies for Learning Questionnaires (MSLQ). To measure metacognitive strategies and self-efficacy related to mathematics, the Motivated Strategies Learning Questionnaires (MSLQ) was used. According to the authors, the MSLQ is intended to be utilized in a specific course to measure the motivational orientations of college students and their use of learning strategies at the college level. Each scale consists of a list of statements, and participants are asked to rate the extent that each statement is true of them on a 7-point Likert scale (1 = *not at all true of me*; 7 = *very true of me*). For the current study, the wording of some questions on the MSLQ was slightly altered to address mathematics (i.e., changing *this course* to *a math course*), and the 7-point Likert scale was reduced to a 5-point Likert scale (1 = *not at all true of me*; 5 = *very true of me*).

Metacognitive Strategies. To measure metacognitive strategies, a 16-question scale was developed utilizing items from the cognitive and metacognitive scales of the MSLQ. Questions from the rehearsal, elaboration, organization, and metacognitive self-regulation scales were used. Sample questions included: “When I become confused about something I read for a math course, I go back and try to figure it out;” “I try to relate ideas in math to those in other courses whenever possible;” and “I make simple charts, diagrams, or tables to help me organize math material.” The metacognitive section of the survey with a complete list of questions can be found in Appendix A.

Self-efficacy. To measure self-efficacy, seven of the eight items on the self-efficacy for learning and performance scale of the MLSQ were used. One item was eliminated (“Considering the difficulty of this course, the teacher, and my skills, I think I will do well in this class”) due to difficulty in rewording the statement to be applicable to math in general versus a specific math course. Sample questions included: “I am certain I can understand the basic concepts taught in a math course;” “I am confident I can understand the most complex material presented by the instructor in a math course;” and “I am certain I can master the skills being taught in a math class.” The self-efficacy section of the survey with a complete list of questions can be found in Appendix B.

Design

This study utilized Intellectus Statistics to analyze the data. The specific tests used were two Wilcoxon signed rank tests, one paired samples *t* test, and two independent samples *t* tests. Hypothesis 1 compared mathematics course duration preferences (i.e., full-term semesters and accelerated semesters) utilizing a Wilcoxon signed rank test. Hypotheses 2 and 3 compared mathematics instructional method preferences.

Specifically, Hypothesis 2 compared preferences for instructor lectures and online courses utilizing a Wilcoxon signed rank test, and Hypothesis 3 compared preferences for instructor lectures and computer-assisted instruction utilizing a paired samples *t* test. An independent samples *t* test was used to examine both Hypotheses 4 and 5. Hypothesis 4 compared the metacognitive strategies utilized in mathematics by student veterans with a time lapse of 3 or fewer years between high school and college to the metacognitive strategies utilized by those with a time lapse of more than 3 years. Hypothesis 5 compared the mathematics self-efficacy of student veterans with a time lapse of 3 or fewer years between high school and college to the self-efficacy of those with a time lapse of more than 3 years.

Procedure

A portion of the Motivated Strategies Learning Questionnaires (MSLQ) was combined with author-created items and imported into Qualtrics to create the survey. Permission to use the MSLQ can be found in Appendix C. Prior to data collection, approval from the Institutional Review Board (IRB) at Middle Tennessee State University (MTSU) was obtained (see Appendix D). Once IRB approval was secured, an email providing a link to the survey was sent to all enrolled student veterans at MTSU asking for voluntary participation. Those who followed the link were taken to an introduction to the survey, which discussed the purpose of the survey, the right to decline participation or withdraw at any time, and obtained their informed consent. Participants remained anonymous to the researcher, and data were stored using Qualtrics. All data were exported from Qualtrics, and Intellectus Statistics was used to perform the statistical analyses.

CHAPTER III: RESULTS

Hypothesis 1

This study hypothesized that student veterans prefer taking mathematics courses during a traditional academic semester (i.e., fall and spring semesters) versus an accelerated semester (i.e., summer sessions). Prior to analysis, the assumption of normality was assessed using a Shapiro-Wilk test. The results of the Shapiro-Wilk test were significant, $W = 0.92$, $p = .013$, suggesting that difference is unlikely to have been produced by a normal distribution; thus, normality cannot be assumed. In order to conduct a paired samples *t* test, normality must be assumed, so a Wilcoxon signed rank test was conducted to examine Hypothesis 1. A Wilcoxon signed rank test is a non-parametric alternative to the paired samples *t* test that does not share its distributional assumptions (Conover & Iman, 1981). The results indicated that preference scores for taking a mathematics course during a traditional semester were statistically significantly higher than preference scores for a shortened semester, $z = -3.44$, $p < .001$. Based on these results, one can assume the differences between student veterans' course duration preference scores are not likely due to random variation.

Hypothesis 2

This study hypothesized that student veterans would prefer mathematics courses taught via instructor lectures versus online mathematics courses. Prior to analysis, the assumption of normality was assessed using a Shapiro-Wilk test. The results of the Shapiro-Wilk test were significant, $W = 0.91$, $p = .007$, suggesting that difference is unlikely to have been produced by a normal distribution; thus, normality could not be assumed. In order to conduct a paired samples *t* test, normality must be assumed, so a

Wilcoxon signed rank test was conducted to examine Hypothesis 2. The results indicated that preferences scores for instructor lectures were statistically significantly higher than preferences scores for online courses, $z = -3.87$, $p < .001$. Based on these results, one can assume the differences between student veterans' mathematics instruction method preference scores are not likely due to random variation.

Hypothesis 3

This study hypothesized that student veterans prefer mathematics courses taught via instructor lectures versus classes taught utilizing computer-assisted instruction (CAI). Prior to analysis, the assumption of normality was assessed using a Shapiro-Wilk test. The results of the Shapiro-Wilk test were not significant, $W = 0.95$, $p = .108$. This suggested the deviations from normality could be explained by chance; therefore, normality could be assumed. A paired samples *t* test was conducted to evaluate Hypothesis 3. The results indicated that preference scores for instructor lectures were statistically significantly higher than preference scores for CAI, $t(34) = 3.13$, $p = .004$. Based on these results, one can assume the differences between student veterans' mathematics instruction method preference scores are not likely due to random variation.

Hypothesis 4

This study hypothesized a statistically significant difference in mathematics metacognitive strategies used between student veterans who enrolled in college 3 or fewer years after graduating from high school and those who enrolled more than 3 years after graduation. Prior to analysis, the assumptions of normality and homogeneity of variance were assessed. The results of the Shapiro-Wilk test were not significant, *W* = 0.95, *p* = .082; therefore, normality can be assumed. The results of Levene's test for equality of variance were not significant, *F*(1, 33) = 0.09, *p* = .764, indicating the assumption of homogeneity of variance was met. Due to these assumptions being met, an independent samples *t* test was used to evaluate Hypothesis 3. The results were not significant, *t*(33) = -1.89, *p* = .067, suggesting the mean score for metacognition was not significantly different between student veterans with a time lapse of 3 or fewer years between high school graduation and college enrollment and those with a time lapse of more than 3 years.

Hypothesis 5

This study hypothesized a statistically significant difference in mathematics self-efficacy scores between student veterans who enrolled in college 3 or fewer years after graduating from high school and those who enrolled more than 3 years after graduation. Prior to analysis, the assumptions of normality and homogeneity of variance were assessed. The results of the Shapiro-Wilk test were not significant, *W* = 0.94, *p* = .069; therefore, normality can be assumed. The results of Levene's test for equality of variance were not significant, *F*(1, 33) = 0.00, *p* = .986, indicating the assumption of homogeneity of variance was met. Due to these assumptions being met, an independent samples *t* test was used to evaluate Hypothesis 4. The results were not significant, *t*(33) = 0.62, *p* = .543, suggesting the mean score for self-efficacy was not significantly different between student veterans with a time lapse of 3 or fewer years between high school graduation and college enrollment and student veterans with a time lapse of more than 3 years.

Hypothesis 6

A multiple linear regression analysis was conducted to assess the degree to which grade point average (GPA) was predicted by metacognitive strategies used in mathematics and self-efficacy. The results were significant, $F(2,24) = 6.58$, $p = .005$, $R^2 = 0.35$, indicating approximately 35% of the variance in GPA can be explained by metacognition and self-efficacy. However, neither metacognition nor self-efficacy were unique predictors of GPA (see Table 3). In this situation, the predictors (i.e., metacognition and self-efficacy), which were not significantly correlated with GPA, produced a significant model. This can happen when the predictors are substantially correlated with each other. A Pearson correlation analysis was conducted and found a significant positive correlation between metacognition and self-efficacy ($r_p = 0.48$, $p = .004$). Because of this, both predictors were examined individually utilizing simple linear regressions. The first simple linear regression considered the degree to which GPA was predicted by metacognition. The results indicated metacognition significantly predicted GPA, $B = 1.10$, $t(25) = 3.21$, $p = .004$ (see Table 4). The second simple linear regression examined the degree to which GPA was predicted by self-efficacy. The results indicated self-efficacy significantly predicted GPA, $B = 0.56$, $t(25) = 2.90$, $p = .008$ (see Table 5).

Table 3

Multiple Linear Regression with Metacognition and Self-Efficacy Predicting GPA

Variable	*B*	*SE*	95% CI	β	*t*	*p*
(Intercept)	0.65	1.17	[-1.76, 3.05]	0.00	0.56	.584
Metacognition	0.78	0.40	[-0.04, 1.60]	0.38	1.95	.063
Self-Efficacy	0.33	0.22	[-0.12, 0.77]	0.30	1.52	.142

Note. Results: $F(2,24) = 6.58$, $p = .005$, $R^2 = 0.35$.
Unstandardized Regression Equation: GPA = 0.65 + (0.78 × Metacognition) + (0.33 × Self-Efficacy).

Table 4

Linear Regression with Metacognition Predicting GPA

Variable	*B*	*SE*	95% CI	β	*t*	*p*
(Intercept)	0.60	1.20	[-1.87, 3.06]	0.00	0.50	.623
Metacognition	1.10	0.34	[0.40, 1.81]	0.54	3.21	.004

Note. Results: $F(1,25) = 10.32$, $p = .004$, $R^2 = 0.29$.
Unstandardized Regression Equation: GPA = 0.60 + (1.10 × Metacognition).

Table 5

Linear Regression with Self-Efficacy Predicting GPA

Variable	*B*	*SE*	95% CI	β	*t*	*p*
(Intercept)	2.56	0.66	[1.20, 3.93]	0.00	3.87	< .001
Self-Efficacy	0.56	0.19	[0.16, 0.95]	0.50	2.90	.008

Note. Results: $F(1,25) = 8.41$, $p = .008$, $R^2 = 0.25$.
Unstandardized Regression Equation: GPA = 2.56 + (0.56 × Self-Efficacy).

CHAPTER IV: DISCUSSION

First, this study examined student veterans' mathematics course duration preferences. As hypothesized, student veterans' preference for taking mathematics courses during traditional semesters (i.e., fall and spring) was statistically significantly higher than their preference for taking mathematics courses during accelerated semesters (i.e., summer sessions). This suggests a possible reason more student veterans did not enroll in the veterans only summer mathematics course that was cancelled due to lack of enrollment.

Second, this study investigated student veterans' mathematics instructional methods preferences, specifically instructor lectures, online courses, and computer-assisted instruction (CAI). As proposed, findings demonstrated student veterans' preference for instructor lectures was statistically significantly higher than their preference for online courses. Additionally, student veterans' preference for instructor lectures was statistically significantly higher than their preference for CAI. These findings also suggest potential reasons for the lack of interest in the veterans only summer mathematics course.

Last, this study examined factors that can impact mathematics performance, specifically metacognition and self-efficacy. Hypotheses 4 and 5 proposed that metacognition and self-efficacy would be higher among student veterans who enrolled in college 3 or fewer years after graduating from high school; however, the data from this study did not support this. The lack of support for these hypotheses could be due to the uneven comparison groups. The majority of the participants were in the more than 3-year time lapse group, making it difficult to draw accurate conclusions. While these hypotheses were not supported, the findings resulted in reassuring news. Colleges and universities cannot change the time lapse between when student veterans graduate from high school and when they enroll at their postsecondary institutions. As such, it is encouraging to learn time lapse does not significantly relate to metacognition or self-efficacy in a negative way. Although Hypotheses 4 and 5 were not supported, data from this study partially supported Hypothesis 6. Results of the multiple linear regression revealed that, overall, metacognition and self-efficacy correlated with GPA; however, neither metacognition nor self-efficacy were unique predictors of GPA in the model. GPA was significantly predicted by metacognition and self-efficacy when evaluated utilizing individual simple linear regressions. These findings reinforce the need to help student veterans develop a strong mathematics foundation.

Conclusions

The majority of the findings were generally significant. Student veterans at MTSU were found to prefer taking mathematics courses during traditional academic semesters rather than during accelerated semesters. It also was discovered that student veterans' instructional method of preference is instructor lectures as opposed to online courses or computer-assisted instruction. A second finding was that time lapse does not negatively relate to metacognition or self-efficacy. Considering the average age of student veterans attending 4-year colleges and universities is 33 years (American Council on Education, 2013), it is reassuring the metacognition and self-efficacy did not differ significantly based on time lapse between high school graduate and college enrollment. Finally, metacognition and self-efficacy together correlated with GPA and independently were significant predictors.

Limitations

Several limitations are noted in this study. First, it is apparent many participants were unmotivated to complete the survey in its entirety. Of the 81 participants, only 35 fully completed the survey (i.e., answered every question). This leads to the second limitation of the study: the small sample size. A larger sample size may provide a clearer picture of MTSU's student veteran population relative to mathematics. It is possible the length of the survey had an impact on the number of participants, as the survey was used to collect data beyond what was needed to evaluate the hypotheses. Another limitation is that, of the 35 participants, 30 enrolled in college more than 3 years after completing high school, but only 5 enrolled 3 or fewer years after completing high school. This calls into question the reliability and validity of the data failing to support Hypotheses 4 and 5, as the comparison groups were extremely uneven. Finally, as the sample was drawn from only currently enrolled student veterans at MTSU, it is impossible to generalize conclusions to all student veterans.

In the future, it would be helpful to measure these hypotheses by using student veterans enrolled at multiple postsecondary institutions. Additionally, it would be beneficial to have a larger sample size. This would ensure the sample is more representative of the student veteran population as a whole, rather than having a limited pool of participants by using currently enrolled student veterans from one university. Furthermore, the research did not control for any other variables that could affect GPA, metacognition, or self-efficacy in mathematics (e.g., gender, SES, college major). Future research may consider controlling for these variables in order to better examine the correlations between metacognition, self-efficacy, GPA, and mathematics.

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APPENDICES

APPENDIX A

METACOGNITIVE STRATEGIES QUESTIONS FROM MSLQ

Related to the college-level mathematics course(s) you are required to take, if you think the statement is very true of you, select 5; if a statement is not at all true of you, select 1. If the statement is more or less true of you, find the number between 1 and 5 that best describes you.

		Not at all true of me				**Very true of me**
1)	**During class, I often miss important points because I'm thinking about other things. (REVERSED) (self-regulation)**	1	2	3	4	5
2)	When I become confused about something I read for a math course, I go back and try to figure it out. (self-regulation)	1	2	3	4	5
3)	Before I study new course material thoroughly, I often skim it to see how it is organized. (self-regulation)	1	2	3	4	5
4)	I try to change the way I study in order to fit the course requirements and the instructor's teaching style. (self-regulation)	1	2	3	4	5
5)	**I often find that I have been reading for class but don't know what it was all about. (REVERSED) (self-regulation)**	1	2	3	4	5
6)	I try to think through a topic and decide what I am supposed to learn from it rather than just reading it over when studying. (self-regulation)	1	2	3	4	5
7)	When studying for a math course, I try to determine which concepts I don't understand well. (self-regulation)	1	2	3	4	5
8)	When I study for a math course, I set goals for myself in order to direct my activities in each study period. (self-regulation)	1	2	3	4	5
9)	If I get confused taking notes in class, I make sure I sort it out afterwards. (self-regulation)	1	2	3	4	5
10)	I memorize key words to remind me of important concepts. (rehearsal)	1	2	3	4	5

11)	When studying for this class, I read my class notes and the course readings over and over again. (rehearsal)	1	2	3	4	5
12)	I try to relate ideas in math to those in other courses whenever possible. (elaboration)	1	2	3	4	5
13)	I try to understand the material in this class by making connections between the readings and the concepts from the lectures. (elaboration)	1	2	3	4	5
14)	When I study for this course, I go through the readings and my class notes and try to find the most important ideas. (organization)	1	2	3	4	5
15)	I make simple charts, diagrams, or tables to help me organize math material. (organization)	1	2	3	4	5
16)	I try to play around with ideas of my own related to what I am learning in math. (critical thinking)	1	2	3	4	5

APPENDIX B

SELF-EFFICACY QUESTIONS FROM MSLQ

Related to the college-level mathematics course(s) you are required to take, if you think the statement is very true of you, select 5; if a statement is not at all true of you, select 1. If the statement is more or less true of you, find the number between 1 and 5 that best describes you.

		Not at all true of me				Very true of me
1)	I believe I can receive an excellent grade in aa math course.	1	2	3	4	5
2)	I'm certain I can understand the most difficult material presented in the readings for a math course.	1	2	3	4	5
3)	I'm confident I can understand the basic concepts taught in a math course.	1	2	3	4	5
4)	I'm confident I can understand the most complex material presented by the instructor in a math course.	1	2	3	4	5
5)	I'm confident I can do an excellent job on the assignments and tests in a math course.	1	2	3	4	5
6)	I expect to do well in a math class.	1	2	3	4	5
7)	I'm certain I can master the skills being taught in a math class.	1	2	3	4	5

APPENDIX C

PERMISSION TO USE THE MSLQ

How to obtain permission to use the Motivated Strategies for Learning Questionnaire (MSLQ)?

The Motivated Strategies for Learning Questionnaire (MSLQ) developed by Pintrich, Smith, Garcia & McKeachie, 1991, exists in the public domain of the internet. All are welcome to use it for valid research purposes, and you are not required to ask permission to use it as long as the instrument is cited appropriately in your writings and publications. Please note the following files are available for download:

- A Manual for the Use of the Motivated Strategies for Learning Questionnaire (MSLQ)
- The Making of the Motivated Strategies for Learning Questionnaire
- MSLQ Chapter
- Contact Information

For questions about its specific usage and development please contact some of the people involved in its original development. For those types of inquiries please e-mail: mslq@umich.edu. The MSLQ has been translated into several languages by individual users. For limited information regarding this subject please contact mslq@umich.edu.

http://www.soe.umich.edu/faqs/tag/education+and+psychology/

APPENDIX D

IRB APPROVAL

IRB
INSTITUTIONAL REVIEW BOARD
Office of Research Compliance,
010A Sam Ingram Building,
2269 Middle Tennessee Blvd
Murfreesboro, TN 37129

MIDDLE TENNESSEE STATE UNIVERSITY

IRBN007 – EXEMPTION DETERMINATION NOTICE

Friday, April 28, 2017

Investigator(s):	Ava Walker (Student PI), Hilary Miller (FA), Mary Martin, and Tony Johnston
Investigator(s') Email(s):	akw3r@mtmail.mtsu.edu; Hilary.Miller@mtsu.edu; Mary.Martin@mtsu.edu; Tony.Johnston@mtsu.edu
Department:	Psychology
Study Title:	Student Veterans Math Boot Camp
Protocol ID:	**17-1238**

Dear Investigator(s),

The above identified research proposal has been reviewed by the MTSU Institutional Review Board (IRB) through the **EXEMPT** review mechanism under 45 CFR 46.101(b)(2) within the research category *(2) Educational Tests* A summary of the IRB action and other particulars in regard to this protocol application is tabulated as shown below:

IRB Action	EXEMPT from furhter IRB review***
Date of expiration	**NOT APPLICABLE**
Participant Size	30 (THIRTY)
Participant Pool	MTSU Student Veterans
Mandatory Restrictions	Adult participants age 18+ Informed consent collected from all participants De-identified data collection and storage
Additional Restrictions	**None at this time**

Comments	NONE	
Amendments	**Date** 8/3/17	**Post-Approval Amendments** Approved changes to survey and data collection via internet survey.

***This exemption determination only allows above defined protocol from further IRB review such as continuing review. However, the following post-approval requirements still apply:

- Addition/removal of subject population should not be implemented without IRB approval
- Change in investigators must be notified and approved
- Modifications to procedures must be clearly articulated in an addendum request and the proposed changes must not be incorporated without an approval
- Be advised that the proposed change must comply within the requirements for exemption
- Changes to the research location must be approved – appropriate permission letter(s) from external institutions must accompany the addendum request form
- Changes to funding source must be notified via email (irb_submissions@mtsu.edu)
- The exemption does not expire as long as the protocol is in good standing
- Project completion must be reported via email (irb_submissions@mtsu.edu)
- Research-related injuries to the participants and other events must be reported within 48 hours of such events to compliance@mtsu.edu

The current MTSU IRB policies allow the investigators to make the following types of changes to this protocol without the need to report to the Office of Compliance, as long as the proposed changes do not result in the cancellation of the protocols eligibility for exemption:

- Editorial and minor administrative revisions to the consent form or other study documents
- Increasing/decreasing the participant size

The investigator(s) indicated in this notification should read and abide by all applicable post- approval conditions imposed with this approval. Refer to the post-approval guidelines posted in the MTSU IRB's website. Any unanticipated harms to participants or adverse events must be reported to the Office of Compliance at (615) 494-8918 within 48 hours of the incident.

All of the research-related records, which include signed consent forms, current & past investigator information, training certificates, survey instruments and other documents related to the study, must be retained by the PI or the faculty advisor (if the PI is a student) at the secure location mentioned in the protocol application. The data storage must be maintained for at least three (3) years after study completion. Subsequently, the researcher may destroy the data in a manner that maintains confidentiality and anonymity. IRB reserves the right to modify, change or cancel the terms of this letter without prior notice. Be advised that IRB also reserves the right to inspect or audit your records if needed.

Sincerely,

Institutional Review Board
Middle Tennessee State University

Quick Links:

Click here for a detailed list of the post-approval responsibilities. More information on exempt procedures can be found here.