BEST LEARNING AND STUDY STRATEGY PREDICTORS OF GPA 
FOR VOCATIONAL ADULT AND TRADITIONAL LEARNERS

by

LaChelle Marie Rosenbaum

Liberty University

A Dissertation Presented in Partial Fulfillment
Of the Requirements for the Degree
Doctor of Education

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ABSTRACT

Vocational education has gained support and endorsement from the Obama Administration as a way to advance the American public in economic and social prosperity in this coming age. Time and resources are crucial as traditional and adult learners seek the skills they need for competitive employment. The purpose of this quantitative study was to examine the predictive relationship between learning and study strategies and academic performance (GPA) among first semester vocational adult learners and vocational traditional learners. The participants for this study were selected from a convenience sample of vocational college students at a northwestern, rural, four-year college with an academic and vocational division. The sample included traditional learners, students between the age of 18 to 24 years-old and adult learners who completed the Learning and Study Strategies Inventory (LASSI) during Spring 2013, Fall 2013, Spring 2014, and Fall 2014 vocational student success enrollment interviews. Adult learners included students who were 25 and older, and younger students who had adult responsibilities such as full-time employment or dependents. LASSI subscale scores were matched with corresponding first semester cumulative grades and demographics. Two multiple regression analyses were conducted on the predictive relationship between subscales of the LASSI and GPA for Vocational Adult Learners and Vocational Traditional Learners. As a result, it was identified that there were no predictive relationships between subscales of the LASSI and GPA for Vocational Adult Learners or Vocational Traditional Learners. This study failed to reject both null hypotheses.

Keywords: Learning and Study Strategies Inventory (LASSI), vocational education, adult learners, traditional learners, attainment, academic performance, grade point average (GPA)
Dedication

In gratitude, I dedicate this dissertation to my husband, Ryan, who in full confidence, faithfully encouraged me to pursue my dreams. To my daughters, Kaylee and Katelyn, may you one day embark on your own journey that stretches your belief in yourselves to find your faith and family are there to encourage you through, as mine have in this endeavor. Also, to my parents, Joel and Renae Hansen, who have lovingly guided me, believed in me, and encouraged me to follow Jesus’ calling in my life. Finally, I am humbled that God first called, then equipped me to walk through this journey. “To Him who is able to do immeasurably more than all we ask or imagine, according to his power that is at work within us, to Him be glory in the church and in Christ Jesus throughout all generations, for ever and ever! Amen” (NIV, Eph. 3:20-21).
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List of Abbreviations

Adult Learner (AL)

Council for Adult and Experiential Learning (CAEL)

Learning and Study Strategies Inventory (LASSI)

Grade Point Average (GPA)

Servicemen’s Readjustment Act of 1944 (G.I. Bill)

Traditional Learner (TL)
CHAPTER ONE: INTRODUCTION

Background

As each new college semester rotates in, those perusing the school supplies aisles are no longer exclusively the expected 18 to 24 year olds known as traditional learners (TLs). Rather, adults from varied age and experience backgrounds stand in those aisles attempting to prepare themselves for college success. Researchers understand that it takes much more than typical school supplies to obtain a college degree; however, traditional learners, students under the age of 25, tend to be the focus of student success research studies over the non-traditional learners (Wolniak, Mayhew, & Engberg, 2012). Traditional learners may still represent the majority of college students, yet adult learners (ALs), students over the age of 24 (Knowles, Holton, & Swanson, 2005; Jacobs & Hudnley, 2010) or younger students who have adult responsibilities such as full-time employment or dependents (Brock, 2010; Clark 2012; Knowles 1990), are on the increase (Gilardi & Guglielmetti, 2011). Nearly one-fourth of four-year colleges’ and just over one-third of two-year colleges’ enrolled populations are students 25 years old or older (U.S. Census Bureau, 2012).

Adult learners present a unique population. According to a considerable contributor to the Adult Learning Theory, Knowles (1990), ALs have different expectations of college and experience college differently than TLs. This field of understanding ALs needs expanding because, even though ALs are increasing in frequency, they are not necessarily completing vocational college degrees (D’Amico, Morgan, & Robertson, 2011; Hirschy, Bremer, & Castellano, 2012). Although there are numerous reasons why individual ALs may not complete two-year degrees, their early academic performances as represented by grade point average (GPA) are vital indicators. Wang (2009) used community college GPA to measure “early
academic performance” resulting in significant predictors of both degree completion and continuous enrollment. Furthermore, numerous studies found that students’ learning and study strategies were predictors of academic performance through analyses of Learning and Study Strategies Inventory (LASSI) to GPA (e.g., Griffin, MacKewn, Moser, & VanVuren, 2013; Griffin et al., 2012; Schutz, Gallagher, & Tepe, 2011; West & Sadoski, 2011). The LASSI was normed across age, gender, ethnicity, GPA, and institution type. Although institution types included: universities, state colleges, community colleges, and technical institutions, the population being studied did not include vocational, two-year degree seeking college students enrolled in an Associate’s degree program. In addition, only 17% of the normed samples were over 25 years old (Weinstein & Palmer, 2002).

The infiltration of adult learners (ALs) over 24 years old in higher education has not waned, but has steadily increased over time (Gilardi & Guglielmetti, 2011). Understanding the background of the adult learners within vocational education’s history provides insight into the need for re-establishment of vocational importance within the greater society. Vocational education’s importance, the increase in ALs attendance in such institutions, and the Adult Learning Theory’s explanation of how and why ALs seek higher education will further be explored in this section.

First Adult College Learners

As servicemen returned home from World War II, they revolutionized college education. Combating the “wrong kind of student” label from the opposition of the 1944 Servicemen’s Readjustment Act, veterans entered traditionally aged college campuses as experienced and mature students. Not attempting to “fit in,” but to make the most of the privilege of access, the servicemen identified college as a “serious endeavor.” Finally, their success, despite their non-
traditional status, demolished the philosophy that “only a select few could benefit from college” (Lazerson, 2010, p. 18), ultimately setting the stage for future ALs. President Truman’s Higher Education Commission of 1947 extended that equal opportunity to the general public by enabling all Americans broader access to higher education. Truman believed, “no society can long remain free unless its members are freemen, and men are not free where ignorance prevails…education that liberates and ennobles must be made equally available to all” (Sullivan, 2010, p. 646). Adult learners accepted and embraced that invitation in mass. By the late 1980’s students over 30 years old were the fastest growing student population segment in all of higher education (Lazerson, 2010).

Today’s adult learners are as crucial to the United States (U.S.) in reestablishing the importance of education as veteran servicemen were seventy years ago. During the White House Summit on Community Colleges, Dr. Jill Biden reported that, “Community colleges are uniquely positioned to provide the education and training that will prepare students for the jobs in the 21st century” (White House, 2011, p. 8). This reestablishment of educational importance is not a mirror of past philosophies of the school of liberal arts; rather it is vocational in nature.

Vocational education is skill based preparation for occupational employment in fields such as manufacturing, energy, healthcare, tourism, transportation, and logistics, to name a few (D’Amico et al., 2011). The development of vocational education began to rise from 1880 to 1930 when specific preparation for occupations became a step in the ladder of higher education (Lazerson, 2010). Community colleges were natural recipients of the strategic shift toward vocational curriculum, thus providing the American public with over 1,100 colleges to choose from (White House, n.d.). In fact, not only did many students choose community colleges, but two-thirds to three-fourths of undergraduates chose degree programs that were “vocational”
Lazerson, 2010). This shifting in curriculum and purpose in education has had a profound effect on college enrollment and economic opportunity. Hirschy et al. (2011) hypothesized that, “high levels of career integration [would] be associated with high levels of program or credential completion” (p. 308). That was partially true. However, D’Amico et al. (2011) and West and Sadoski (2011) indicated student characteristics, college environment, and student success also played important roles in the completion rate of vocational learners. Their concluding recommendation was to match environment and intervention with students’ needs.

Today, higher education is the foundation of tomorrow’s jobs according to President Obama’s administration. This is proven through action as monies and efforts are invested into the community college and vocational college education systems. During the 2013 budget proposal, President Obama requested an, “$8 billion investment in community colleges and states over three years to partner with businesses to train workers in a range of high-growth and in-demand areas, such as health care, logistics, transportation, and advanced manufacturing” (White House, n.d., par. 20). In addition, Knowles et al. (2005) reported that the, “input of human capital is an even more critical determinant of organizational output than material capital” (p. 136). Economic opportunity, through human capital — that is GPA, skills, knowledge, and academic experience — has increasingly been offered more equitably, but only partially realized. For despite the influx of adult learners (ALs), their attainment rates have not matched their enrollment rates. Without the completion of a certificate or degree program adult students may not reap the rewards their opportunity offered. Unfortunately, the uncompleted opportunity may perpetuate oppression, heighten poverty, and secure debt (Brimley, Verstegen, & Garfield, 2012). On the other hand, the reward for completion presents the opportunity for the reduction of poverty through a heightened chance of employment and an increase in income (Hirschy et
al., 2011). In fact, the employment opportunity for Associate degree completers is placement within one of the 65% of jobs that require a vocational degree (D’Amico et al., 2011). Educational opportunity is increasingly utilized and leveraged by ALs; however there remains a substantial barrier between enrolling in college and degree attainment for these students.

Interestingly, President Obama and his 2009-2016 administration clearly sees the discrepancy between enrollment and attainment. In response, the White House (n.d.) challenges America to graduate “an additional five million community college graduates by 2020” (par. 10). Weighing the cost and benefit, both nationally as well as individually, the greatest return for investment is seen in the additional $18,460 per year potential earnings that a two-year degree graduate can make over a high school graduate (Hirschy et al., 2011). Unfortunately, two hurdles could hinder the successful completion of a two-year degree for adult learners (ALs). They are non-credit-bearing courses and short-term vocational skills.

First, according to D’Amico et al. (2011), many students need pre-college developmental (non-credit-bearing) courses. Developmental courses are preparatory math or English (reading and/or writing) classes that are offered to students who lack relatively basic skills essential to proficiently complete college-level courses (Howell, 2011). Federal Financial Aid funds 150% of the 60 credits usually required to complete an Associate degree. However, developmental courses often “use up” some of the 90 credits without contributing to the graduation course load. For example, if an individual starts out at the lowest developmental math course, say MATH 010, he must also take MATH 025 and MATH 103 before he can take the required MATH 123. These three developmental math courses occupy nine of the 90 allotted credits and three semesters of a student’s time. The 90 allotted credits includes all courses taken over one’s lifetime. Therefore, these nine developmental courses are hindrances for adult learners who have
a semester or two on their transcript from previous college attempts. For if 80% of allotted credits are completed and a degree cannot be obtained in the next 20%, Federal Financial Aid is withheld until the student reaches Satisfactory Academic Standing (LCSC, 2014b) through their own funds.

The second hurdle for vocational education completion is that some students participate in college short-term only to obtain specific vocational skills. Because vocational education is practical rather than theoretical in curriculum, there is a potential for students to consider their education “complete” at a certain level of skill and then “job out” to employment regardless of certificate or degree attainment. Therefore the challenges for vocational education institutions are to understand adult learners’ initial developmental skill needs and to match learning and study strategy interventions to appropriately engage and support students towards retention.

Before providing for the skill needs of individual students, vocational education institutions must understand the uniqueness of adult learners (ALs). As stated earlier, adult learners are students over the age of 25 years-old, while encompassing younger students who also have adult responsibilities such as full-time employment or dependents (Brock, 2010; Clark, 2012; Jacobs & Hundley, 2010; Knowles, 1990; Knowles et al., 2005). Adult learners also possess developed minds, bodies, and social abilities, enabling their purpose for learning and method of understanding to differ from traditional learners. The theoretical basis for this study is Knowles’ (1990) Adult Learning Theory. This theory expands upon the knowledge that adult learners interact with academic course content and their immediate learning environment to develop meaning and purpose. In response to the complexity and uniqueness of adults, Knowles et al. (2005) summarized the six Andragogy Basic Assumptions as a way to understand and appropriately engage ALs. The six assumptions are as follows: (a) the need to know, (b) the
learners’ self-concept, (c) the role of the learners’ experiences, (d) readiness to learn, (e) orientation to learning, and (f) motivation (pp. 64-68). These assumptions are the lens into the heart and motive of ALs.

Connecting previous knowledge and experiences to course learning objectives is a strategy that utilizes (a) the need to know and develops buy-in by the adult learner. Buy-in carries weight as the adult (b) learners’ self-concept is challenged. Transitioning from students who are “taught at” instead of engaged with, adult learners (ALs) desire to make the switch from dependent learners to self-directed and interactive learners. This intentional interaction with the vocational education connects and solidifies one’s identity as an individual. Knowles et al. (2005) reports, “to children, experience is something that happens to them; to adults, experience is who they are” (p. 66). The (c) role of a learner’s experiences is critical for ALs to connect the learning and experience to who they are. Adult learners’ ability and (d) readiness to learn connects their material to the enhancement of their identity. Their composition and (e) orientation to learning is life-centered, task-centered, or problem-centered in relation to the purpose of the end result. This end result is impacted by (f) motivation, the final assumption that drives the ALs to growth and development.

In applying Adult Learning Theory to this current study this researcher proposed that in vocational education, the predictive variables, subscales of the LASSI, might influence the criterion variable, GPA. The prediction was rooted in the research that learning and study strategies enhance academic performance (Griffin et al., 2012; Griffin et al., 2013; Schutz et al., 2011; West & Sadoski, 2011). The study’s statistical analysis sought to identify the statistically significant predictor variables for vocational ALs and vocational TLs to GPA. Inclusion of
vocational TLs served as a control type group, allowing this researcher to explore unique and similar predictive factors within the results section.

**Problem Statement**

It appears, through connection of adult learning theory and prior research regarding poor degree completion rates (D’Amico et al., 2011; Lazerson, 2010; Hirschy et al., 2011), that there may be a viable solution to assisting adult learners (ALs) in becoming more consistently adult completers in vocational institutions. Literature reports that GPA is a predictor of academic completion (Wang, 2009) and LASSI scores a predictor of academic performance (Griffin et al., 2012; Schutz et al., 2011). Therefore, if educators know where to impact students’ learning and study strategies so that they can earn better grades earlier, then degree completion can be heightened through early intervention. Yet there is a gap in the literature regarding the learning and study strategy predictors of academic performance for ALs and traditional learners (TLs) in specifically vocational education (Brock, 2010; Tuckman & Kennedy, 2011). Adult learners may share similar academic performance (GPA) predictors to TLs. However, learning and study strategy research has predominately been focused on TLs and has left educators in the dark regarding the learning and study predictors of the vocational ALs (Griffin et al. 2012; Schutz et al., 2011; West & Sadoski, 2011). Knowles et al. (2005) identified that ALs differ among themselves and therefore reported a need to increase educators’ knowledge of ALs differences. Hirschy et al. (2011) reported that vocational student learners are on the rise. This unique population of students may not be appropriately served if student services, professors, and learning centers approach the vocational ALs and vocational TLs as they would approach the adult academic learners. Therefore the problem is that there is a limited amount of literature portraying the learning and study strategy predictors of GPA for vocational ALs and vocational
TLs. This in turn perpetuates the universal method of intervention for student success, disregarding the strengths and resources vocational and adult students contribute, and thus failing to acknowledge their represented population on college campuses.

**Purpose Statement**

The purpose of this quantitative study was to examine the predictive relationship between learning and study strategies and academic performance (GPA) among first year vocational adult learners and vocational traditional learners. The predictive variables, subscales of the LASSI, are generally described as learning or study strategies including: anxiety, attitude, concentration, information processing, motivation, self-testing, selecting main ideas, use of support techniques, use of time management, and test strategies. The criterion variable is defined as academic performance as represented by first semester grade point average (Griffin et al., 2012; Griffin et al., 2013; Schutz et al., 2011, West & Sadoski, 2011).

**Significance of the Study**

In a country where outsourced jobs are on the rise, college completion rates are lower than other industrialized countries, and employment competition is steep; having a college degree or certificate is increasingly valuable (White House, 2011). The nation has once again moved to a place where citizens need increased access to vocational education where specific skills and training can be and have been utilized by adult learners (ALs). According to the U.S. Census Bureau (2012), 60.9% of American adults, age 25 years and older, have yet to attain an Associate’s degree and therefore present a large market of demand. Yet without the attainment of a degree, the educational opportunity is a burden to the individual as well as the U.S. financial lender. Therefore, the focus of this study was to determine the best learning and study strategy predictors of vocational adult and traditional learners’ academic performance.
Through the knowledge of the predictive relationship between LASSI subscales and GPA, vocational educators may more effectively support their adult and traditional learners (TLs) toward persistence and completion. “Study strategies such as those involving time and study management seem to be consistently related to achievement even when aptitude is controlled for” (West & Sadoski, 2011, p. 697). In addition, research has linked individual motivation to academic success (Griffin et al., 2013; D’Amico et al., 2011). However, these results are generalizable to traditional aged academic students rather than ALs. Knowles’ et al. (2005) framework on ALs suggested that educators cannot expect ALs to mirror the behaviors and expectations of TLs. Similarly, educators cannot group all adult learners in one category or understanding or mode of learning. Given the ever-growing population of adult vocational learners, research on how their learning and study strategies differ or mirror TLs can rectify this gap of knowledge.

**Research Questions**

The following research questions were proposed:

**RQ1:** Can one or more subscales of the LASSI (anxiety, attitude, concentration, information processing, motivation, self-testing, selecting main ideas, use of support techniques, use of time management, or test strategies) predict vocational adult learners’ first semester academic performance (GPA)?

**RQ2:** Can one or more subscales of the LASSI (anxiety, attitude, concentration, information processing, motivation, self-testing, selecting main ideas, use of support techniques, use of time management, or test strategies) predict vocational traditional learners’ first semester academic performance (GPA)?
Null Hypotheses

The following null hypotheses were proposed:

H₀₁: There is no predictive relationship between the subscales of the LASSI and first semester academic performance for vocational adult learners in a northwestern public college.

H₀₂: There is no predictive relationship between the subscales of the LASSI and first semester academic performance for vocational traditional learners in a northwestern public college.

Definitions

The following definitions were used for this study:

1. Learning and Study Strategies Inventory (LASSI) identifies students’ strengths and weaknesses within ten subscales: Anxiety, Attitude, Concentration, Information Processing, Motivation, Self-Testing, Selecting Main Idea, Use of Support, Time Management, and Test Strategies (Weinstein et al., 2002).

2. Adult learners are defined as, “individuals who are typically over the age of twenty-five or who occupy social roles that would otherwise signal adulthood” (Jacobs & Hundley, 2010, p. xi) such as full-time employment or dependents (Brock, 2010; Clark, 2012; Knowles, 1990).

3. Traditional learners are students attending college directly after high school, with little or no break, are under the age of 25 years-old, and have minimal “adult responsibilities” such as dependents or employment responsibilities (Jacobs & Hundley, 2010).

4. Vocational education is defined as post-secondary two-year education that promotes practice experience and specific skill sets to prepare students for a specific occupational role (D’Amico et al., 2011; Lazerson, 2010).
5. Academic performance is represented by students’ first semester cumulative grade point average (Griffin et al., 2012).

6. Attainment is defined as persistence through college from one year to the next and the completion of a certificate or degree (Kalsbeek, 2013; U.S. Census Bureau, 2012).
CHAPTER TWO: REVIEW OF THE LITERATURE

Introduction

This researcher examined the study of vocational adult and traditional learners’ learning and study strategies through the Adult Learning Theoretical framework. First examined in this literature review was vocational education and vocational student demographics. Understanding their demographics led to the importance of examining Adult learners (ALs) in vocational post-secondary education. Finally, prior research regarding strengths and barriers of ALs’ successful college completion was reported. The Adult Learning Theory’s Andragogy Practice Model revealed how adults approach learning which might also transfer to vocational adult learners. Although research has explored predictors of academic success for many populations, there has been minimal research on the best predictors of academic success for vocational traditional learners (TLs) and even less for ALs. Therefore, the ten subscales of the Learning and Study Strategy Inventory (LASSI) with its ten subscales are explained in detail in this chapter to clarify how each subscale measures different learning and study strategies. Digging deeper, this chapter will then address social and historical movements of vocational education, where ALs stand comparatively to TLs, and what the next logical step would be to understand and advocate for this population of individuals’ academic successes. Finally, related studies were set as models and their recommendations for future research considered.

Current Significance

Malcolm Knowles’ (1990) Adult Learning Theory identifies adult learners (ALs) as individuals 25 years old or older, including those younger who have increased responsibilities and experiences, such as full-time employment or dependents. According to
Knowles (1990) learning is a lifelong process yet the interaction with learning is approached distinctly different for ALs. However, college success curricula and research on incoming students are often tailored to the traditional incoming 18 year olds fresh out of high school (Wolniak et al., 2012). If ALs truly approach and experience college differently than TLs, students under the age of 25 without adult responsibilities, then interaction and intervention with this unique population, as identified by Knowles (1990) and Knowles et al. (2005), must be addressed and provided for. A substantial gap in literature is therefore the learning and study strategy predictors of academic performance for ALs and traditional learners (TLs) in specifically vocational education (Brock, 2010; Tuckman & Kennedy, 2011).

Overview of Vocational Education

Vocational students are currently fulfilling national needs for skilled professional and technical workers in an environment where more jobs are being outsourced and sent offshore (D’Amico et al., 2011; Hirschy et al., 2011; Lazerson, 2010; White house, 2011). Vocational education is most often offered within community colleges. Although four-year institutions also cater to students who desire to obtain technical certificates or Associate degrees. According to the U.S. Census Bureau (2012) there was a large representation of students 25 years old or older in two-year as well as four-year institutions. Approximately 34% of enrolled two-year college students and 24% of four-year college students are ALs (based only on age). More interestingly, the same year’s data reported that of the 9,380,000 vocationally emphasized Associates degree graduates, 92% were ALs (based only on age). In addition, ALs represented 91.72% of academically emphasized Associate degree and 93.72% of bachelor degree obtainers. The data from the U.S. Census Bureau dispute
previous research that ALs, particularly vocational or two-year college students, are not as proficient in degree completion as their academic peers (D’Amico et al., 2011 & Hirschy et al., 2011). In additions, those numbers distinguished the adult learner as the vast majority of vocational degree completers without even accounting for the younger students who, due to increased adult responsibilities rather than age, are also considered adult learners.

**Importance of Adult Learners**

Previous research has indicated that non-traditional students have not graduated at the same rate as traditional students. The term, non-traditional has typically been applied to students who many definitions in research including: under-represented minority, first generation, low economic status, under prepared, and single parents. Late starters, students over the age of 24, and females have also been group in the non-traditional college students by researchers (Brock, 2010; Clark, 2012). Although adult learners (ALs) may be “non-traditional” in more than one category or circumstance, the Adult Learning Theory validates narrowing the focus to differentiate groups by age and responsibility rather than other criteria. This allows for a more narrow focus from which to study the learning and study strategy predictors of academic performance for ALs to reduce the gap in adult and vocational education literature.

This chapter will expand upon TLs and ALs situated within the context of Adult Learning Theory. Adult Learning Theory seeks to explain and describe why ALs are different than TLs. This is of essence as, “the so-called traditional [learner]…is now the exception not the rule” (Brock, 2010, p. 113). Adult Learners have thus been determined by literature and the 2010 U.S. Census to be a hefty population within the student body and that in of itself constitutes a study. The interest and need for this study is to clarify if there
is a difference in the way TLs and ALs approach or utilize learning and study strategies. Learning and study strategies are an indicator of how a student will approach college responsibilities and have been found to be predictors of grade point average as a measure of students’ academic performance (Bush, Hux, Zickefoose, Simanek, Homberg, & Henderson, 2011; Griffin et al., 2012; Griffin et al., 2013; Schutz et al., 2011; Urciuoli & Bluestone, 2013; West & Sadoski, 2011). Academic performance, self-efficacy, time management, and study strategies among other learning strategies are thought to be crucial for student success (Aubke, 2009; Tuckman & Kennedy, 2011; Stupnisky, Renaud, Daniels, Haynes, & Perry 2008; Wolniak et al., 2012).

Kalsbeek (2013) reported, “the national dialogue about retention and student success has taken on a greater intensity” (p. 5). This chapter will expand upon the increase of students’ access to college, but for now it is of interest to note that, due to the deliberate attempt to increase access to college for all individuals interested, able, or willing, there has been a 741% increase of community college enrollment since 1963, representing 35% of students currently enrolled in higher education. Of those, 43% reported the intent to obtain an Associate’s degree and 42% reported the desire to increase job skills though a vocational or terminal education (Gilbert & Heller, 2013). However, access to college comes at a price. Brock (2010) wrote that it would be financially irresponsible to fund and increase college access if degree completion was not also valued and sought after. Therefore college completion, through increased student semester-by-semester success, would benefit all those bearing the cost: the student, the institution, and state and federal governments. Furthermore, the United States, which is currently falling behind in educational and technical advancement in comparison to other leading nations, could also reap the benefits
of more effective vocational education. Thus the value of student success is paramount and has been valued by stake-holders for decades. Research on student success is vast for TLs (Bailey, Alfonso, Scott, & Leinbach, 2004; Hirschy et al., 2011; Wolniak et al., 2012) yet additional research needs to be conducted on student success strategies of ALs who, as noted before, make up 24-34% of college campuses, not including the younger students who are adult learners through their adult-like responsibilities.

**Contribution of Proposed Research**

Since learning and study strategies are a predictor of grade point average, a measure of academic performance, and academic performance an indicator of persistence and completion; then utilization of an instrument to measure learning and study strategy use is logical. Such an inventory allows educators upfront information about the predictability as well as strengths and weaknesses for individuals or groups of students seeking to enroll in college. Previous research has utilized the Learning and Study Strategies Inventory (LASSI) as an instrument to measure students’ learning and study strategies (Bush et al., 2011; Griffin et al., 2012; Griffin et al., 2013; Schutz et al., 2011; Urciuoli & Bluestone, 2013; West & Sadoski, 2011). The research use of the LASSI has been recommended for additional populations within education and at various levels of higher education to assess how diverse students’ use of learning and study strategies affect their academic performance (Griffin et al., 2012; Schutz et al., 2011; Tuckman & Kennedy, 2011; West & Sadoski, 2011). In alignment with Adult Learning Theory, this study will contribute knowledge about the differences between TLs’ and ALs’ learning and study strategies as a predictor of academic performance within vocational post-secondary education. Brock (2012) reported:
Without clear evidence on what to do differently, colleges and universities are likely to continue the same kinds of programs and services that they have been running for years, and with similar results. Researchers must actively disseminate evaluation findings and technical assistance to help administrators, faculty, and staff adapt the most effective program strategies to their campuses (p. 126).

Not only will this study seek to identify some of the learning and study strategy differences, or lack of differences, between TLs and ALs, but will also seek to articulate learning and study strategies that are statistically significant predictors of academic performance for each population of learner within post-secondary vocational education.

**Theoretical Framework**

The theoretical framework for examining adult learners (ALs) is informed by Knowles’ (1990) Adult Learning Theory and the learning and study strategies explained by Weinstein and Palmer (2002). The Adult Learning Theory allows a lensed perspective into students’ learning and study strategies.

**Knowles’ Adult Learning Theory**

The theoretical backdrop of Malcolm Knowles’ (1990) Adult Learning Theory is situated in Andragogy, “the art and science of helping adults learn” (Henschke, 2011, p. 34). The term “andragogy” was first used in 1833 by Alexander Kapp as a descriptor of Plato’s educational theory. In the early 1900’s the term began to gain recognition first in Germany and then in America as it was used to distinguish the theory of adult learning from “pedagogy,” the theory of youth learning (Henschke, 2011; Knowles, 1990). Beginning with the expectation that, according to Eugen Rosenstock (1921), “It is not enough to translate the insights of education theory [or pedagogy] to the situation of adults” (as cited
in Knowles, 1990, p. 52) rather we must development an adult learning theory that would stand on its own. Since 1970, Knowles has found his place in andragogy by “acknowledging that learners [are] self-directed and autonomous and that the teacher is a facilitator of learning rather than presenter of content” (Henschke, 2011, p. 34). Knowles, Holton, and Swanson (2005), known for their continued research on Malcolm Knowles’ Adult Learning Theory, traced his constructed theory from the psycho-social-educational thinkers of his time. Eduard Lindeman’s The Meaning of Adult Education, Sigmund Freud’s research of the role subconscious mind has on behavior, Carl Jung’s four functions of extracting information, Erik Erikson’s eight stages of personality development, Abraham Maslow’s hierarchy of needs, Carl Rogers’ person-centered approach, and Cyril Houle’s research on continuing education contributed to the human behavior knowledge foundation needed to inform Knowles’ theory (pp.37-55). These founders and contributors of psychology, philosophy, and adult education created a well-rounded catalyst for understanding adult learners and how educators and their institutions might effectively meet students’ needs. Meeting students’ needs might first occur through understanding adult learning. According to Knowles (1990), ALs are motivated by their connection of knowledge to their daily living. Through use of circular process, old knowledge allows new knowledge to “take root” because of clear association with previous learned knowledge and skills. Since the new knowledge connects with the old knowledge, learning becomes purposeful and meaningful.

This is in direct opposition to the traditional “rewards” given by institutions of education as part of the pedagogy organizational structure. Accordingly, Adult Learning Theory situates ALs within a process model (Knowles et al., 2005). Demonstrating that
ALs are continuously developing behaviorally and cognitively towards their personal educational objectives as opposed to root movement based off expectations of society or others.

**Andragogy practice model.** Knowles et al. (2005) articulated that student pursuit of higher education fulfills two purposes for the adult learner (AL): the work purpose and the human purpose. The work purpose accomplishes the ALs’ needs to increase job skills and serve their organization. “Their human purpose is furthered to the extent that they use adult education to help [adult learners] develop the competencies that will enable them to work up the ladder of Maslow’s hierarchy of needs” (Knowles et al., 2005, p. 107). Due to age and experience, ALs are more unique and diverse, compared to TLs as well as to their adult learning peers. Knowles et al. (2005) proposed that Adult Learning Theory has been an attempt to understand where ALs are and propose a practice model to guide the diverse group toward further learning. This andragogy practice model from Knowles, Holton, and Swanson (2005) includes three dimensions: (a) Goals and Purposes for Learning, (b) Individual and Situational Differences, and (c) Andragogy: Core Adult Learning Principles.

**Goals and purposes for learning.** The outer encompassing dimension, *Goals and Purposes for Learning*, is broken down further into three sub-categories: individual, institutional, or societal goals. As stated earlier, adult learners (ALs) start, continue, or advance their education for a conglomerate of reasons. It is imperative that institutions and educators realize and cater to the various goals of ALs as, “the goal will also likely affect the learning process” (Knowles et al., 2005, p. 151). For whether ALs enroll for, “career advancement, work stability, financial support…or [to] enrich [themselves]
intellectually” (Jacobs & Hundley, 2010, p. 7) it is the institution’s responsibility and best interest to meet their needs.

**Individual and situational differences.** On the middle dimension of the practice model, *Individual and Situational Differences* is highlighted. Within this dimension, there are three sub-categories that heighten educators’ awareness of those uniqueness qualities within adult learners (ALs). *Subject-Matter Differences* suggest that considerations be made for various types of learning. For example, “individuals may be less likely to learn complex technical subject matter in a self-directed manner” (Knowles et al., 2005, p. 153). *Situated Differences*, the second sub-category, encourages educators to examine location, past educational experiences, and cultural background experiences. In light of that, Olson and Presley (2009) reported, “the next decades will see increasing numbers of adults balancing family and job responsibilities against part-time academic work” (p. 157). In addition, Jacobs and Hundley (2010) and Ross-Gordon (2003) agree that often ALs pursue college at a time when their responsibilities are already over extended or they have, or are about to have, a life changing event.

**Individual differences.** Seeing these situational differences, researchers to wonder, “Who are these individuals who pursue higher education because of/or in spite of their responsibilities?” This introduces the central dimension, *Individual Differences*. This dimension is so substantive that since the theoretical development of this practice model in 1998, researchers have contemplated an Adult Education Psychology sub-field that would explore the influence of cognitive abilities, controls, and styles, in addition to personality styles and the influence of prior knowledge on ALs education (Knowles et al, 2005). However, it is certain, “individuals vary in their approaches, strategies, and preferences
during learning activities” (Knowles et al., 2005, p. 154). It is the awareness and implications of these individualized differences that imply there is a lack of knowledge in the area of vocational education that enrolls both adults and traditional learners. Furthermore, there should be an expansion of knowledge around the similarities and differences between vocational adult and traditional learners’ learning and study strategy predictors of GPA. Adult Learning Theory suggests that there are differences. In Tinto’s (1993) examination of social involvement, learning, and persistence he was cautious not to generalize his theory too far when reporting:

> We are forced to ask whether our impressions are merely a reflection of the types of students who have thus far been studied, namely youthful students attending four-year institutions. Would the same results apply equally well to older students or to students in two-year institutions who are immersed in external communities of work, family, and friends? (p. 135).

Further understanding of how learning and study strategies influence the academic performance of vocational ALs appears to be a valuable step toward informing educators about learning and study strategy behavior of vocational adult and traditional learners.

**Andrology: Core adult learning principles.** Central to the *Goals and Purposes for Learning and Individual and Situational Differences* dimensions is the Andrology: Core Adult Learning Principles. Six principles orientate educators on how to engage and plan the educational environment for their adult learner (AL) students. Without placement within the previous dimensions, these principles would provide insufficient knowledge to educators. The six core principles are assumptions that can be made about ALs: (a) the need to know, (b) the learners’ self-concept, (c) the role of the learners’ experiences, (d) readiness to learn, (e)
orientation to learning, and (f) motivation (Knowles, 1990, pp. 57-63; Knowles et al, 2005, pp. 64-68). As ALs have experienced more life, their learning, in which they translate information into meaning, is filtered through the process of what Tokuhama-Espinosa (2010) called ‘sense and meaning’ in that, “all new learning needs to connect to something already present in the brain,” (Tokuhama-Espinosa, 2010, p. 2). Connecting what adults already know to meaning and purpose is evident in the first assumption, the need to know. The awareness of why the learning is relevant to where they want to be is a catalyst for considerable investment of time and energy on the part of the individual (Knowles, 1990). The second assumption, the learner’s self-concept coincided with Jacobs and Hundley’s (2010) depiction of ALs being responsible for others in addition to themselves. This pride in self-directing comes with such tenacity that if placed in an environment where “learner equals dependent,” the “subconscious psychological need to be self-directing” may take over (Knowles, 1990, p. 58). Knowles (1990) expands this concept recording, “the way most people deal with psychological conflict is to try to flee from the situation causing it—which probably accounts in part for the high dropout rate in much voluntary adult education” (p. 59). Therefore, educators can come alongside ALs’ pride in being responsible for their own learning and transferring the skills to that of self-directing. The role of the learners’ experiences, assumption three, “piggybacks on the principle that the brain remembers information best when facts and skills are embedded in authentic experiences (natural contexts)” (Tokuhama-Espinosa, 2010, p. 116). These experiences are as vast and unique as the individuals themselves. The AL’s diversity of experience heightens the classroom learning. This difference in experience is also delineated by the identity gained by the experience. Experience is no longer something that “happens to them” but is now part of “who they are” (Knowles, 1990, p. 60). This intensity of ALs connecting and experiencing the content fosters
reinforcement of the material’s meaning. “The richest resources for learning resides in the adult learners themselves” (Knowles et al., 2005, p. 66), which can either be a strength or a barrier as ALs determine assumption four, their readiness to learn. This assumption is not stagnating, rather it is in flex because the ALs determine the level of connectedness they will have with the content. Knowles et al. (2005) quotes Boyd et al. (1980) reporting that learning, “emphasizes the person in whom the change occurs or is expected to occur. Learning is the act or process by which behavioral change, knowledge, skills, and attitudes are acquired” (p. 10). However, this learning must occur at a time in which the ALs perceive they need or desire it, which might explain the interest in vocational education and its emphasis on occupational skill sets. Adults’ orientation to learning, assumption five, is life-centered, task-centered, or problem-centered in relation to the change the learner is seeking rather than subject-centered. Subject-centered is broad dissemination of facts. Facts are needed in life-, task-, or problem-centered learning, but as knowledge that can be concretely applied (Knowles, 1990). Finally at the cortex of the AL assumptions is number six, motivation. “Adults are motivated to learn to the extent that they perceive that learning will help them perform tasks or deal with problems that they confront in their life situations” (Knowles et al., 2005, p. 67). Furthermore, it is an internal drive for increased intrapersonal satisfaction.

**Theory and Practice Link**

The Council for Adult and Experiential Learning (CAEL) is an organization that advocates for ALs. They pride themselves on working with colleges to enhance their services to ALs that improves completion rates. Reporting that, “Adult students are the present and future of higher education, representing the majority of U.S. college students. They have different needs, and schools need new tools to help them succeed” (par. 1). The CAEL also helps ALs
directly through resources that guide them in their journey toward higher education. One resource is their *A Consumer’s Guide to Going to School* (2013) handbook. This handbook describes the process of seeking out a college that is right for them, providing definitions for college lingo, and asking imperative “getting started” questions. These questions ask potential college students about their computer skills, time available for studies, time management skills, their self-motivation to complete the degree, writing skills, career goals, and whether they had the support system they needed to be successful. An organization whose sole purpose is to advocate and assist ALs understands that adults are different yet asks many of the same questions that the Learning and Study Strategies Inventory (LASSI) asks. Although Adult Learning Theory is not specifically mentioned in either the CAEL website or LASSI literature, the language and principles of Knowles’ (1990) theory in respect to ALs is evident.

**Subscales of LASSI**

Weinstein and Palmer (2002) thoroughly describe in their instructor’s manual the ten subscales that the Learning and Study Strategies Inventory utilizes to describe the assessment of the 80 self-reported questions. The ten subscales neatly fit into three well developed and researched constructs (p. 4). The three constructs are: *Study Skills, Willingness to Learn*, and *Self-Regulation*.

**Study skills construct.** The *Study Skills Construct* is the process of understanding and handling new information and then articulating the concept or process that was learned through a demonstration of knowledge. The first scale, *(a)* *Information Processing*, evaluates the mental process a student utilizes to connect new information to old through organizational strategies that utilize schemes to create meaning and thus understand and recall information faster. It is evaluated through questions that check students’ use of skills such as paraphrasing chapters
studied or mentally linking information to past experiences. The (b) Selecting Main Ideas scale examines students’ ability to identify the core theme of the concept taught or content read to be emphasized in studying, versus the non-crucial learning that supports the core. It narrows down important information to make studying more efficient and effective. This is revealed through students’ self-report of knowing what to underline in the text or what to study from the lecture notes. The (c) Test Strategies scale assesses students’ preparation for test taking. This subscale is essential as often, “students’ performance on a test is not an accurate indicator of what they have learned” (Weinstein & Palmer, 2002, p. 13). The scale measures the degree to which students know how to study for varying exam types and what to study prior to the test.

**Willingness to learn construct.** The second measured construct, Willingness to Learn, consists of three subscales. Overall, this construct examines the students’ attitude, beliefs, and behavior with regard to higher education. It asks if students have goals, the diligence to complete the assignment or degree program, as well as their level of anxiety over grades, tests, or failing. The first subscale, (d) Anxiety, is the only subscale with reverse scaling. It measures “how intense or concerned they are when approaching academic tasks” (Weinstein & Palmer, 2002, p. 8). It is based off the premise that thoughts influence emotions and beliefs, and together they affect academic performance. These thoughts negatively influence the beliefs and emotions about one’s own ability to learn, intelligence, and future success. This leads students into actions of fear, anxiety, and tension, which leads concentration away from academic tasks, thus creating self-defeating behaviors. Subscale, (e) Attitude, on the other hand measures students’ interests, thoughts, and beliefs about college and its place in the pursuit of the students’ goals. This attitude motivates the student to study diligently, which helps them maintain concentration and develop good work habits. If a positive attitude is not present or goals are unclear, the student
may question the purpose of college, resulting in increased difficulty in maintaining diligence. It also examines whether students have clear goals and whether education is important to them. Finally the most heavily researched subscale, (f) Motivation. Motivation, measures the effort, drive, and diligence students have to successfully complete their program. Despite interest in the topic or class, students with high levels of motivation accept responsibility for their learning and actively perform tasks needed to be successful. For example, reading textbooks, preparing for class, and consistently studying contribute to student success. In addition, a highly motivated student is able to complete assignments on time and persist when classes or assignments are difficult.

**Self-regulation construct.** The third construct, Self-Regulation, examines students’ ability to control their learning through (g) Concentration, (h) Self-Testing, and the use of (i) Study Aids and (j) Time Management. These four subscales work together to form the drive behind the behavior. Concentration measures students’ ability to focus on academic tasks for appropriate durations of time rather than on distracting thoughts or situations. Diminished concentration or distraction from non-school related topics could reduce the intake of information being presented. Additionally, “people have a limited capacity to process what is going on around them, and in their own thoughts, if they are distracted, there will be less capacity to focus on the task at hand” (Weinstein & Palmer, 2002, p. 10). The LASSI also measures whether students have utilized Self-Testing strategies that assist them in understanding and using preparatory test taking strategies that increase students’ awareness of content or skills learned. Knowledge acquisition and comprehension checking allows for meaningful learning and develops into transferable knowledge for cross-sectional content areas. Furthermore, it distinguishes gaps of information that need further exploration. These are further emphasized
through the use of study aids. The subscale, *Study Aids*, assesses students’ use of materials or techniques for learning and retaining new meaningful content or skills. For example, students above the national average utilize practice tests or draw organizational pictures to connect meaning. Finally, the last subscale, *Time Management*, is evaluated. This subscale examines students’ use of time for academic and organizational tasks and preparation for future conflicts; all of which contributes to their student success. It is essential that students manage their multiple responsibilities through realistic schedules and accepting responsibility for their behavior.

**Instrument match for research.** The LASSI was nationally normed through diverse regional sampling in universities, community colleges, state colleges, and technical institutions across the country. It sampled traditional and adult learners, and mirrors Adult Learning Theory language such as, meaningful learning, cross content comprehension, responsibilities in concentration, as well as time-management. Additionally, there are 2274 institutions who utilize the LASSI (H&H Publishing, 2014, par. 9). Therefore the LASSI is an often used quality instrument that is appropriate for the research of this nature.

**Literature Review**

Understanding the place of vocational education within America and the journey it has experienced is important to our understanding of the adult learners (ALs), who were once not a part of this system. From pre-World War I to President Obama’s ‘Complete College America,’ the ALs role has changed and will be described below.

**Vocational education**

Learning and institutions of higher education don’t always go hand in hand, as individuals have been learning independently since the beginning of time. However, as the
functions of society become more complex and specific, the need for specialized training or learning increases. In Lazerson’s (2010) book, *Higher Education and the American Dream*, he asks the age old question, “Why college?” Then answers by stating, “the modernization of American society, especially its adoption of advanced technologies, made education more important. Governments and corporations invested in [higher education] because it would pay off” (p. 22). Institutions of education have been and are currently training workers to fulfill social and economic responsibilities of this nation. However, higher education has not always been as diverse as it currently is. Nor has its trajectory been favorable for ALs. It once enrolled students transferring directly from high school, imparted to them a liberal arts curricula, and graduated them into society at approximately 22 years of age. Interestingly, the non-traditional, by age or responsibility, college students may soon be the consistent majority.

**Growing change in student population.** From 1970 to 1975, students 22 years-old or older increased by 50% while traditionally aged student rates stayed the same. From 1978 to 1989, there was a 44% increase in students 25 years-old and older. In 1975, it was determined that students 22 years-old and older were the “majority of college-going population” (Lazerson, 2010, p. 37). Lazerson (2010) reported that, by the late 1980’s, students over the age of 30 were the fastest growing student population. According to the National Center for Educational Statistics (2011), students 25 years-old and older were attending career or job-related courses at least three times the rate of those participating in part-time, post-secondary education for each of the five-year age groups.

**Complete college America.** President Barack Obama has challenged every American “to commit to at least one year of higher education or post-secondary
training…[so] that by 2020, America would once again have the highest proportion of college graduates in the world” (The White House, n.d., par. 3). To accomplish that goal, he has committed to helping middle class families afford college by keeping costs down, strengthening community colleges, and improving transparency and accountability of institutions and government (The White House, n.d.). However, one year of a liberal arts baccalaureate education facilitates introduction to higher level theories such as psychology, science, and fine arts while only skimming the surface on practical and transferable skills such as written and oral communication and math. One program advisor reported, “one year for people who have not taken college-level classes and have not paid full tuition before is too long. It is a lot more realistic to expect more retention and better outcomes with one quarter to two quarters” (Wachen, Jenkins, & VanNoy, 2011, p. 142). This statement was affirmed by research that found vocational training attractive to adult learners, but that the attraction did not necessarily equate to completion. The lack of completion may be due to their individual goals and motivations for continuing their education (D’Amico et al., 2011; Hirschy et al., 2011). Therefore, included in President Obama’s plan was the strengthening of community colleges as the gateway for America’s reinstatement of competitive completion rates. The Obama Administration’s goal of increased completion rates by 2020 was envisioned through the doors of community colleges, with a calling for five million more community college completers. “Each year, over 1,100 community colleges provide students and workers with critical skills to succeed in a 21st century economy” (The White House, n.d., par. 10). Associate and vocational education is the new gateway to American success. “The fact is that two-thirds to three-quarters of undergraduates are majoring in fields with overtly vocational
goals….Community colleges represent the most dramatic manifestation of the shift to vocational goals” (Lazerson, 2010, pp. 46-47).

**Historical context.** Vocational education is not a “new” fad, but a deliberate shifting of focus, resources, and end results that had its roots in the early 1900’s as a need to apply educational skills to specific occupations (American Vocational Association, 1998; Gilbert & Heller, 2013). This movement has predominately been White House initiated, starting as early as 1914 with the formation of a commission to study “national aid for vocational education” and President Woodrow Wilson’s stamp of support in 1916 for critical economic development for the nation. By 1926, there were approximately 900,000 students who were vocationally enrolled (American Vocational Association, 1998) in fields such as social work, business, engineering, education, and nursing (vocational/occupational degrees in that era). By 1930, a need to produce a middle step between high school diplomas and higher educational degrees was determined. Vocational education became that next step and a direct link to professional occupations. The early 1940s brought President Franklin D. Roosevelt’s work on making the “New Deal social policies more generous, expanding them to all Americans, and, most important, on the pursuit of a full-employment economy” (Mettler, 2005, p. 350). Thus the New Deal and its ideas of prosperous American life for all citizens through education and work continued the advancement of the social construct of opportunity for all.

**WWII: A new kind of student.** After World War II there was a need to reintegrate the influx of servicemen into the workforce. Instead of flooding the market, the Servicemen’s Readjustment Act of 1944 (G.I. Bill) was established. Lazerson (2010)
reported that 2.2 million predominately male servicemen accepted the benefit and enrolled in college from 1945-1949. Although these service men were:

   Older than the traditional college students, more explicitly vocationally oriented, and impatient with the traditions of college life, especially since many were married with children, the veterans dramatized the reinforced and inextricable link between getting ahead, grabbing a piece of the American dream, and enrolling in college (p. 17).

The distribution and participation in this federal grant had three major implications. It expanded educational opportunity to the once “wrong kind of student,” and made attending and succeeding in college a “serious endeavor.” Furthermore, “the veterans’ academic success demolished the traditional idea that only a select few could benefit from college” (Lazerson, 2010, p. 18).

**Truman’s commission for open access.** In 1947 President Truman’s controversial Higher Education for American Democracy (HEAD) Commission was established. It promoted and supported the quality of education for economic growth and national defense. President Truman recognized that if financial or discriminatory barriers were not removed for minorities, women, or religious individuals those individuals would not be able to access higher education. If those same individuals did not have access to higher education, the United States would lose their leadership and citizenship potential (Gilbert & Heller, 2013). The G.I. Bill and Truman’s HEAD Commission in essence created a new era of education. If older “veterans,” minorities, religious outcasts (at that time the Jews), and women could attend college, it begged the question, “Who then could not?” That question was the very one President Truman wanted to address. In the conclusion of the Commission he reported
the “‘decision as to who shall go to college is at present influenced far too much by economic considerations’ (Vol. II, p. 16). It decreed that the only factors that should limit enrollment were the ability and interest of the student” (Gilbert & Heller, 2013, p. 419).

Although increased access was met with criticism through the 1950’s and 1960’s, President Lyndon Johnson adjusted the access and purpose of education once again when he signed the Vocational Education Act of 1963.

**Professional-technical: A new kind of education.** The Vocational Education Act of 1963 set the stage for federal funding of professional and technical occupations and subsequent amendments (Gilbert & Heller, 2013). In 1972 the Higher Education Amendment endowed the “equality of opportunity the core of federal higher education policy” (Lazerson, 2010, p. 28). Henceforth the median age for community college students has been 24 years old rather than the four-year academic norm of 21 years old (Gilbert & Heller, 2013). The shift in median age showed that adult learners had discovered community colleges and planned on taking advantage of that opportunity. Finally the 1990 Perkins Act defined vocational education as, “organized education programs offering a sequence of courses… directly related to the preparation of individuals in paid or unpaid employment in current or emerging occupations requiring other than a baccalaureate or advanced degree” (NCES, n.d., par. 1). These acts and policy changes dramatically changed the way America and her people viewed and supported education. The evolved shift from elite to egalitarian mind frame opened up educational and employment opportunity to everyone. However, such opportunity remains only a dream if students do not successfully complete their program and enter into their related work field. Therefore,
academic performance and persistence from one semester to the next is a vital and integral part of increasing the opportunity for all.

**Social context.** As the nation puts time, energy, and resources into increasing completion rates of college students, it is important to understand why. Education has historically been the promotion of well-rounded moral individuals who could serve communities and be economic contributors. However as explained earlier, Lazerson stated that (2010):

> In the course of the 20th century, accelerating during the last half of the century, the economic purposes of higher education became embedded in a set of vocational education practices within educational institutions whose primary purpose became preparation for occupational roles (p. 44).

According to the research conducted by Hirschy, Bremer, and Castellano (2011), vocational education has reduced poverty by improving job opportunities and earnings. “For better or for worse, the American system of higher education has become dominated by vocational goals and in the process it has produced enormous increase in education levels and economic opportunity” (Lazerson, 2010, p. 53). Yet if these opportunities are not fully utilized and completion of the degree or certificate is not obtained, the opportunity becomes a burden. It is important to understand the individuals seeking these degrees because of the large percentage of ALs in vocational higher education. There are too many internal and external characteristics restricting students from completing a certificate or degree to singularly blame the students or leave persistence to their own devices. Therefore, general knowledge about the statistical significance of learning and study strategies for ALs could be utilized to enhance their success within vocational education. As Hirschy et al. (2011)
and Bailey et al. (2004) reported that, “understanding student success in occupational programs in 2-year colleges deserves focused attention” (p. 297).

**Adult Learners**

With the change in the student population has led researchers to redefine adult learner (Brock, 2010; Clark, 2012; Jacobs & Hundley, 2010; Knowles, 1990; Knowles et al., 2005). Jacobs and Hundley (2010) defined adult learners (ALs) as 25 years old or older, mature and developmentally complex, and/or having a status of responsibility for dependents, employers, or community (p. 5). This change which increased adult admission and enrollment into college has become the norm (Brock, 2010; Clark, 2012; Freed & Mollick, 2010). The shift in access, equality, and equity within colleges was due to the federal government involvement through funding and policy making. It has drastically changed the population of students heading to college classrooms each fall and spring semester. Not only has access to college increased but federal financing has increased; enabling those once before held back by lack of funds to venture into the world of higher education (Gilbert & Heller, 2013). Furthermore, Lazerson (2010) and Freed and Mollick (2010) reported that shifts in economy and industry propelled adults into the world of college. Lazerson (2010) stated, “not only does more education make the labor force more efficient, it makes people better able to embrace all kinds of change including the introduction of new technologies…and to create new technologies” (p. 22). In addition to the shift of ALs to academics, there was also an increase of ALs in vocational post-secondary institutions as it holds a direct link between college training and specific occupational skills needed for the workforce. However, Hirschy et al. (2011) in their research, “found that occupational students pursuing an associate’s degree achieved that
goal less often than their academic counterparts” (p. 300). Therefore these ALs had two strikes against them before ever setting foot on campus. First, they were more likely to be non-traditional in age and responsibilities and second, they were pursuing a type of program that had less statistical success in completion. These two “strikes” were undoubtedly interrelated yet for a proportion of vocational attenders this was not a concern. This group of individuals were also categorized as lifelong learners and caused a potential limitation to this study as their end goal in taking vocational post-secondary courses may not have been to obtain a degree, but to enhance their occupational skills and/or for personal development (D’Amico et al., 2011; Lazerson, 2010).

**Strengths and barriers.** Lifelong learners aside, Harward (2012) suggested, “The reasons for the lack of persistence to graduation have as much to do with the students’ psychosocial support and development as with their intellectual and cognitive aptitude” (p. 93). Clark (2012), when writing about the broader definition of non-traditional students, which encompassed ALs, stated that the situations that made students “non-traditional” or “Adult Learner” may also, “positively influence persistence” (p. 511). For within their community of part- or full-time employment, marriage, children, and family, those psychosocial support systems can encourage the student to keep persisting academically despite the overwhelming challenges of overloaded responsibilities. On the other hand, Tinto (1993) found in his research on college persistence, that external demands on returning adults could be challenging. “The issue of going to college is not a matter of “doing” college instead of something else but of “doing” college in addition to a host of other things” (p. 126).
**Need for learning and study strategies.** Adult learners’ support systems can be instrumental in overcoming these difficulties. However, external influences are second to internal college influences (Tinto, 1993; Tokuhama-Espinosa, 2010). A college rarely has changing power over external influences, yet it can have a significant impact through increased access to learning and study strategy assistance thereby increasing those skills (Brock, 2010; Tuckman & Kennedy, 2011; Wang, 2013). Therefore, if ALs made up approximately 30% of college campuses, how has research called for change in college behavior to facilitate a supportive environment for ALs? The LASSI informs educators and institutions of students’ initial learning and study skills, communicating their predictors of success as measured by persistence and degree of achievement (ASHE, 2007).

**Related Studies**

Although the results may not be generalizable to other colleges, many studies have assessed the statistical relationship between academic performance and learning and study strategies utilizing the Learning and Study Strategies Inventory (Flowers, Bridges, & Moore, 2012; Griffin et al., 2012; Griffin et al., 2013; Schutz et al., 2011; West & Sadoski, 2011). These combined studies contribute to the external validity of the instrument’s predictive measures while increasing the cross content reliability. For example, in the above references, the following student populations have been studied: pre-medical, business verses non-business, male verses female, chiropractic, and African American students. Although these studies are unique in the representing population, they have an overlap in results.

**Medical students.** West and Sadoski (2011) for example, “examined the relationship between study strategies, academic aptitude and academic performance in first-
semester medical students” (p. 697). Bivariate regression model analysis found that study skills, particularly Time Management and Self-Testing, were stronger predictors of academic performance (GPA) than other predictor variables they examined such as students’ pre-admission GPA or their Medical College Admission Test (MCAT) scores. West and Sadoski (2011) acknowledged that although the LASSI was normed for college students and not specifically medical students it served the population at hand. Their recommendation for future research was to replicate it among other medical schools. They also recommended replicating it and “in other populations and [examining] whether other differences, such as undergraduate major subjects, gender, ethnicity, etc., affect study strategies” (West & Sadoski, 2011, p. 702).

**Chiropractic students.** Schutz et al., (2011) took a farther step from the LASSI’s normed college group by comparing students’ learning and study strategies to academic performance. Schutz and her colleagues at Logan College of Chiropractic compared 57 doctoral chiropractic students’ GPA to their LASSI subscale scores. Student data was divided into two groups: Low GPA (1.29 to 3.00) and High GPA (3.01 to 3.94). Data was run through t-tests to analyze the learning and study strategy differences between doctoral chiropractic students with Low GPA as compared to students with High GPA. The results indicated that subscales: Anxiety, Attitude, Concentration, Motivation, Test Strategies, and Selecting Main Ideas were significantly higher for High GPA students as compared to Low GPA students. Thus supporting their research that, “strategic learning is an important factor in academic success” (Schutz et al., 2011, p. 9). They also recommended future research on leaning and study strategies across various academic populations.
Business students. Finally, a study more applicable to vocational students, Griffin’s et al. (2012) learning and study strategy research examined male versus female freshman business and non-business public university students, \( N = 107 \). Their research posed the question, “Do learning skills and strategies differ with statistical significance between genders?” (Griffin et al., 2012, p. 110). This question was analyzed through a series of 2x2 ANOVAs, “with gender and major as the grouping variables and the ten LASSI subscales as separate dependent variables” (Griffin et al., 2012, p. 112). Females scored significantly higher in Information Processing, Motivation, Self-Testing, Use of Study Aids, and Time Management. Males scored higher on Anxiety, but because of its reverse score it indicated they have low anxiety about college and their school performance. Furthermore, ANCOVA analysis confirmed that, “linkage between gender and academic performance can be explained to a significant degree by the mediating effect of learning skills and strategies” (Griffin et al., 2012, p. 113). Griffin’s et al. (2012) profound study found learning and study strategies to be significantly different between genders when predicting academic performance. They challenged future researchers to “ duplicat[e] the study with other student sample groups at the same or other institutions” (p. 113).

Call for Research

In response to West and Sadoski (2011), Schutz et al. (2011), and Griffin’s et al. (2012) recommendation, further related research should be conducted to examine the best learning and study strategy predictors of vocational adult and traditional learners’ academic performance. Such a study would expand the current research and thereby increase the knowledge in the academic performance predictability of the LASSI. Finally, it would fill
the gap by identifying the learning and study strategies needed for ALs to succeed in vocational education.

Summary

The literature review has indicated that college campuses have been steadily changing since the early 1900s. With the adapting of times, vocational education became a necessity. With the country’s increased emphasis on vocational education and the increased access to institutions of higher education at any level, adult representation at those institutions also increased. Adult learners (based on age only) now represent 24-34% of the student body. Yet these ALs are more likely than their traditional peers to have external responsibilities. Although these external responsibilities may also be sources of strength, they can also be challenging as attention from academic tasks may be pulled away. Colleges in general are very limited in the ability to affect students’ external influencers, yet can increase and promote their internal influencers, such as learning and study strategies (Hirschy et al., 2011). Therefore, in response to the literature reviewed, the relevant studies examined, and recommendations for further study, the proposed research seeks to decrease the current knowledge gap through examining the predictive relationship between the learning and study strategies and academic performance among adult and traditional learners in vocational education.
CHAPTER THREE: METHODS

Design

The purpose of this quantitative correlational study was to examine the predictive relationship between the subscales of the Learning and Study Strategies Inventory (LASSI) and academic performance as represented by first semester grade point average (GPA) of vocational adult learners and vocational traditional learners. Participants completed the LASSI as a component of a vocational education intake interview. A multiple regression analysis was conducted for vocational adult learners and for vocational traditional learners.

This study was first modeled after Griffin’s et al. (2012) study on the statistically significant relationship between the subscales of the LASSI and academic performance for business and non-business students. Secondly, it responded to the recommendation for further research regarding the predictive relationship between the subscales of the LASSI and academic performance within diverse populations as requested by Griffin et al., (2012); Schutz et al., (2011); and West and Sadoski, (2011).

A predictive correlational design was utilized for this research. Due to the LASSI subscales producing more than two predictive variables to one criterion variable, a multiple regression was chosen to test the null hypotheses (Warner, 2013). This design measured the predictive significance of each \( k \) predictor variable to the criterion variable while controlling for all other predictors (Warner, 2013). The multiple regression equation for \( k = 10 \) LASSI subscales are represented as follows:

\[
Y' = b_0 + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + b_5x_5 + b_6x_6 + b_7x_7 + b_8x_8 + b_9x_9 + b_{10}x_{10}
\]

The predictor variables were designated within three constructs and represented as follows:

(a) Study Skills Construct which included Information Processing \((x_1)\), Selecting Main
Ideas Attitude ($x_2$), and Test Strategies ($x_3$); (b) Willingness to Learn Construct included Anxiety ($x_4$), Attitude ($x_5$), and Motivation ($x_6$); and (c) Study Strategies Construct included Concentration ($x_7$), Self-testing ($x_8$), Use of Support Techniques ($x_9$), and Use of Time Management ($x_{10}$). The criterion variable ($Y'$) was students’ first semester GPA utilizing a 4.0 system. A 4.0 is the best GPA a student can earn, while having less than a 2.0 places a student immediately on academic probation or suspension because they did not maintain Satisfactory Academic progress. A 0.0 indicates a student failed all attempted credits.

**Research Questions**

The following research questions were proposed:

**RQ1:** Can one or more subscales of the LASSI (anxiety, attitude, concentration, information processing, motivation, self-testing, selecting main ideas, use of support techniques, use of time management, or test strategies) predict vocational adult learners’ first semester academic performance (GPA)?

**RQ2:** Can one or more subscales of the LASSI (anxiety, attitude, concentration, information processing, motivation, self-testing, selecting main ideas, use of support techniques, use of time management, or test strategies) predict vocational traditional learners’ first semester academic performance (GPA)?

**Null Hypotheses**

The following null hypotheses were proposed:

**H01:** There is no predictive relationship between the subscales of the LASSI and first semester academic performance for vocational adult learners in a northwestern public college.
**H₀²**: There is no predictive relationship between the subscales of the LASSI and first semester academic performance for *vocational traditional learners* in a northwestern public college.

**Participants and Setting**

The participants for this study were selected from a convenience sample of vocational college students at a northwestern, rural, four-year college with an academic and vocational division. Of the 4,376 students enrolled in both the academic and vocational division, 509 were educated within the vocational division in two-year applied science programs such as auto mechanics, welding, information systems analysis, bookkeeping, early childhood development, and graphic design (LCSC, 2014). The convenience sample was taken from enrolling vocational students who completed the Learning and Study Skills Strategy (LASSI) during their vocational intake interview and completed one of the following semesters: Spring 2013, Fall 2013, Spring 2014, or Fall 2014. The LASSI was offered to most students who applied to the vocational division of the college. However, not every student who went through the intake interview process took the LASSI due to student choice or counselor prerogative. Students were excluded from study participation if they had been enrolled in college the previous five years, failed to enroll in college, or withdrew from college before the end of their first year. This ensured the remaining sample were enrolled college students who had at least a five year break from college experience and had a first semester grade point average (GPA) to measure the LASSI against. LASSI results and GPA reports were previously collected by vocational staff. Therefore, consent was given by the college rather than the student. The sample included two groups that were naturally occurring: \( n = 59 \) traditional learners (students 18-24 years old without adult responsibilities) and \( n = 38 \) adult learners. According to Jacobs and Hundley (2010), adult
learners are defined as, “individuals who are typically over the age of twenty-five or who occupy social roles that would otherwise signal adulthood” (p. xi) such as full-time employment or dependents (Brock, 2010; Clark, 2012; Knowles, 1990). Due to the definition, TLs were 95% single, had no dependents, and were either part-time employed (56%) or unemployed. Of the TLs, 29% were actively seeking employment, while 12% were not. Adult learners on the other hand had many “social roles” that suggested adulthood as seen in Figure 1.

**Figure 1.** Demographic percentages of adult responsibilities for adult vocational learners.

Of the 97 participants, 66 students were between the ages of 18-24 years-old, seven of which were considered ALs due to their adult responsibilities of having dependents or full-time employment. Remaining age ranges, as defined by 2010 U.S. Census Bureau, include 22 participants between the ages of 25 and 34, seven between 35 and 44, and two between 45 and 54. Fifty percent of ALs had dependents, 21% were single parents, and 11% were self-employed. Thus, even within the AL sample, there were unique combinations of marital status, number of dependents, and employment status. All combinations are considered either potential sources of strength and encouragement (Clark, 2012) or challenges (Tinto, 1993).
According to the last institutional report on the demographics of the northwestern college’s vocational division, approximately 46% were ALs (by age only) and 54% were TLs (LCSC, 2014). This study’s sample had fewer ALs (39.2%). There was a larger representation of male participants than the general population for both ALs and TLs, as seen by Table 1.

Table 1

*Demographic Percentages of Sample Gender and Type of Learner Compared to Population*

<table>
<thead>
<tr>
<th></th>
<th>Sample</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Adult</td>
<td>Traditional</td>
</tr>
<tr>
<td>Type of Learner</td>
<td>39.2</td>
<td>60.8</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>68.4</td>
<td>69.5</td>
</tr>
<tr>
<td>Female</td>
<td>28.9</td>
<td>30.5</td>
</tr>
</tbody>
</table>

In addition, the college, including both the academic and vocational division, enrolled approximately 84% Caucasian individuals. Figure 2 reveals the overall ethnicity of this study’s sample. The sample of vocational ALs in this study were 81% Caucasian, and the vocational TLs were 95% Caucasian. Adult learners represented less than the population at 81% Caucasian and TLs more than the population at 95% Caucasian. Within the sample, overall ethnicity appeared proportionately distributed between the ALs and TLs.
Finally, of the sample vocational students, 78% utilized financial aid, whereas 22% utilized a different financial option to pay for college. Of those that were using financial aid, 33% were ALs and 67% were TLs.

Unfortunately, the total sample size of vocational students ($N = 97$) did not satisfy the 130 minimum requirement for a medium effect size with statistical power of .7 at the .05 alpha level (Warner, 2013) and therefore created a limitation in this study.

**Instrumentation**

The instrument for this study was the Learning and Study Strategies Inventory (LASSI), developed by Weinstein et al. (2002), and administered as a web version through H&H Publishing’s website. According to contact with an H&H Publishing representative, no permission was needed to use this instrument in research unless the entirety of the LASSI content was copied (Priscilla Trimmier, personal communication, June 2, 2014). This instrument was developed as an assessment tool for institutions of higher education to evaluate their learning and study skills programs that were increasing on college campuses to assist under-prepared students. Additionally it was designed as a diagnostic tool to assess students’ entry-
level skill base for identification of intervention need. The second edition was enhanced through deleting dated questions, adding web study skills questions, and incorporating current research such as “metacognition concepts of awareness, reflections, and self-regulation” (Weinstein & Palmer, 2002). Structurally, the inventory changed from the original 77-items to 80-items to allow for each subscale to have eight Likert Scale questions. Finally, the national norms were based off 12 diverse geographical regions representing various types of higher education including universities, community colleges, state colleges, and technical institutions. In addition age, gender, ethnicity, and GPA were utilized in norming the LASSI. Their norming sample included 1092 participants. Of those participants, 84 were 17 years old or younger, 628 were ages 18-19, 101 were ages 20-21, 53 were ages 22-23, 43 were ages 24-25, and 183 were 26 years old or older (Weinstein & Palmer, 2002). The instrument has since been utilized in various studies by Griffin et al., (2012); Schutz et al., (2011); and West and Sadoski, (2011). Each study recommended further research regarding diverse populations.

Subscales

The LASSI’s ten subscales were designated within three constructs and represented as follows: (a) Study Skills Construct included Information Processing ($x_1$), Selecting Main Ideas Attitude ($x_2$), and Test Strategies ($x_3$); (b) Willingness to Learn Construct included Anxiety ($x_4$), Attitude ($x_5$), and Motivation ($x_6$); and finally (c) Study Strategies Construct included Concentration ($x_7$), Self-Testing ($x_8$), Use of Support Techniques ($x_9$), and Use of Time Management ($x_{10}$). These subscales have been utilized to predict academic performance (Flowers et al., 2012; Griffin et al., 2012; Schutz et al., 2011; Urciuoli & Bluestone, 2013; West & Sadoski, 2011). The inventory utilized 80 five-point Likert scale questions, eight questions for each of the ten subscales. Total subscale questions were scored thereby obtaining interval
level of measurements, which is required for a regression analysis (Warner, 2013). The scale ranged from “Not at all typical of me” to “Very much typical of me” and allowed students to self-assess their study skills, their will to learn, and their study strategies (Weinstein et al., 2002).

**Study skills construct.** The first construct is the *Study Skills Construct*: Information Processing; Selecting Main Ideas; and Test Strategies have all correlated positively to student GPA in at least two research studies (Griffin et al., 2012; Schutz et al., 2011). Study skills of this nature examine the ability students have in recognizing relevant information, understanding the course objectives, and demonstrating that through adequate test taking methods. An example question from this construct asks, “To help me remember new principles we are learning in class, I practice applying them” (Weinstein et al., 2002). A student’s desire to learn was the most statistically significant predictor of academic performance according to Griffin et al. (2013), Schutz et al. (2011), and Urciuoli and Bluestone (2013).

**Willingness to learn construct.** The second construct is the *Willingness to Learn Construct* encompassing Anxiety, Attitude, and Motivation which evaluate students’ diligence, willingness to work hard, interest in the course at hand, and value on high school performance.

**Study strategies construct.** Finally, the third construct, *Study Strategies Construct*, which includes: Concentration, Self-Testing, Study Aids; and Time Management, continues to be a statistically significant predictor of academic performance even when aptitude is controlled for (West & Sadoski, 2011). Study strategies consist of the students’ focus, study techniques, and effective test taking skills which allow them to manage time and effectively communicate learning. An example LASSI question for this construct is, “When they are available, I attend review sessions for my classes” (Weinstein et al., 2002). See pages 9-13 of the LASSI User’s
Validity

Development of the LASSI was extensive with multiple layers of analysis by categorical experts and pilot testing by students to establish validity. After each analysis or testing, adjustments were made. One challenge with self-reports is the level of social desirability influence. Therefore, items that measured a .50 correlation with social desirability were removed. In addition, scales scores were measured against other similar assessment factors as well as against performance measures (Weinstein & Palmer, 2002, p. 15). Finally, more than 30 colleges and university professors, advisors, developmental educators, and counselors tested the inventory on a trial basis. Since the publication of the LASSI, as seen in the review of literature, the LASSI has predominately been used to predict academic performance and was validated for various subpopulations of students in that evaluation setting (Griffin et al., 2012; Griffin et al., 2013; Schutz et al., 2011; West & Sadoski, 2011). Unfortunately, not all researchers found the LASSI to be valid for their varied predictive measures, for example Flowers et al. (2012) did not find the LASSI to be statistically significant in predicting pre-college African Americans’ American College Testing (ACT) scores. In addition, Bush et al. (2011) found that when measuring self-perception of skills for students with traumatic brain injury as compared to their non-brain injured peers, the non-brain injured peers’ LASSI results did not fall within the instruments normalized scores. These two examples are the minority of invalid result of the use of the LASSI. However, this study sought to evaluate the predictive relationship between the subscales of the LASSI to GPA, which was consistent with research that validated that particular use of the instrument.
Reliability. The LASSI evaluates three constructs: study skills, will to learn, and study strategies through ten subscales. Through three- to four-week interval testing, Weinstein and Palmer (2002) reported internal consistency of test-retest reliability for the three LASSI constructs with Cronbach’s Alpha ranging from .73 to .89. Cronbach’s Alpha is the most consistently used assessment to measure the internal consistency reliability of multiple-item scales and .73 to .89 falls within the statistically significant range (Warner, 2013).

Scoring

Scoring of the Web LASSI was automatic upon on-line completion and submission. Results were stored on a password-protected database for college access. H&H Publishing (2014) reported the inventory, “provides standardized scores (percentile score equivalents) and national norms for ten different scales” (par. 2). Each subscale has a high score of 40 and a low score ranging from 10 to 21. The scores are positively calculated, for example, the more skill, motivation, or strategy the student reports, the higher the score. An exception is made for the subscale, Anxiety, which reverses the scoring reporting the students who articulate low anxiety to have a high Anxiety subscale score result. All subscales are independent within themselves and an “overall” score is not calculated. Scores are plotted and performance percentiles are calculated to reflect the students’ scores relative to the nationally sampled scores. Coded scores were downloaded into an Excel® spreadsheet, matched with the coded students’ first semester GPA and analyzed utilizing SPSS®.

Procedures

The researcher initiated this study upon written approval from the college’s Vice President of Student Affairs to conduct the study and utilize student demographic information, LASSI scores, and first semester GPA. See Appendix A for approval. Institutional Review Board
(IRB) approval from both Liberty University and the sampled college were obtained before the archival data were retrieved and the research protocol followed. See Appendix B for Liberty IRB approval and Appendix C for site IRB approval. Archival data on vocational students who enrolled Spring 2013, Fall 2013, Spring 2014, and Fall 2014 were available for immediate downloading upon approval of this study.

**Data Collection**

The archival data were previously collected through the following procedures. Aligned with the purpose of the LASSI, education counselors at a northwestern, rural four-year college administered the Web LASSI as part of their vocational college intake interview. After students were admitted to the college, they were referred to the vocational division’s education center where each student answered a vocational division intake form with multiple demographic questions. These demographics were entered into a secure Access® database. This archival data was retrieved upon IRB permission. The demographic data was then entered into an Excel® spreadsheet. Identifying information, such as name and student identification number, were coded and removed before analysis in SPSS®.

After completing the vocational division intake form, students were introduced to one of the educational counselors who then met with each enrollee to discuss students’ readiness for college, program of choice, and results of assessments. Assessments, such as the LASSI and a career exploration inventory, were utilized during most intake interviews. Prior to completing assessments, counselors instructed students on purpose, navigation, and printing procedures. The college paid for the assessments, for which the students were led to a 13-computer testing room to complete the assessments. The LASSI took each student approximately 15 to 20 minutes to complete entering their name and date, reading the instructions, and answering the 80
Likert inventory questions. Upon completion, LASSI scores, students’ names, and date were automatically uploaded to the college’s password protected LASSI database account while students’ results were printed for immediate review. Each counselor was trained to utilize the LASSI to communicate to the student his or her learning and study strategy strengths and weaknesses and to refer the student to appropriate resources. The data was downloaded by the researcher into an Excel® spreadsheet linked with demographic information utilizing students’ names.

Data collection for the first semester GPA was downloaded as a report from the registrar’s office. The report was generated from a “request for information.” The first semester GPA was entered into the Excel® database that also contained student LASSI scores and demographic information. Upon collection of all relevant information into a comprehensive Excel® spreadsheet, each student was given a new identifying number (NIN). Identifying information, such as name and student identification number, was cut and pasted, along with the NIN, and stored on a separate secure Excel® spreadsheet. The complete coded spreadsheet was then uploaded into SPSS® statistical software and analyzed to determine statistical significance.

**Data Analysis**

In this study a correlational, multiple regression analysis was conducted to test each of the two null hypotheses. The null hypotheses each contained a criterion variable (GPA) and multiple predictor variables (ten LASSI subscales). Therefore a multiple regression was utilized to calculate the slope of each predictor variable while controlling for the other nine predictor variables, enabling this researcher to evaluate two reports (Warner, 2013). First, the multiple regression analysis reported whether the ten predictor variables overall were statistically significant predictors of GPA, by examining the Model Summary’s $R$, $R^2$, adjusted $R^2$, F (9, N-k),
and evaluated at a $p < .05$. Second, the report revealed which of the ten subscales of the LASSI were individually statistically significant predictors of GPA, with $p < .05$. This multiple regression analysis was conducted for **vocational adult learners** and **vocational traditional learners**. The following section will report the analysis procedures.

The multiple regression analysis was conducted utilizing SPSS® and the findings from the study was reported to the Vice President of Student Affairs, the dean of the vocational division, the coordinator of the vocational education center, and the LASSI publishing company, who indicated an interest in the findings.

The LASSI asks 80 five-point Likert scale self-assessment questions ranging from “Not at all typical of me” to “Very much typical of me.” The 80 questions are divided into ten subcategories that can reach a maximum of 40 points. The minimum point for each subscale ranges from 10 to 21. No total instrument scores were generated; rather, each subscale is independent of the group. Furthermore, due to scholarly controversy questioning the use of Likert-type scale questions for parametric testing (Gliem & Gliem, 2003; Jamieson, 2004), it should be noted that no individual questions will be analyzed. Rather, the eight Likert-type question subscale composite scores ($k = 10$) will be used in line with the recommendation that a composite score of four or more Likert-type questions can be labeled an interval measure and parametric testing can be conducted (Boone & Boone, 2012; Gliem & Gliem, 2003). Finally, assumptions of normality will be established as preliminary data analysis for parametric analysis of Likert scale data (Warner, 2013).

The researcher utilized Excel® to attach the LASSI scores to student demographic information. Once compiled, student name and school identification numbers were replaced with new identifying numbers (NIN). Data errors, outliers, and missing data patterns were
evaluated and decisions to remove participants were conducted in accordance to Warner’s (2013) data screening process, before the coded data was downloaded into SPSS® software to be analyzed. A multiple regression for vocational adult learners and vocational traditional learners had several assumptions, which were tested. Therefore, preliminary analysis was conducted to examine the assumption of normality and linearity for each variable through normally distributed histograms and the Kolmogorov-Smirnov test reported at the .05 alpha level. Linearity and homoscedasticity were met through centralization of the scatterplot for each pair of quantitative variables with an examination for outliers. Once preliminary assumptions were conducted and met, a standard multiple regression was conducted in which all predictor variables were entered in one step due to the existence of more than two predictor variables for the vocational adult learner group (Warner, 2013). This step was then repeated for the traditional learner group. The significance level of $p < .05$ was utilized as an indicator of rejecting the null hypotheses, a standard according to Warner (2013). The effect size was measured and discussed in terms of $R$ and $R^2$ as an index of the strength of linear relationship between the criterion and predictive variables (Warner, 2013).
CHAPTER FOUR: FINDINGS

Research Questions

The following research questions were proposed:

**RQ1:** Can one or more subscales of the LASSI (anxiety, attitude, concentration, information processing, motivation, self-testing, selecting main ideas, use of support techniques, use of time management, or test strategies) predict vocational adult learners’ first semester academic performance (GPA)?

**RQ2:** Can one or more subscales of the LASSI (anxiety, attitude, concentration, information processing, motivation, self-testing, selecting main ideas, use of support techniques, use of time management, or test strategies) predict vocational traditional learners’ first semester academic performance (GPA)?

Null Hypotheses

The following null hypotheses were proposed:

**H01:** There is no predictive relationship between the subscales of the LASSI and first semester academic performance for vocational adult learners in a northwestern public college.

**H02:** There is no predictive relationship between the subscales of the LASSI and first semester academic performance for vocational traditional learners in a northwestern public college.

Descriptive Statistics

The descriptive statistics in this study were derived from the ten LASSI raw subscale scores and vocational adult and traditional learners’ first semester GPA as seen in Table 2.
Table 2

*Descriptive Statistics of Criterion and Predictor Variables*

<table>
<thead>
<tr>
<th>Type</th>
<th>Variables</th>
<th>Adult Learners</th>
<th>Traditional Learners</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Mean</td>
<td>Std Dev</td>
</tr>
<tr>
<td>Criterion</td>
<td>1st Semester GPA</td>
<td>2.69</td>
<td>0.97</td>
</tr>
<tr>
<td>Predictor</td>
<td>Anxiety</td>
<td>26.16</td>
<td>7.36</td>
</tr>
<tr>
<td></td>
<td>Attitude</td>
<td>32.97</td>
<td>4.06</td>
</tr>
<tr>
<td></td>
<td>Concentration</td>
<td>29.13</td>
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</tr>
<tr>
<td></td>
<td>Info. Processing</td>
<td>28.24</td>
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<td></td>
<td>Motivation</td>
<td>31.13</td>
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<tr>
<td></td>
<td>Selecting Main Ideas</td>
<td>28.87</td>
<td>5.15</td>
</tr>
<tr>
<td></td>
<td>Study Aids</td>
<td>26.26</td>
<td>4.75</td>
</tr>
<tr>
<td></td>
<td>Time Management</td>
<td>28.58</td>
<td>5.57</td>
</tr>
<tr>
<td></td>
<td>Test Strategies</td>
<td>29.74</td>
<td>4.37</td>
</tr>
</tbody>
</table>

*Note.* The criterion variable, GPA, utilized a 4.0 system. The predictor variables, LASSI subscale raw scores, could reach a maximum score of 40 points, and had a minimum score range from 10 to 21 points.

Through examination of the variables’ mean and standard deviations, it appears that adult learners (ALs) and traditional learners (TLs) were very similar in their average scores of all LASSI subscales and first semester GPA, within approximately one integer except for the *Time Management* subscale. Adult learners appeared to score higher in *Time Management* \( (m = 28.58) \) than TLs \( (m = 25.95) \) as shown in greater detail in Figure 3.
Figure 3. Histogram comparison between adult and traditional learners’ LASSI Time Management scores.

The ALs’ rounded mean *Time Management* score of 29 placed students above the 50\(^{th}\) percentile at 65% where TLs’ rounded mean score of 26 placed students below the 50\(^{th}\) percentile at 45%. Although conclusions and correlations cannot be drawn from examination of these scores, a 20% difference and positioning on either side of the 50\(^{th}\) percentile does reveal a difference in “needs improvement” verses “relative weakness” as depicted by the LASSI scoring interpretation (Weinstein et al., 2002, p. 13). Furthermore, an examination of the percentiles of the remaining LASSI subscales is depicted in Table 3.
Table 3

Comparison of LASSI Percentiles between Adult and Traditional Learners

<table>
<thead>
<tr>
<th>Subscales</th>
<th>Adult Learners</th>
<th></th>
<th>Traditional Learners</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>( n = 38 )</td>
<td>( n = 59 )</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Rounded Mean</td>
<td>LASSI Percentile</td>
<td>Rounded Mean</td>
<td>LASSI Percentile</td>
</tr>
<tr>
<td>Anxiety</td>
<td>26</td>
<td>50</td>
<td>27</td>
<td>55</td>
</tr>
<tr>
<td>Attitude</td>
<td>33</td>
<td>40</td>
<td>32</td>
<td>30</td>
</tr>
<tr>
<td>Concentration</td>
<td>29</td>
<td>60</td>
<td>28</td>
<td>50</td>
</tr>
<tr>
<td>Info. Processing</td>
<td>28</td>
<td>55</td>
<td>28</td>
<td>55</td>
</tr>
<tr>
<td>Motivation</td>
<td>31</td>
<td>45</td>
<td>31</td>
<td>45</td>
</tr>
<tr>
<td>Self-Testing</td>
<td>25</td>
<td>50</td>
<td>23</td>
<td>40</td>
</tr>
<tr>
<td>Selecting Main Ideas</td>
<td>29</td>
<td>55</td>
<td>29</td>
<td>55</td>
</tr>
<tr>
<td>Study Aids</td>
<td>26</td>
<td>55</td>
<td>25</td>
<td>45</td>
</tr>
<tr>
<td>Time Management</td>
<td>29</td>
<td>65</td>
<td>26</td>
<td>45</td>
</tr>
<tr>
<td>Test Strategies</td>
<td>30</td>
<td>55</td>
<td>30</td>
<td>55</td>
</tr>
</tbody>
</table>

*Note.* LASSI Percentile figures were determined by examining the Scoring Directions (Weinstein et al., 2002, p. 13). "A percentile indicates the portion of a national sample of students who scored at or below a particular score. For example, the score of 32 on ATT is beside the 30th percentile; that means 30% of the students in the national sample scored 32 or lower while 70% of the students scored higher than 32" (Weinstein et al., 2002, p. 13).

Through interpretation of the LASSI Scoring Directions (Weinstein et al., 2002), the sample population of both ALs and TLs fell below the 50th percentile in both Attitude and Motivation. Traditional learners also fell below the 50th percentile in Self-Testing, Study Aids, as well as the previously described Time Management. These descriptive results are concerning. Attitude and motivation are two of the most documented internal factors related to student success (West & Sadoski, 2011). In addition, self-testing and study aids are the means to integrate knowledge to memory. Thus, Weinstein et al. (2002) reported that scores below the 50th percentile demonstrate weakness and that, “strategies and skills in these areas are not sufficient to help [students] succeed in college” (p. 13). All remainder AL and TL scores fell between the 50th and 75th percentile. This middle bracket range represents areas for needed improvement. According
to Weinstein et al. (2002), “without improving [one’s] knowledge and skills in these areas, [students] may encounter difficulties succeeding in college” (p. 13). Within this bracket, there were subtle differences between adult and traditional learners with the ALs slightly out-scoring the TLs. The only subscale in which TLs scored better than ALs was in the subscale *Anxiety*. However, because *Anxiety* uses a reverse score it indicates that TLs have lower anxiety about college and their school performance than ALs.

Examining the results of the LASSI as compared to the ALs’ and TLs’ mean and standard deviations of their first semester GPA (as seen in Figure 4), it appears that students are one standard deviation away from either earning solid academic grades or flunking out of college with grades that no longer meet the satisfactory academic progress expectation of a 2.0 GPA.

![Histogram comparison between adult and traditional learners' GPA.](image)

**Note.** Adult learners ($m = 2.69; S.D. = .97$) and traditional learners ($m = 2.67; S.D. = 1$).

**Figure 4.** Histogram comparison between adult and traditional learners’ GPA.

Overall, descriptive statistics reveal that the vocational student participants from the northwestern, rural four-year college scored poorly in the documented learning and study strategies needed to be successful in college.
Results

Data Screening

A simultaneous multiple regression analysis was used to test both null hypotheses. Data screening was conducted on each of the variables (first semester GPA, anxiety, attitude, concentration, information processing, motivation, self-testing, selecting main ideas, use of support techniques, use of time management, and test strategies) regarding data inconsistencies, outliers, and normality. No data errors or inconsistencies were identified in accordance with the procedures recommended by Warner (2013, pp. 132-137, 550, 573). Box and whiskers plots were used to detect outliers on each of the predictor and criterion variables (Warner, 2013, p. 153). Outliers were identified in five of the variables. The criterion variable, first semester GPA, consisted of one outlier, a participant with a GPA of .09. This participant was removed from the study as this individual failed all first semester courses. Four predictor variables had outliers: attitude, concentration, information processing, and test strategies. Within the four predictor variables, seven participants’ scores were in question. Upon examination of each of the seven participants’ individual scores making up the total raw score for each LASSI subscales, all identified outliers were legitimate scores. Although lower than the rest of the participants, the outlier subscale scores revealed accurate participant responses. Since all predictive outliers were different participants, this researcher assumed that all scores were an accurate reflection of participants’ learning and study strategies. Therefore, all predictive outliers were retained for this study. The total $N$ for the sample was 98; one participant was dropped for a failing GPA, with a resulting sample of $n = 97$. Normality was examined through use of histograms for each predictor and criterion variables and no violations were found (Warner, 2013, p. 550).
Tested Assumptions

Multiple regression analysis requires that three assumptions are met: linearity, homoscedasticity, and extreme bivariate outliers. The assumption of linearity, the linear relationship between each predictor variables (LASSI subscales) to the one criterion variable (GPA) was examined using scatter plots and no curvilinear plots were identified (Warner, 2013, pp. 268, 573). No violations were found. The assumption of homoscedasticity, meaning the variable in scores between each predictor variables to the one criterion variable, was examined using scatter plots which resulted in the classic “cigar shape” between each variable (Warner, 2013, pp. 268-269, 555, 573). No violations were found. Scatter plots between each predictor variables and the one criterion variable were examined for extreme bivariate outliers (Warner, 2013, p. 573). No violations were found. See Figure 5 for a scatter plot matrix for all predictive and criterion variables.
Figure 5. Scatter plot matrix of all predictive and criterion variable combinations.

Null Hypothesis One

A simultaneous multiple regression analysis of the ten LASSI subscale predictor variables to the first semester criterion variable for vocational adult learners was conducted. Meaning all predictor variables and the criterion variable were entered in one step. The analysis results indicated first whether the combination of predictive variables was significant and second, the statistical significance of each predictor variable to the criterion. Upon reviewing the results of the simultaneous multiple regression, this researcher failed to reject the first null hypothesis. Therefore, there were no significant predictive relationships between the criterion
variable (GPA) and the predictor variables (anxiety, attitude, concentration, information processing, motivation, self-testing, selecting main ideas, use of support techniques, use of time management, and test strategies) for vocational adult learners, $F(10, 27) = 1.286, p = .287$. The multiple correlation coefficient for the prediction model was $R = .568$, adjusted $R^2 = .072$, $R^2 = .32$ meaning that 32% of the variance can be accounted for by the linear combination of the measures, a large effect size. Furthermore, each predictor variable was examined to determine how much each contributed to the prediction of the criterion variable. Each individual predictor’s contribution was determined by examining their slopes using a $t$-ratio. All ten individual predictors were not significant predictors of first semester GPA within the prediction model. See Table 4 for Contribution of Predictor Variables for Vocational Adult Learners.

Table 4

<table>
<thead>
<tr>
<th>Variable</th>
<th>$B$</th>
<th>$SE$</th>
<th>$\beta$</th>
<th>$t$</th>
<th>Sig.</th>
<th>Zero-order</th>
<th>Partial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anxiety</td>
<td>-0.04</td>
<td>-0.31</td>
<td>-0.31</td>
<td>-1.01</td>
<td>0.32</td>
<td>-0.02</td>
<td>-0.20</td>
</tr>
<tr>
<td>Attitude</td>
<td>0.06</td>
<td>0.24</td>
<td>0.24</td>
<td>0.84</td>
<td>0.41</td>
<td>0.31</td>
<td>0.16</td>
</tr>
<tr>
<td>Concentration</td>
<td>0.02</td>
<td>0.10</td>
<td>0.10</td>
<td>0.25</td>
<td>0.81</td>
<td>0.30</td>
<td>0.05</td>
</tr>
<tr>
<td>Info. Processing</td>
<td>-0.08</td>
<td>-0.36</td>
<td>-0.36</td>
<td>-1.39</td>
<td>0.18</td>
<td>0.05</td>
<td>-0.26</td>
</tr>
<tr>
<td>Motivation</td>
<td>-0.05</td>
<td>-0.27</td>
<td>-0.27</td>
<td>-0.80</td>
<td>0.43</td>
<td>0.23</td>
<td>-0.16</td>
</tr>
<tr>
<td>Self-Testing</td>
<td>-0.02</td>
<td>-0.11</td>
<td>-0.11</td>
<td>-0.34</td>
<td>0.74</td>
<td>0.21</td>
<td>-0.07</td>
</tr>
<tr>
<td>Select Main Ideas</td>
<td>0.03</td>
<td>0.17</td>
<td>0.17</td>
<td>0.41</td>
<td>0.68</td>
<td>0.28</td>
<td>0.08</td>
</tr>
<tr>
<td>Study Aids</td>
<td>0.09</td>
<td>0.46</td>
<td>0.46</td>
<td>1.75</td>
<td>0.09</td>
<td>0.28</td>
<td>0.33</td>
</tr>
<tr>
<td>Time Management</td>
<td>0.03</td>
<td>0.15</td>
<td>0.15</td>
<td>0.29</td>
<td>0.77</td>
<td>0.29</td>
<td>0.06</td>
</tr>
<tr>
<td>Test Strategies</td>
<td>0.09</td>
<td>0.41</td>
<td>0.41</td>
<td>1.02</td>
<td>0.32</td>
<td>0.27</td>
<td>0.20</td>
</tr>
</tbody>
</table>

Note. Statistics in the columns are represented as unstandardized regression coefficients ($B$), associated standard errors ($SE$), standardized regression coefficient betas ($\beta$), significant tests of each variable ($t$), associated $p$ values ($Sig.$), and zero-order and partial correlations explained.
Correlations were produced using a Pearson Product Moment Correlation analysis. [Pearson will match the zero-order correlations]. Significant relationships from the predictor variables to the one criterion variable were not found for Vocational Adult Learners.

**Null Hypothesis Two**

A simultaneous multiple regression analysis of the ten LASSI subscale predictor variables to the first semester criterion variable for vocational traditional learners was conducted. Meaning all predictor variables and the criterion variable were entered in one step. The analysis results indicated first whether the combination of predictive variables was significant and second, the statistical significance of each predictor variable to the criterion. Upon reviewing the results of the simultaneous multiple regression, this researcher failed to reject the second null hypothesis. Therefore, there were no significant predictive relationships between the criterion variable (GPA) and the predictor variables (anxiety, attitude, concentration, information processing, motivation, self-testing, selecting main ideas, use of support techniques, use of time management, and test strategies) for *vocational traditional learners*, $F(10, 48) = .610, p = .798$. The multiple correlation coefficient for the prediction model was $R = .336$, $\text{adj } R^2 = .072$, $R^2 = .113$ meaning that 11% of the variance can be accounted for by the linear combination of the measures. Furthermore, each predictor variable was examined to determine how much each contributed to the prediction of the criterion variable. Each individual predictor’s contribution was determined by examining their slopes using a $t$-ratio. All predictive variables were not found to be significant within the prediction model. See Table 5 for Contribution of Predictor Variables for Vocational Traditional Learners.
Table 5

Contribution of Predictor Variable for GPA for Vocational Traditional Learners (N= 59)

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>SE</th>
<th>β</th>
<th>t</th>
<th>Sig.</th>
<th>Zero-order</th>
<th>Partial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anxiety</td>
<td>0.02</td>
<td>0.02</td>
<td>0.16</td>
<td>0.86</td>
<td>0.40</td>
<td>0.12</td>
<td>0.12</td>
</tr>
<tr>
<td>Attitude</td>
<td>-0.02</td>
<td>0.05</td>
<td>-0.08</td>
<td>-0.36</td>
<td>0.72</td>
<td>0.04</td>
<td>-0.05</td>
</tr>
<tr>
<td>Concentration</td>
<td>-0.01</td>
<td>0.05</td>
<td>-0.05</td>
<td>-0.18</td>
<td>0.86</td>
<td>0.04</td>
<td>-0.03</td>
</tr>
<tr>
<td>Info. Processing</td>
<td>-0.03</td>
<td>0.04</td>
<td>-0.15</td>
<td>-0.72</td>
<td>0.48</td>
<td>0.02</td>
<td>0.17</td>
</tr>
<tr>
<td>Motivation</td>
<td>0.08</td>
<td>0.05</td>
<td>0.41</td>
<td>1.61</td>
<td>0.11</td>
<td>0.17</td>
<td>0.23</td>
</tr>
<tr>
<td>Self-Testing</td>
<td>-0.03</td>
<td>0.04</td>
<td>-0.16</td>
<td>-0.70</td>
<td>0.49</td>
<td>0.05</td>
<td>0.05</td>
</tr>
<tr>
<td>Select Main Ideas</td>
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<td>0.05</td>
<td>-0.17</td>
<td>-0.67</td>
<td>0.51</td>
<td>0.05</td>
<td>0.17</td>
</tr>
<tr>
<td>Study Aids</td>
<td>0.05</td>
<td>0.05</td>
<td>0.28</td>
<td>1.16</td>
<td>0.25</td>
<td>0.10</td>
<td>0.17</td>
</tr>
<tr>
<td>Time Management</td>
<td>-0.04</td>
<td>0.05</td>
<td>-0.26</td>
<td>-0.95</td>
<td>0.35</td>
<td>-0.03</td>
<td>0.14</td>
</tr>
<tr>
<td>Test Strategies</td>
<td>0.03</td>
<td>0.05</td>
<td>0.16</td>
<td>0.57</td>
<td>0.57</td>
<td>0.11</td>
<td>0.08</td>
</tr>
</tbody>
</table>

Note. Statistics in the columns are represented as unstandardized regression coefficients (B), associated standard errors (SE), standardized regression coefficient betas (β), significant tests of each variable (t), associated p values (Sig.), and zero-order and partial correlations explained.

Correlations were produced using a Pearson Product Moment Correlation analysis.

[Pearson will match the zero-order correlations]. Significant relationships between the predictor variables and the one criterion variable were not found for Vocational Traditional Learners.

Interpretation of Non-Significant Results

According to Warner (2013) it is not automatically assumed that because an analysis suggests non-significance that the null hypotheses should fail to be rejected. Instead, alternative explanations should be ruled out. For example, a non-significance can easily be caused by “small effect size, small sample sizes, variations in [treatment delivery], unreliable or invalid outcome measures, failure to include the outcome measures that would reflect differences in outcome, and a number of other limitations of the study” (Warner, 2013, p. 101). The effect size, which was measured in terms of R and R² as an index of the strength of linear relationship...
between the criterion and predictive variables, was large. The sample size did not meet the standards encouraged for an effect size. Two formulas were given in Warner (2013). For an overall regression, it was recommended to have a minimum of \( N > 104 + k (104 + 10 = 114) \) or \( N > 50 + 8k (50 + 80 = 130) \). The total sample \( N = 97 \), with \( n = 38 \) for adult learner participants and \( n = 59 \) for traditional learners, did not meet the desired 114 or 130 sample size. Therefore, this study’s sample size may have been too small to establish a statistical power to examine statistical significance. Variations in treatment delivery may have also occurred. For example, upon completion of the LASSI, students were given copies of the outcome and counseled regarding the strengths and areas of learning and study strategy improvement. The students seeking enrollment for a vocational program met with one of four intake counselors, each of whom may have provided different guidance. This study could not maintain continuity between counselors. Therefore, students may have received or responded to their counselor differently.

Thus, just reviewing the LASSI results with an educational counselor may have positively or negatively affected student academic performance outcomes. Three potential outcomes of taking the LASSI were not included in this study. Due to strict participation requirements set up for this study to examine students who successfully finished their first semester, all students who failed to enroll in college, failed the entire first semester, or withdrew from college before completion of their first semester were removed from the sample. However, not enrolling, failing, or withdrawing from the first semester could have contributed to the regression model’s statistical significance. Furthermore, awareness of ones’ learning and study strategy strengths and weaknesses could have impacted students’ belief in their ability or lack of ability to maintain academic performance. Thus, sample size, variation in educational counseling, and missing outcomes may have contributed to a non-significant multiple regressions. Finally, relationships
among variables should be considered when examining a non-significant result, known as multicollinearity among predictors. This multicollinearity among predictors is measured by tolerance within a multiple regression report. The tolerance measures the “proportion of variance in $X_i$ that is not predictable from other $X$ predictor variables that are already included in the regression equation” (Warner, 2013, p. 571).

Table 6

<table>
<thead>
<tr>
<th>Predictor Variables</th>
<th>Adult Learners</th>
<th>Traditional Learners</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sig.</td>
<td>Tolerance</td>
</tr>
<tr>
<td>Anxiety</td>
<td>.29</td>
<td>.28</td>
</tr>
<tr>
<td>Attitude</td>
<td>.34</td>
<td>.33</td>
</tr>
<tr>
<td>Concentration</td>
<td>.57</td>
<td>.17</td>
</tr>
<tr>
<td>Info. Processing</td>
<td>.26</td>
<td>.40</td>
</tr>
<tr>
<td>Motivation</td>
<td>.46</td>
<td>.22</td>
</tr>
<tr>
<td>Self-Testing</td>
<td>.56</td>
<td>.24</td>
</tr>
<tr>
<td>Selecting Main Ideas</td>
<td>.82</td>
<td>.16</td>
</tr>
<tr>
<td>Study Aids</td>
<td>.09</td>
<td>.38</td>
</tr>
<tr>
<td>Time Management</td>
<td>.93</td>
<td>.11</td>
</tr>
<tr>
<td>Test Strategies</td>
<td>.28</td>
<td>.16</td>
</tr>
</tbody>
</table>

*Note.* Tolerance values range from 0.0 to 1.0. A value that is closer to 1.0 indicates that the variable is less correlated to other predictor variables. A value closer to 0.0 indicates that there is higher correlation with other variables and less variance can be explained by that variable alone (Warner, 2013).

Table 6 reveals the levels of multicollinearity among the predictor variables of both the adult and traditional learners within their separate multiple regression analysis. For ALs, Information Processing (.40) and Study Aids (.38) are more accurately explained by themselves than by the collection of predictive variables, whereas Concentration (.17), Selecting Main Ideas (.16), Time Management (.11), and Test Strategies’ (.16) variance can be explained by other variables in this multiple regression. However, even when the four subscales with low tolerance values were
removed from the regression analysis, the results were similar; that is the first null hypothesis would still fail to be rejected, $F(6, 31) = 1.217, p = .324$. The multiple correlation coefficient for the adjusted prediction model was $R = .437$, adj $R^2 = .034$, $R^2 = .191$ meaning that 19% of the variance can be accounted for by the linear combination of the measures. Traditional learners’ multicollinearity values reported minimally stronger individual tolerance than the ALs with the tolerance values ranging from .23 to .56. Anxiety (.56) was the most uncorrelated within the regression, with Information Processing (.42) and Attitude (.41) following closely behind. Therefore, despite the study’s limitations, this researcher accepts the null hypotheses as the final results.
CHAPTER FIVE: DISCUSSION, CONCLUSIONS, AND RECOMMENDATIONS

Discussion

As college enrollment continues to see increases in adult learners (ALs) returning for higher education, more knowledge is needed about the academic learning and study strategies of this population. Furthermore, vocational students, both ALs and traditional learners (TLs), are an under-researched population. This researcher gathered information about their learning and study strategies as it relates to academic performance (Griffin et al., 2012; Schutz et al., 2011; West & Sadoski, 2011). Therefore, the purpose of this quantitative study was to examine the predictive relationship between learning and study strategies and academic performance (GPA) among first semester vocational adult learners and vocational traditional learners. Ninety-seven participants were vocational adult and traditional learners from a northwestern, rural, four-year college who enrolled in the vocational division during the Spring 2013, Fall 2013, Spring 2014, and Fall 2014 semesters. Adult learners were determined by age, those students 25 years or older, while also including younger students with adult responsibilities such as full-time employment and/or dependent children (Brock, 2010; Clark 2012; Jacobs & Hundley, 2010; Knowles, 1990). Traditional learners were defined as students attending college directly or shortly after high school, under the age of 25, and having minimal adult responsibilities (Jacobs & Hundley, 2010).

The two Null Hypotheses, there is no predictive relationship between the subscales of the LASSI and first semester academic performance for vocational adult learners \((H_01)\) and vocational traditional learners \((H_02)\) in a northwestern public college were both failed to be rejected. Therefore, there were no significant predictive relationship between the criterion variable (GPA) and the predictor variables (anxiety, attitude, concentration, information
processing, motivation, self-testing, selecting main ideas, use of support techniques, use of time management, and test strategies) for vocational adult learners ($H_01$) and traditional learners ($H_02$).

This study’s aim was to identify learning and study strategy predictors of academic performance among vocational adult and traditional learners. This knowledge would potentially minimize the gap of vocational adult learning within Adult Learning Theory, while also comparing the similarities and differences of ALs to TLs. Adult Learning Theory theorized that ALs learn and approach college differently than TLs (Knowles et al., 2005). Additionally, this study may reduce the gap in literature as defined by Brock (2010) and Tuckman and Kennedy (2011) in understanding academic performance predictors for vocational education specifically, but not in the way that previous researchers found in their results.

The results of this study do not support the related studies previously identified in the literature review. The predictive relationship between time management and self-testing to GPA that West and Sadoski (2011) found in their study of first semester medical students was not validated by this study. As their results were not generalizable, but instead an analysis of their convenient population, this study does not discount their results, but suggests that vocational ALs and TLs’ academic performance (GPA) were not positively or negatively impacted by the learning and study strategies of time management and self-testing skills.

Griffin, MacKewn, Moser, and VanVuren (2012) found that eight of the ten LASSI subscales (attitude, concentration, information processing, motivation, self-testing, study aids, time management, and test-taking strategies) were statistically significant in a positive correlation to GPA. Griffin et al. (2012) examined the correlations between academic performance and the ten LASSI subscale scores through analysis of “several bivariate
correlations (Pearson, two-tailed)” (p. 111). Out of the related studies examined in the literature review, the participants in Griffin’s el al. (2012) study most closely relate to the participants in this research. Their sample included 107 academic students from a public undergraduate college. The differences between the Griffin’s et al. (2012) study and this study include: a small difference of ten students between sample sizes; academically enrolled students instead of this study’s vocational enrollment; and mid-south location as compared to this study’s northwest region. Although not identified specifically in Griffin’s et al. (2012) article, it can be assumed that their methodology, “several bivariate correlations” meant the researchers ran a bivariate analysis for each predictor to criterion variable combination, resulting in conducting ten bivariate regressions. According to Warner (2013), a Bonferroni procedure should have been included in their study to account for the number of analyses run and to control for a Type I error. As not overtly expressed in their article, caution should be used when interpreting their results as they may have rejected their null when the null may have been correct.

The results of this study were also examined through the Adult Learning Theory lens that suggested that adult learners approach learning differently than traditional learners (Knowles et al., 2005). According to the multiple regression analyses, LASSI subscales were not individual predictors of academic performance (GPA). However, both ALs and TLs had the same non-significant results. In addition, descriptive statistics revealed that all adult and traditional learners’ LASSI subscales fell either closely below or above the 50th percentile. Although ALs had slightly higher percentiles, the across the board need for increased skills demonstrates that all vocational students could benefit from learning and study strategy training to maximize their learning opportunity. This opposes the previously suggested interpretation of Adult Learning Theory that ALs need different learning and study skill intervention. However, the low
percentile within all ten LASSI subscales suggests increase in learning and study skill intervention is imperative for the rising vocational learners as suggested by Hirschy et al. (2011) and is supportive of the research that suggests learning and study strategies are a component of that which makes students successful (Aubke, 2009; Brock, 2010; Tuckman & Kennedy, 2011; Stupnisky et al., 2008; Wang, 2013; Wolniak et al., 2012).

Learning and study strategies are not the only variables that impact student success. Clark (2012) and Harward (2012) suggested that students’ psychosocial support can either be sources of strength or challenges for college students as they pursue academic success and completion. This study may strengthen their case. For if learning and study strategies are not statistically significant predictors of academic performance (GPA) of vocational learners, other variables must have a greater impact.

According to Adult Learning Theory (Knowles et al., 2005), adults within themselves are unique in their approach to learning, and thus identified for this study. Interestingly enough, vocational ALs and TLs self-describe their learning and study strategies similarly. Two possible interpretations arise from this result. First, vocational ALs may still be traditional learners, not defined by age, but as defined by their learning style. For instance, there is the potential that this sample’s ALs did not use vocational course content to develop the meaning and purpose as previously expected in ALs. Additionally, perhaps these ALs did not approach learning as defined by Andragogy Basic Assumptions, (a) the need to know, (b) the learners’ self-concept, (c) the role of the learners’ experiences, (d) readiness to learn, (e) orientation to learning, and (f) motivation (Knowles, 2005, pp. 64-68). Secondly, as these participants were vocational students, there may be an unknown, or less obvious, element in vocational education that reduces
the learning style difference between ALs and TLs, causing their academic performance (GPA) and approach to learning and study strategies (LASSI subscales) to be similar across the board.

Conclusions

This study found an exception to previous findings. Previous studies showed that there was a predictive relationship between learning and study strategies to academic performance (Griffin et al., 2012; West & Sadoski, 2011). Originally this researcher had made the assumption that this would hold true for vocational students. However, this study’s vocational adult and traditional learners’ learning and study strategies were not predictive of their first semester academic performance (GPA). Through the lens of Adult Learning Theory, this researcher supposed that vocational ALs would have different strengths and weaknesses in learning and study strategies than vocational TLs. However, the results of this study also showed an exception to the current knowledge about adult and traditional learners. Although these exceptions have occurred, generalizations across other populations should be cautiously considered because the sample was convenient and smaller than Warner (2013) recommended for an appropriate effect size. Despite the lack of recommendation to generalize to other populations, this study revealed that in vocational education, ALs and TLs share similar learning and study strategy strengths and weaknesses. According to LASSI’s scoring instrument, the sample vocational students’ LASSI subscales surrounded the 50th percentile. LASSI’s scoring instrument suggests that students who score in this percentile may have insufficient learning and study strategy skills to be successful (Weinstein et al., 2002). However, both the vocational ALs and TLs had an identical mean GPA of 2.7 and a standard deviation of 1, when both were rounded to the nearest decimal. Under the evaluation of the 4.0 grading system, a 2.7 GPA is considered a “B-” average.
Implications

In alignment with the findings of this study, colleges should continue their efforts in intervening with vocational students. According to this study, vocational ALs and TLs have similar learning and study strategy patterns, as depicted in the LASSI. Thus administration can broaden their definition of students who need learning and study strategy interventions to include both adult and traditional vocational learners. As a result, this similarity has an impact on the gap of knowledge about vocational adult and traditional learners. It suggests that in terms of learning and study strategies, vocational ALs and TLs can be treated equally. Equal in non-significant predictability of LASSI subscales to first semester GPA, but more importantly, also equal in substantial need for learning and study strategy training. The non-significant predictive relationship findings reinforces that colleges should not use the LASSI as an enrollment qualifier for vocational students. Rather, the LASSI should continue to be used as a student success tool where the bulk of the value comes from informing the student of his/her learning and study strategy strengths and weaknesses. As described earlier in the literature review, colleges in general are very limited in their ability to impact students’ external influencers, yet such institutions can increase and promote students’ internal influencers, such as learning and study strategies (Hirschy et al., 2011). Therefore, in vocational college settings, where both adult and traditional learners embark to further their education, learning and study strategies should continue to be taught.

Assumptions and Limitations

Assumptions

This study is based on the following assumptions:

1. Students reported honestly on their self-assessment of their learning and study skills in
order for the analysis of the data to be meaningful and accurate.

2. Students completed the LASSI to the best of their ability with the same general understanding of the terms used.

3. The data collected from the sample was representative of vocational students from a northwestern, rural, four-year public institution that houses a vocational degree program.

3. Due to use of secondary data, the students who participated in the LASSI did so to complete the vocational intake process and to know for themselves the learning and study strategy areas in which they displayed strengths and weaknesses.

Limitations

This study was conducted according to the following limitations:

1. Bush, Hux, Zickefoose, Simanek, Homberg, & Henderson (2011) reported that there may be a threat to external validity in that the mean scores of their sample did not match the statistical norms for the inventory. This threat was present in this study as it too could not reduce the threat to external validity by having “an N of at least 100 for any study where correlations are reported” (Warner, 2013, p. 275). Furthermore, for a multiple regression analysis, the formula $N > 104 + k$ was utilized (Warner, 2013, p. 570). $N = \text{sample size, } k = 10$ the number of LASSI subscales and therefore this study sought out $N > 130$, but was unable to obtain that sample size. Therefore, this study is limited in its generalizability through threat of the external validity.

2. There was also a threat to the internal validity through use of secondary data, thus a selection threat may have occurred due to the non-random nature of the sampling design. There is also a possibility that intake counselors placed more partiality in administering the LASSI to students who appeared to have more learning or study strategy concerns and may have forgone the LASSI for other students who appeared more prepared for college. Therefore the results may have been
negatively impacted. However, it is part of the standard vocational intake process to complete the LASSI, and therefore each student should have had an equal opportunity to complete the inventory.

**Recommendations for Future Research**

Hirschy et al. (2011) and Bailey et al. (2004) reported, “understanding student success in occupational programs in 2-year colleges deserves focused attention” (p. 297). For this convenience sample, internal learning and study strategies were explored and found non-significant when predicting end of first semester GPA from LASSI subscales. Therefore, expanding the analysis to include a larger sample size, first and second-year cumulative GPA, or college persistence may be informative. Harward (2012) reported that psychosocial support also greatly influences college persistence. Clark (2012) and Tinto (1993) vacillate between whether psychosocial influencers are sources of strength or a challenge when individuals pursue higher education. Therefore, it may be beneficial to conduct research to analyze the impact of psychosocial support on student success. The findings of this research clearly communicated the similarities among vocational adult and traditional learners, even to the point of having identical GPA and low levels of learning and study strategies. As the research surrounding student success continues, it is this researcher’s recommendation that vocational students’ college success variables be examined.
REFERENCES


June 10, 2014

Dear Ms. Rosenbaum:

Upon reviewing the scope and purpose of the research you wish to do with LCSC student data, I am comfortable authorizing you access to same pending approval from the Liberty University and Lewis-Clark State College Institutional Review Board. Good luck with your dissertation!

Sincerely,

Andrew T. Hanson, Ph.D.
Vice President for Student Affairs.
December 18, 2014

IRB Exemption 2014.121814: Best Learning and Study Strategy Predictors of GPA for Vocational Adult and Traditional Learners

Dear LaChelle,

The Liberty University Institutional Review Board has reviewed your application in accordance with the Office for Human Research Protections (OHRP) and Food and Drug Administration (FDA) regulations and finds your study to be exempt from further IRB review. This means you may begin your research with the data safeguarding methods mentioned in your approved application and no further IRB oversight is required.

Your study falls under exemption category 46.101(b)(4), which identifies specific situations in which human participants research is exempt from the policy set forth in 45 CFR 46.101(b):

(4) Research involving the collection or study of existing data, documents, records, pathological specimens, or diagnostic specimens, if these sources are publicly available or if the information is recorded by the investigator in such a manner that subjects cannot be identified, directly or through identifiers linked to the subjects.

Please note that this exemption only applies to your current research application, and any changes to your protocol must be reported to the Liberty IRB for verification of continued exemption status. You may report these changes by submitting a change in protocol form or a new application to the IRB and referencing the above IRB Exemption number.

If you have any questions about this exemption or need assistance in determining whether possible changes to your protocol would change your exemption status, please email us at irb@liberty.edu.

Sincerely,

Fernando Garzon, Psy.D.
Professor, IRB Chair
Counseling

(434) 592-4054

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Appendix C

TO: LaChelle Rosenbaum
FROM: Institutional Review Board, Teri Rust, Chair
DATE: December 31, 2014
SUBJECT: Liberty University IRB #2054.121814
Best Learning and Study Strategy Predictors of GPA for Vocational Adult and Traditional Learners

Thank you for providing the IRB approval letter from Liberty University and the other materials for your study. You may proceed with data collection at Lewis-Clark State College.

If there are any adverse events during your project, please remember to complete and submit the appropriate form from the web site.

This approval does not relieve the investigator from the responsibility of providing continuing attention to ethical considerations involved in the use of human subjects participating in the study.

After completing data collection and removing any identifying information you may have connected with the data, please go to www.lcsc.edu/irb and complete the Modification/Completion Form. This is a new procedure to bring us into compliance with federal guidelines.

Happy data collection and analysis!

If you have any questions during your research, please feel free to contact me (trust@lcsc.edu or 208-792-2276) or the Board.

Thank you for taking the time and effort to protect the rights of your human participants.