

A CAUSAL COMPARATIVE STUDY OF THE DIFFERENCE IN ACHIEVEMENT  
SCORES OF AT-RISK, MINORITY STUDENTS BASED ON LEARNING STYLES

by

Linda O. Green

Liberty University

A Dissertation Presented in Partial Fulfillment

Of the Requirements for the Degree

Doctor of Education

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## ABSTRACT

The American education system has historically promoted free and equal education for all, but history has shown that ethnic minority students' academic achievement has been lower than ethnic majority students' academic achievement. The resulting gap in achievement has been addressed throughout the research, but definitive solutions remain elusive. The study addressed the lack of research surrounding cultural learning patterns of at-risk students. The purpose of this quantitative, casual comparative study is to determine the difference among annual state mandated test scores of at-risk students who have visual, auditory, read/write or kinesthetic (VARK) learning styles. The participants for the study were drawn from a convenience sample of students located in a northeastern state during the spring semester of the 2020-2021 school year. The assessment was administered to students who were in grades six, seven and eight during the 2020-2021 school year to determine preferred learning styles. The researcher also used 2020-2021 Northwest Evaluation Association (NWEA) results to determine the differences among annual, state-mandated test scores of at-risk students who have VARK learning styles. The data were analyzed from each of the visual, auditory, read/write, and kinesthetic learning styles profiles. A one-way analysis of variance (ANOVA) was used to analyze the samples. The research shows that students benefit from increased teacher/student connections, faith-based partnerships, and increased awareness of cultural influences on learning. The data supports implementing tiered supports to address absenteeism and student disengagement.

*Keywords:* at risk, learning styles, differentiated instruction, achievement gap, learning style approach, Northwest Evaluation Association (NWEA).

## **Dedication**

This work is dedicated to my family who has supported me throughout this journey. My husband Chuck, our five children, their spouses, and our 12 grandchildren have given me encouragement and the moments of levity I needed to see this through.

In addition, this work is dedicated to students who have struggled with academic success. This is for you.

## Acknowledgments

I would like to acknowledge the family members I lost during this process. Each of them played a role as I began this dissertation. I miss them.

My brother-in-law	Steve Meeks	January 14, 2014
My father	Gerald Jordan	May 19, 2016
My sister	Christy Jordan Meeks	January 25, 2018
My brother-in-law	Randy Valimont	October 31, 2019

We will meet again because of the promise of everlasting life.

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## **List of Abbreviations**

Analysis of Variance (ANOVA)

Common Core Learning Standards (CCLS)

English/Language Arts (ELA)

Every Student Succeeds Act (ESSA)

Experimental Learning Theory (ELT)

Internal Review Board (IRB)

Measures of Academic Progress (MAP)

Multi-Tiered Systems of Support (MTSS)

National Center for Educational Statistics (NCES)

No Child Left Behind Act (NCLB)

Northwest Evaluation Association (NWEA)

Socioeconomic Status (SES)

Statistical Package for the Social Sciences (SPSS)

## **CHAPTER ONE: INTRODUCTION**

### **Overview**

Following the Civil Rights Act in 1964, the Equality of Educational Opportunity Study was commissioned by Congress (Coleman et al., 1966). The Equality of Educational Opportunity Study, authored by Coleman et al. (1966), became known as the Coleman Report. The report and subsequent studies have attempted to address the reasons students in American schools fall farther behind the longer they are in school. Chapter One includes a discussion of the background related to the study. The problem statement, the purpose of the study, and the significance of the study will also be discussed. The research questions and definitions of key terms will be provided as well.

### **Background**

The American education system was founded upon the guiding principle that all children should have access to a free education (Cookson et al., 2018). However, in early America there was a tiered system for a free education: American born Caucasians were the top tier, followed by European immigrants, and freed slaves in the lowest tier (Kammerer, 2017). Immigrants were expected to assimilate and were not given the same opportunities, nor accessibility to education that American born students were given (Zervas, 2017).

For decades, an equitable education was more accessible for European immigrants than for African, Hispanic, or Native Americans (Salinas & Alarcon, 2016). Terman (1916), a well-known eugenicist, believed that ethnic minority students should be relegated to menial tasks because they were lacking in intelligence. Terman stated, “They cannot master abstractions, but they can often be made efficient workers able to look out for themselves” (p. 92). Terman’s assumptions about race and ethnicity found support with some researchers in the educational

community (Brigham, 1923; Pintner, 1934). However, other researchers questioned the legitimacy of the conclusions and began to examine contributing factors to the differences between the educational outcomes of African American students and Caucasian students (Du Bois, 1935; Reuter, 1927). Although an equitable education for ethnic minority students was not a priority, the Civil Rights movement and the subsequent Civil Rights Act of 1964 began the process by which all students would eventually have the right to an equitable education.

The Civil Rights Act of 1964 required the Commissioner of Education to determine the availability of an equitable education for all students regardless of race, nationality, or religious preferences (Coleman et al., 1966). The publishing of the Equality of Educational Opportunity Study focused educators and policy makers on the educational inequities between ethnic minority students and Caucasian students (Coleman et al., 1966). Coleman et al. determined that ethnic minority students were less likely to become academically successful than their ethnic majority peers. At that time the consensus of educators was that the differences in student academic outcomes rested mainly on the schools in which the students learned (Hill, 2017). When the analysis of the data did not support that assumption, numerous researchers began to conduct studies to determine not only the cause, but also the point in time students become at-risk (Draper et al., 2015; Grimm, et al., 2018; Herman-Smith, 2012; Hughes et al., 2018; McKee & Caldarella, 2016; O'Tool & Due, 2015; Spilt & Hughes, 2016; Wang & Algonzzine, 2008).

In 1981 the National Commission on Excellence in Education was created and directed to determine the quality of education in America (Gardner et al., 1983). Gardner et al. determined American students were at risk for education failure and published *A Nation At Risk*. As a result

of the report, the term *at risk* became the designation by which students who struggled academically would become known.

Academically challenged students in the classroom is not a new phenomenon. The history of education is highlighted with research that has attempted to determine the reasons some students fail to meet academic achievement standards (Kussmaul, 1877; Morgan, 1896). Students who struggled with learning did not have a regulated education system upon which to rely. Small communities, lack of resources, and the lack of a common curriculum created an inconsistent education system (Middlekauff, 1961).

Beginning in 1867, the federal government recognized the need for oversight of the nation's education system and established a rudimentary education department. The initial purpose of the United States was to obtain information that would aid in establishing successful schools (U.S. Department of Education, 2017). However, it was much later that there was a concerted effort to track the academic achievement of students for the purpose of evaluating schools and teachers (Janak, 2019).

In 1947, President Truman established the Commission on Higher Education. President Truman charged the commission with defining the responsibilities of colleges and universities. A bill of rights for returning service men and women made a college education possible for many. The Commission's report stated,

Education is by far the biggest and most hopeful of the Nation's enterprises. Long ago our people recognized that education for all is not only democracy's obligation but its necessity. Education is the foundation of democratic liberties. Without an educated citizenry alert to preserve and extend freedom, it would not long endure. (Zook et al., 1947, p. 25)

Since Truman's report, subsequent presidents have contributed legislation that addressed the education of America's children. Speaking before a joint session of Congress in 1961, President Kennedy stated, "Too many—an estimated one million a year—leave school before completing high school—the bare minimum for a fair start in modern-day live" (Kennedy, 1962, para. 5). To combat the number of students leaving school before graduation, President Kennedy proposed the addition of more classrooms to house students, and more training for teachers (Kennedy, 1962).

Building upon President Kennedy's legacy, President Lyndon B. Johnson continued to explore the educational needs of America's children and passed legislation to support the education of all children in the United States with the Elementary and Secondary Education Act (ESEA) of 1965 (United States Congress Senate Committee on Labor and Public Welfare, 1965). The passing of the Elementary and Secondary Education Act marked the most comprehensive education law ever passed (Kosar, 2011). However, even with this comprehensive legislation, five years later President Nixon stated in 1970, "American education is in urgent need of reform" (Nixon, 1970, par. 1).

In 1971, a poll was conducted to determine what American citizens thought about the education system (Gallup, 1971). The public's concern for America's education system began to make its way to the forefront, and in 1972, the National Center for Educational Statistics (NCES) began tracking the national high school graduation and dropout rates. In the first report the nation learned that the dropout rate was 14.6%. The dropout rate among Hispanic students was more than double the dropout rate of Caucasian students. NCES reported more than 34% of Hispanic students failed to graduate (Stark & Noel, 2015). As President Ford took office in 1974, one of his first acts as president was to reauthorize ESEA. President Carter took reform a step farther,

signing into law the Department of Education Organization Act (S-210). In a statement at the signing of the Department of Education Organization Act, President Carter expressed concern over the Federal government's lack of attention to the education of America's children (Department of Education Organization Act Statement on Signing S.210 into Law, 1979).

In 1981, the Secretary of Education, Terrel H. Bell, under the direction of President Ronald Reagan, established The National Committee on Excellence in Education and required the commission to present a report on the quality of education in America. In 1983, *A Nation at Risk: The Imperative for Educational Reform* was published. The report highlighted the failing American education system and the inability of graduates to compete in a global market (Gardner et al., 1983).

Since *A Nation at Risk* was published, American education has been continually evaluated. Despite continuous evaluations and dismal forecasts that warned public education was faltering, very little changed in the years following the publishing of *A Nation at Risk*, and the nation's students remained in academic jeopardy. Bloom (1987) painted a dismal picture of the American education, noting the value placed on superficial learning and the lack of moral education and critical thinking.

As the evaluation of American education continued, Bennett et al. (1998) reviewed *A Nation at Risk* and determined the education system was still in danger and wrote *A Nation Still At Risk: An Education Manifesto*. Bennett et al. found the longer students were in school, the more likely they were to fall farther behind in their education, and stressed the point that since *A Nation at Risk* was written, the way in which students were educated had not improved. The authors proposed three strategies for change, including national standards, improved assessments, and accountability throughout the education system.



In 2001, President Bush reauthorized ESEA, also known as the No Child Left Behind Act (NCLB). NCLB attempted to address the strategies for change proposed in the manifesto *A Nation at Risk*. (Public Law 107-110, 2002 115 STAT.1425). NCLB emphasized educator accountability for test results, gave more control to local communities in determining how monies would be spent, gave parents a measure of control in school choice, and placed emphasis on research-based teaching methods (U.S. Department of Education, NCLB, Testing for Results: Introduction, 2004). During President Obama's tenure Congress reauthorized the Elementary and Secondary Education Act and replaced NCLB with Every Student Succeeds Act (ESSA). ESSA removed some of the restrictive requirements of NCLB but continued to require all students to be taught the same high academic standards in order to prepare them for success in college and career. ESSA has endeavored to put into place educational safeguards for America's most vulnerable students, including high academic standards, local interventions, and continued accountability (ESSA, 2015). However, even with the safeguards in place, many students have remained at risk for academic failure. The policies are in place, but the application of these policies is not always evident in student outcomes.

Preparing all students for post high school success, especially those who are at risk, requires new ideas or retooled older ideas. At-risk students have sat in classrooms where high academic standards and rigorous curriculum were presented, but students have continued to be at risk for dropping out of school (Trends in High School Dropout and Completion Rates in the United States: 1972-2012, 2015). An approach that includes a student's learning style has the potential to reduce the number of students who fail to graduate (Omar, 2017; Schroder et al., 2017).

Throughout the history of education, there have been men and women who have researched methods of teaching that would increase student achievement and provide students with the best possible educational experience. Efforts by educators to provide meaningful learning experiences evolved to include learning style theories (Betts, 1909; Haim, 2019; Lopez & Rugano, 2018; Myers, 1962; Riechmann & Grasha, 1974; Zimmerman et al., 1986). Educators have embraced learning style theories because they engage students in the learning process (Arghode et al., 2017; Reza et al., 2019). Learning style theories have continued to be explored and revised as a means to affect academic outcomes for students (Dunn & Dunn, 1978, 1992; Dunn et al., 1989; Kolb, 1984, 1985; Kolb et al., 2011).

Gardner (1983) developed the theory of multiple intelligences. The theory of multiple intelligences proposes that students have multiple ways in which they acquire information. Although Gardner concluded there was a lack of empirical evidence to support the multiple intelligences theory, educators have embraced the theory as a learning style designed to meet the individual needs of struggling students (Leasa et al., 2017; Macnamara 2016; Sener & Cokcaliskan, 2018). When faced with students who struggle academically, educators have had to think outside the traditional teaching/learning paradigm and consider new paradigms that include teaching and learning through students' preferred learning methods (Golon, 2017; Kallio & Metsarinne, 2017).

Consideration of learning styles as an approach to educating at-risk students has not been without controversy. Opponents of learning style theories have characterized learning style as a pseudo-theory and educators who support the idea of style of learning as naïve (Drumm, 2019). Other researchers have characterized learning style theory as educational malpractice

(De Bruyckere et al., 2015). However, the framework for these studies held a narrow view of learning style theory that classified students into distinct learning groups (Kirschner & Van Merriënboer, 2013).

Theories of learning have continued to be persistent in the literature because of the lack of specific evidence that supports one way of learning for all learners. Specifically, ethnic minority students who have been determined to be at risk for academic failure and current methodologies implemented in the classroom have not adequately addressed their learning challenges.

With at-risk students in mind, the theoretical framework for this study was learning style theory. Learning is an individual experience rather than a personality or psychological type (Kolb, 1984). Individual learning experiences are partially framed through beliefs about learning (Vermunt & Donche, 2017) and cultural background (Gu et al., 2017). Cultural learning experiences have an effect on the development of students' preferred learning styles (Hale, 2016; Heffernan et al., 2010; Joy & Kolb, 2008; Lewthwaite et al., 2015; Naik, 2013). Further research has suggested a connection between the culture of at-risk students and the achievement gap, and researchers have noted that at-risk students' academic achievement improves when educators develop a pedagogy that embraces learning style theory (Baicai & Jingjian, 2010; Fisher, 2005; Ogbu, 1992; Owens & Weigel, 2018; Vermunt & Donche, 2017). Joy and Kolb's (2008) findings on at-risk students suggested that learning experiences should not be separated from culture. Incorporating a learning style perspective that includes cultural learning patterns has the potential to positively affect the achievement gap between Caucasians and Native Americans, African Americans, and Hispanic students.

## **Problem Statement**

Research has determined ethnic minority students are more likely to experience academic failure than their Caucasian peers (Bhowmik et al., 2017; Dee & Penner, 2017; Trieu & Jayakody, 2018). Teachers, parents, socioeconomic status, and students themselves have been viewed as contributing factors for academic failures (Bruning, 2010; Coker, 2015; Dolean et al., 2019; Dosch & Zidon, 2014). The search for the reasons why ethnic minority students score lower on state assessments than ethnic majority students has been a prevalent theme in the research on this topic (Becares & Priest, 2015; Burgess & Greaves, 2013). Each year new ideas have been explored, funding appropriated, and more research studies published, but ethnic minority students have continued to fall behind their peers. Much of the research has focused on either the identification of students who are at risk for failure (Fien et al., 2018; Luo et al., 2009; Zhang et al., 2014), or student engagement in the learning process (Deckers & Zinga 2012; Delisle, 2012; Lei et al., 2018; Northey et al., 2018).

Annual high school dropout rates among ethnic minority students have continued to be higher than for Caucasian students (Hughes et al., 2018). Educators have used annual state test scores to determine student proficiency in mathematics, English language arts, science and social studies, but have not considered the methods by which students have learned and demonstrated mastery of concepts (NCES, 2018). This study will contribute to the body of knowledge concerning at-risk students' annual state test scores and the connection to their preferred learning style.

The preferred learning style of at-risk students is known to be significantly influenced by these students' cultures; however, the tests by which students are assessed are representative of the cultural majority (Fuchs & Fuchs, 1989; Hinton & Higson, 2017; Stevenson et al., 2015;

Williams, 2009). The results in mathematics and English language arts on annual state tests support the findings in the research that there is a gap of achievement between ethnic minority students and ethnic majority students (NCES, 2018). The problem is the lack of research investigating the differences in at-risk students' mathematics and English/language arts achievement scores on state assessments across preferred learning styles.

### **Purpose Statement**

The purpose of this quantitative, casual comparative study was to determine the differences between ethnic minority, at-risk students who have visual, auditory, read/write or kinesthetic (VARK) learning styles on their state mandated test scores in mathematics and English/language arts. Fleming and Mills (1992) developed VARK after reviewing the literature from psychology and education and concluded that learners respond differently but consistently in learning situations.

Building on the neuro linguistic programming research of Bandler and Grinder (1990), Fleming and Mills (1992) believed the learning categories defined by the authors were insufficient and did not fully explain learning differences in students. Fleming defined the learning modalities as V-visual, a preference for graphical ways of representing information; A-aural, a preference for hearing information; R-read/write, a preference for print; and K-kinesthetic, a preference for acquiring information through the five senses (sight, touch, taste, smell and hearing). The independent variable in this study was student learning style as defined by the VARK questionnaire. The dependent variables in this study were academic achievement results in mathematics and English/language arts as indicated on the Northwest Evaluation Association (NWEA) Measures of Academic Progress (MAP). Academic achievement in this study was defined as learning outcomes as determined by NWEA MAP scale scores (Domenech-

Betoret et al., 2019; Leighton et al., 2018). The NEWA measured student progress in English/language arts, mathematics, and science. Students received a score for each subject area tested.

The participants in this study were ethnic minority, at-risk sixth-, seventh- and eighth-grade students from one public school in a northeastern state. The ethnicity of the city in which the school was located is approximately 87% Caucasian and 13% ethnic minority (U.S. Census, 2019). Historically, the term *at risk* has referred to students who have failed to meet basic levels of proficiency in reading or mathematics, and without intervention these students are likely to drop out of school before graduation (Garcia et al., 2018; Moore, 2006; Weybright et al., 2017).

### **Significance of the Study**

The significance of this study was that the research has the potential to change the way in which at-risk students are educated. Current instructional models, primarily teacher-centered instruction, do not meet the needs of all students. Although there is room for teacher-centered instruction in the classroom, this model has been controversial for many years (Ellis et al., 2019; Magliaro et al., 2005; Minter, 2011; Stockard et al., 2018; Zygmunt & Schaefer, 2005).

Alternative methods of instruction may prove to be beneficial in terms of academically advancing at-risk students (Elban, 2018; Rani, 2016; Shirazi & Heidari, 2019). Online learning has been explored as a possible solution in addressing learning challenges of at-risk students. Lewis et al. (2014) found online learning modules developed at-risk students' belief in their ability to succeed in school. Steed (2012) suggested that flipping the classroom instructional model by providing instruction to students outside the classroom via technology and reserving homework for coaching sessions during the school day would increase student achievement. Tomlinson (2001) determined that differentiating instruction by adjusting the curriculum and teaching strategies would meet the academic challenges of students. Other researchers have

proposed determining students' preferred learning styles as a way to increase student motivation and improve academic achievement (Malacapay, 2019; Nja et al., 2019).

When addressing the learning challenges of academically at-risk students, alternative methods of instruction should be considered. While many alternate methods of teaching have been explored, one that has continued to be researched is learner centered methodology. A learner centered classroom is inclusive of students' preferred learning styles because it places the focus on the students rather than on the teacher (Jaiswal, 2019; Marbach-Ad & Hunt, 2018). Investing in a learning style approach in the classroom may prove to be beneficial in improving at-risk students' test scores. A learning style approach to teaching and student learning warrants serious consideration. As a result of this study educators may be able to address the at-risk student challenges using data that support a learning style approach to instruction and learning.

### **Research Questions**

**RQ1:** How can end-of-year mathematics achievement results, as measured by NWEA, among ethnic minority, at-risk sixth-, seventh-, and eighth-grade students given their various learning styles, as measured by the VARK questionnaire be improved?

**RQ2:** How can end-of-year English/language arts achievement results, as measured by NWEA, among ethnic minority, at-risk sixth-, seventh- and eighth-grade students given their various learning styles, as measured by the VARK questionnaire be improved?

### **Definitions**

1. *Achievement Gap* – The term achievement gap refers to a disparity between racial groups in academic achievement (Coleman, 1966; Voight et al., 2015).
2. *At-risk* – At-risk is a term that refers to students who are more likely than their peers to fail in school and drop out before graduation (NCES, 1992).

3. *Differentiated Instruction* – Differentiated Instruction is the teacher’s response to a learner’s needs (Tomlinson, 1999, 2001, 2003, 2004).

4. *Learning Style Approach* – Learning style approach refers to a methodology used by educators that includes the learning styles of students when planning and implementing lessons (Pasina et al., 2019).

5. *Learning Style* – Learning style refers to a method or methods of gathering and processing information (Khanal e al., 2014).

6. *Northwest Evaluation Association* – NWEA



## **CHAPTER TWO: LITERATURE REVIEW**

### **Overview**

Throughout the history of education, there has been a search to determine the process by which learning takes place. In an effort to meet those needs, studies in theories of learning emerged and educators began the quest to provide meaningful educational experiences for all learners (Dewey, 1902; Thorndyke, 1920). The following review of literature focuses on the problem of meeting the academic needs of students deemed at-risk for academic failure as determined by state mandating testing. The review of literature provides a discussion of learning theories and how incorporating students' preferred learning styles into the instructional day has the potential to change the way in which students achieve academic success.

### **Theoretical Framework**

The theoretical framework guiding this study is Kolb's (1984) experiential learning theory (ELT) and Fleming's model of learning styles (VARK). Theories of learning have been explored throughout history and can be dated to Hippocrates, 460-435 BC (Boyes, 2013). Hippocrates postulated that learning is unique to individuals and can be grouped into four temperaments: Sanguine, Melancholic, Choleric, Phlegmatic (Merenda, 1987). Hippocrates' theory concerning temperaments, or personality traits, established a connection to learning styles and ways of learning that researchers have continued to study (Boyes, 2013; Sadeghi et al., 2012; Threton et al., 2013).

In the 20th century, research in psychology generated modern learning theories. Gestalt psychology, an early form of psychological studies, emerged as a result of German learning experiments and laid the foundation for subsequent studies in the 1920s and 1930s (Ash, 1995; Duncker, 1935/1945; Koffka, 1922; Kohler, 1929). Foundational learning theorists focused on

conceptual frameworks that would explain how learning takes place. The overarching concepts developed were behaviorism (Pavlov, 1927; Skinner, 1953; Thorndyke, 1920) and constructivism (Bruner, 1960; Dewey, 1902; Montessori, 1949; Piaget, 1952; Vygotsky, 1978). Additional learning theorists and concepts such as social learning theory (Bandura, 1971), multiple intelligences (Gardner, 1983), and experiential learning (Kolb, 1984) strengthened this field of study and continued the discussion surrounding the ways in which students acquired new information. Eventually, theories of learning became part of the discussion in universities as educators prepared to take their place in America's classrooms.

### **Learning Preferences and Academic Achievement**

The literature regarding learning styles has significantly informed the discussion about the achievement gap between ethnic minorities and the ethnic majority and has created numerous models of learning (Arendale, 2014; Ford, 2019; Yeh, 2015). For the purposes of this research, VARK (Fleming, 1992) and Kolb's (1984) model of experiential learning form the theoretical framework.

Learning style theory has been researched extensively with mixed results. Although researchers have published reports concerning the lack of empirical evidence to support the use of learning styles as a means of instruction, educators have been persistent in their acceptance of the theory (Cuevas, 2015; Newton & Miah, 2017; Winger et al., 2019; Yankulov & Lu, 2017). Others have dismissed the theory and have characterized the theory of learning styles as a commercial product, easily accessed but lacking in validity (De Bruyckere et al., 2015; Coffield et al., 2004; Kappe et al., 2009; Pashler et al., 2009; Rohrer & Pashler, 2012). Nancekivell et al. (2020) dismissed learning style theory as a myth but found educators' belief in learning styles is "far more complex and variable than previously recognized" (p. 233).

It is the complexity of learning style theory that has contributed to the lack of agreement in the literature. Researchers who have determined learning styles theory as a valid theory, interpret the theory broadly to include personality traits and cultural background as factors that contribute to learning (Buckley & Doyle, 2017; Vass, 2018). Researchers have also determined practitioners do not have a common language when exploring learning styles and find it difficult to define (Labib et al., 2017; Li & Armstrong, 2015).

Defining learning styles and determining a method of instruction for students who are at risk for academic failure and dropping out of school are equally challenging. The issues that have contributed to students' academic failures are complex and are subject to change. In the same way, learning styles, or learning preferences are not static. The stages of life and life experiences have an effect on preferences in play, learning, and human interaction (Piaget, 1952). For the learner whose life experiences have contributed to academic struggles, determining learning preferences may be more complex since security and physiological needs must be present before authentic learning can take place (Maslow, 1943).

Mitigating the academic needs of the at-risk student requires new thinking patterns for the educator. Historical research regarding at-risk students has shown that traditional methods of teaching and learning have not worked, in part, because the at-risk population is comprised mostly of ethnic minority students and the ethnic majority learning paradigm lives in the classroom. Research has also shown that learning styles are influenced by culture, and the culture of ethnic minority students is not always represented by the educator in the classroom (Khalifa et al., 2016; Ladson-Billings, 2017; Redding, 2019).

### **Fleming's Model of Learning**

The early literature on learning styles focused on matching instructional methods to students' learning styles (Conti, 1985; Cronbach & Snow 1977). Fleming, the developer of the VARK model, determined students' academic needs were not being met using this approach and challenged students to articulate concerns about learning. The process by which students learned became a focus, and Fleming found support for his premise in the research on neurolinguistic programming (Bandler et al., 1975; McLeod, 1990). Neurolinguistic programming is a technique in which an individual's communication patterns are improved for the purpose of changing a behavior that will lead to a specific goal (Frankovsky et al., 2019). Fleming and Mills (1992) redirected the focus from instructional methods to the learning process of students and thus created the VARK model.

The Fleming model of learning theorizes learners prefer one of four modalities. Visual (V) learners learn best through maps, graphs, diagrams, and charts. Aural/auditory (A) learners prefer lectures, group discussions, and talking things through. Read/write (R) learners prefer information displayed in text, reports, essays, and written assignments. Kinesthetic (K) learners prefer multiple sensory, experiential learning, or hands-on learning (Fleming, 1995/2001) as a means to acquire knowledge (Boatman et al., 2008; Rogers, 2009).

### **Kolb's Experiential Learning Theory**

Also guiding this study is Kolb's experiential learning theory (ELT; 1984). Kolb, finding inspiration from Lewin (1951) and Piaget (1952), developed the theory of experiential learning (ELT). Kolb (2015) defined ELT as one that is fundamentally different from traditional views of the learning process. Kolb contended that experiential learning was not an alternative to behavioral and cognitive learning theories, but rather a holistic approach to learning that

encompassed experience, perception, cognition, and behavior. The ELT model proposes that students empower themselves when they choose the method by which they incorporate knowledge. Depending on the task or specific learning required, the learner may use concrete, sensory driven learning methods, abstract thinking and analyzing, observing others in the learning process, or becoming an active participant in a learning experiment (Kolb et al., 1999).

Kolb's (1984) ELT emphasizes reflection during the learning process (Boreham, 1987). The reflection process requires self-awareness and emotional intelligence. Reflection is realized when the learner is actively "exploring our previous thoughts, emotions and behaviours, which leads to useful insights for future experiences" (Stanley, 2017, p. 265). Emotional intelligence may be described as the ability to regulate emotions and demonstrate empathy for others (Gallingane & Han, 2015; Goleman, 2005). Before reflection can take place a measure of self-awareness and emotional intelligence must be in place. As a result, experiential learning has become common in higher education classrooms, especially when determining how students learn in specific disciplines (Bower, 2013; Caetant et al., 2018; Hawkins & Weiss, 2005; Judge et al., 2011; Li et al., 2019; Miller et al., 2012; Turesky, & Gallagher, 2011). Campos (2017) found that students who engaged in experiential learning situations improved problem-solving skills in real world situations.

The learning styles identified by Kolb (1984) are divergers, assimilators, convergers, and accommodators. Diverging learners incorporate concrete experience and reflective observation. The Assimilating learners' approach is to arrange information in a logical, concise manner. Converging learners process abstract concepts into practical applications. Accommodating learners prefer active involvement in the learning process.

As the research on learning styles continued to develop, cultural influences were largely ignored. Hillard (1976, 1989) explored how behaviors informed learning, but found that teachers often ignored historical evidence of cultural and behavioral differences. Educators often celebrated student differences but did not incorporate the behavioral and cultural differences into instructional planning (Hillard, 1989). Researchers have acknowledged the link between culture and learning but have approached the link with caution (Mantiri, 2015; Ndemanu & Jordan, 2018). The fear of labeling students' learning patterns by culture or ethnicity has resulted in limited progress in developing instructional methods that address ethnic minority students who have struggled academically. Researchers have explored culture as a way to embrace diversity in the hopes that acknowledging and embracing differences would bring about a sense of belonging, improve academic outcomes for at-risk ethnic minority students, and narrow the achievement gap (Hachfeld et al., 2011; Sarraj et al., 2015; Schachner et al., 2016; Trieu & Jayakody, 2019). However, the achievement gap has remained firmly intact.

Generations of at-risk, ethnic minority students have struggled to meet dominant cultural standards. These students have been marginalized and subjected to repeated interventions without a clear pathway for them to acquire academic success (Dee & Penner, 2017). Research has shown that educators often have lower academic expectations for ethnic minority students and these students' understanding of their academic abilities is a reflection of the educators' lowered expectations (Kleen & Glock, 2018). As a result, students have experienced repeated academic failures (Ames, 1992; Bandura, 1986; Luo et al., 2009; Paunesku et al., 2015; Yeager et al., 2016). However, students' understanding of the learning process and the validation of their abilities has also been determined to affect learning outcomes. The influence of culture on

learning must be explored and new learning pathways created for students who learn outside the Eurocentric classroom model.

This research study will contribute to the field of literature concerning learning styles of at-risk students (Bamford & Pollard, 2018; Hofstede et al., 2010; Joy & Kolb, 2009; Manikutty et al., 2007; O'Malley, & Adekanye, 2015; Owen & Weigel, 2018; Pinder, 2013; Vita, 2001; Voight et al., 2015).

### **Related Literature**

The history of education is comprised of notable theorists who have endeavored to determine the best way that learning takes place (Illeris, 2018). Educators have not easily replaced methodologies held in high regard, but in an effort to reach students who have appeared to be unreachable, new ideas have continued to be explored (Alheit, 2009/2018; Katznelson et al., 2017). As the field of educational research has broadened, educators have explored and embraced newer practices, which have captured the attention of students who struggled academically (Shen, 2018). Extensive research into the lives of students who have been determined to be at risk for failure and dropping out of school has been conducted, disseminated, and published, yet a significant number of students have remained at risk.

Projecting long-range effects of students' education began early in the colonization of America. Individual communities were responsible for the education of its citizens, but inconsistent academic outcomes resulted in national concern. The establishment of a national education office in 1867 marked the first step in providing a systematic, equitable education for the nation's students. Some of the first data reported in 1870 revealed 98% of the nation's students failed to graduate high school (Simon & Grant, 1969). By today's standards that was a disturbing number of students dropping out of school. However, during that period of time,

America was an agrarian society and minimal education was required to be considered successful and a valuable member of society (The Gale Group, 2003). World War I and the continuing industrial revolution brought about changes in American society and the country began to transform from an agrarian society to an industrial society (Field, 1976; Goldin & Katz, 2000; Mirel, 2003).

After World War II, President Truman established the Commission on Higher Education. This was the first time a sitting president established a forum for the evaluation of the American Education system (Zook et al., 1947). By 1946 the dropout rate had fallen to 52.1% (Simon & Grant, 1965). Over the next several decades there were modest but steady increases in the number of students graduating high school. However, the country entered the 1960s with approximately 30% of high school students failing to graduate (Simon & Grant, 1965).

In 1961, President Kennedy challenged the nation to put a man on the moon by the end of the decade (Kennedy, 1961), but the 30% dropout rate proved problematic. Congressional oversight in education birthed the Coleman Report in 1966, which documented the availability of education and the challenges the ethnic minority student encountered in receiving an education. The Coleman Report was the first time the gap in achievement between ethnic minorities and the ethnic majority was acknowledged and given the name *the achievement gap* (Coleman et al., 1966).

By 1970 the dropout rate had been reduced by approximately 50%, but the data concerning the number of students failing to graduate high school showed an alarming trend among ethnic minority students. The dropout rate among White students was 12%, but among African American students and Hispanic students the dropout rate was significantly higher at 21% and 34% respectively (Child Trends, 2018).



By the time President Regan took office in 1980, there were major concerns regarding the American education system. In 1981, President Regan established the National Committee on Excellence in Education and charged the committee to investigate the quality of education in the United States (National Commission on Excellence in Education, 1983). The committee found that American students were unable to pass basic skills tests in literacy and mathematics (National Commission on Excellence in Education, 1983). After this report, the term *at risk* was applied to students who were deemed unlikely to graduate high school. Additionally, the National Center for Educational Statistics (NCES) published a longitudinal study that correlated the characteristics of at-risk students and the likelihood of academic failure (NCES, 1992).

Coleman et al. (1966) reported that race and ethnicity were significant factors in determining high school completion. Coleman et al. also determined the academic achievement of ethnic minority students lagged the academic achievement of ethnic majority students and continued to widen the longer the students were in school. This gap represented approximately two years in sixth grade, increased to 2.4 years in ninth grade, and by 12th grade was 3.3 years (Coleman et al., 1966, p. 21). Multiple studies have confirmed the research of Coleman et al.: the longer ethnic minority students are in school, the wider the gap in achievement (Bali & Alvarez, 2003; Caughy & Owen, 2015; Fordham & Ogbu, 1986; Madyum, 2011; Pitre, 2014; Rashid, 2009; Voight et al., 2015). This trend, ethnic minority students underperforming White students, continued for over 50 years. Beatty (2013) noted,

For example, a more than 20-point gap between white and Hispanic students on National Assessment of Educational Progress tests in reading and mathematics has not changed significantly since 1990, and the gaps between black and white students have followed a similar pattern. (p. 69)

In the years following the Coleman Report (Coleman et al., 1966) and the publishing of *A Nation at Risk* (NCES, 1983), very little changed in the manner in which students were educated. Bennett et al. (1998) stated, “Equal educational opportunity is the next great civil rights issue” (p. 4). The authors recommended national learning standards, authentic assessments, and educator responsibility. As recommended, America now has national learning standards known as Common Core Learning Standards (CCLS). The standards were the result of state-led efforts that included governors and state commissioners of education (National Governors Association Center for Best Practices. Common Core Standards Initiative, 2009). However, the changes in the education system have not significantly affected the gap in achievement between ethnic minorities and Caucasian students (Huntington-Klein & Ackert, 2018).

### ***The Achievement Gap***

The achievement gap refers to the differences in academic achievement between the ethnic majority and ethnic minorities. The students in this gap are at risk for academic failure and dropping out of school. Most of the students represented in this group are African American, Hispanic, or Native American (Guskey, 2016; Harackiewicz et al., 2016). While research has shown the achievement gap exists, the reasons for the gap have been researched for over 50 years but have not yielded a definitive answer to the issue.

Researchers have postulated many reasons for the disparity, including poverty (Lawson, et al., 2017; McLaughlin et al., 2014; Paschall et al., 2017), parental involvement (Carolan & Wasserman, 2015; Kim, 2014), engagement in learning (Lee et al., 2016), educators and instruction (Candal, 2018), discipline, (Wright et al., 2014), racial bias (Martinez et al., 2016; Voight et al., 2015), and school quality (Flores, 2018).

Low socioeconomic status (SES) and the effect it has on learning have been a national concern since the publishing of the Coleman Report (Coleman et al., 1966) and President Johnson declaring war on poverty. Researchers have continued to explore how SES affects academic achievement and the results are consistent within the field: Students with a low SES are often at risk for educational issues that affect academic achievement (Battle & Lewis, 2002; Haverman & Wolfe, 1995; Lawson et al., 2017; McLaughlin et al., 2014; Noble et al., 2015; Stull, 2016; Valant & Newark, 2016). Researchers have suggested that parents with a low SES are less likely to read to children, visit fewer museums and libraries, and have fewer meaningful verbal interactions (Duncan, 2012; Duncan et al., 2014; Evans & Pilyoung, 2013; Reardon, 2011; Reardon & Portilla, 2016; Rothstein & Wozny, 2013). Students whose parents are in a higher income bracket benefit from parent-directed social engagements and leisure activities (Lareau, 2011).

Researchers have linked low SES with other academic issues. Studies have shown that children in poverty are more likely to enter school behind students with a higher SES (Daniel, 2018; Lamy, 2013; Richardson et al., 2017). Research has also shown that kindergarten students whose families were in a higher income bracket approached learning more positively than students whose socioeconomic status was below the federal poverty level (NCES, 2015; Reardon & Portilla, 2016). As a result of the research on this topic, early childhood education has been presented as a way to intervene early and narrow the academic gap in children of low socioeconomic status (Bradbury et al., 2015; Magnuson & Waldfogel, 2016) and bridge the academic achievement gap between ethnic minority students and their non-Hispanic White or Asian peers (Richardson et al., 2017). While socioeconomic status has been determined to

impact students across all ethnicities, the lack of learning opportunities has been found to be more common with ethnic minority students (Kia-Keating et al., 2018)

### ***The Achievement Gap and the Teaching Profession***

The teaching profession has been under the proverbial microscope since the identification of the achievement gap. The quality of collegiate preparation for teachers and expertise in the classroom have been researched under the premise that better prepared teachers would ensure fewer at-risk students (Candal, 2018; Farnan et al., 2014). However, Hiebert and Morris (2012) found that efforts to improve student achievement by focusing on teacher quality, such as personal academic achievement, knowledge of content, and motivation, had no long-lasting impact on student academic improvement.

Teacher attrition has also been a point of concern. Keeping teachers in the classroom has become difficult. Approximately 30% of new teachers leave the profession within the first five years in the classroom, and in low-income areas the attrition rate is higher (Carver-Thomas & Darling-Hammond, 2019; Hansen et al., 2016; Ronfeldt et al., 2013).

Other researchers have determined that the achievement gap has remained, in part, because educators provide less rigorous curriculum for students who are at risk for academic failure (Bower, 2013; Ratcliff et al., 2016). Torff (2014) conducted research and concluded that educators had a belief system that sustained the achievement gap and treated learning as a hierarchical process in which students were required to master lower-level content before moving to more complicated material. Torff noted that students were not exposed to concepts that required critical thinking skills and as a result, students deemed at risk for academic failure were subjected to repeated academic interventions without the benefit of more challenging higher order thinking concepts.

### ***The Achievement Gap and Teaching Strategies***

In an effort to meet the academic needs of all students and close the achievement gap, educators have explored methods to deliver instruction that would address the learning differences of students. The flipped classroom is a model of classroom instruction that presents learning through a blended learning format. Developed by Bergmann and Sams (2012), the flipped classroom incorporates face to face learning and online learning. Elian and Hamaidi (2018) found that blended learning formats were more effective than either face to face or online learning alone.

Differentiation of instruction has been considered a potential pathway to address at-risk learners, and in doing so close the achievement gap. Differentiated instruction is strategic lesson planning designed to meet the needs of a diverse group of learners. Comprehensive knowledge of individual student needs is required for differentiation of instruction to be a success (Beam, 2009). Fountas and Pinnell (2012) stated, “Classrooms are full of a wonderful diversity of children; differentiated instruction is needed to reach all of them” (p. 269). Cultural differences in classrooms may be addressed through differentiation of instruction (Valiandes et al., 2018). The research supports differentiation of instruction as a means to increase academic proficiency with at-risk students (Gavassa et al., 2019). Differentiation of instruction is a foundational principle for cultural learning styles.

### ***The Achievement Gap and School Climate***

The way in which students view the structures and climate of a school has been determined to affect overall student achievement (Konold et al., 2018; Voight et al., 2015; Wang & Degol, 2016). Shindler et al., (2016) found “a strong relationship between the quality of school climate and academic achievement levels” (p. 12). Berkowitz et al., (2017) also

determined a positive school environment helps to balance the inequities of socioeconomic status and academic achievement. Researchers have found a strong connection between academic outcomes and school climate. This is especially true for ethnic minority students, who are most likely to be at risk for academic failure (Hope et al., 2015).

Engagement in the educational process is also affected by classroom and school atmosphere (Alivernini & Lucidi, 2008; Bryce et al., 2018; Green et al., 2012; Henry et al., 2012; Kizildag et al., 2017). In most educational learning spaces, the dominant culture, or ethnic majority, typically controls the rules of engagement in the classroom. As a result, ethnic minority students may not understand the cultural nuances that ensure academic success and often result in disengagement in the educational process. This resulting disengagement often leads to behavior issues and may also lead to students failing to graduate (Lessard et al., 2008). However, by closely monitoring students who are at risk and by providing academic intervention, these students are more likely to achieve academic success (Bryant, 2014; Clark et al., 2011; Coyne et al., 2013) and as a result, behavior issues, which often accompany disengagement, may diminish (Algozzine et al., 2010; Earl et al., 2017; McGregor, 2017; Webster-Stratton & Reid, 2004)

### ***The Achievement Gap and Oppositional Culture.***

Ogbu (1978) suggested students who were at risk opposed the dominant culture and this opposition resulted in academic underachievement. Ogbu's oppositional culture theory proposed that ethnic minorities perceived barriers to success due to discrimination and inequalities in society and education. As a result, students resist the dominant culture's norms for success through education and minimize the value of acquiring an education. Ogbu (2008) explained students' opposition to the dominant culture is a result of ethnic minorities forming a collective identity in response to the dominant culture's reluctance or refusal to allow assimilation. As a

result, ethnic minority groups are powerless to affect change through the dominant culture and choose instead to develop ways of coping in society as a group. “From the minorities’ point of view, there co-exists two opposing cultural frames of reference or ideal ways to behave: one appropriate for minorities and the other appropriate for their oppressors” (Ogbu, 2008, p. 10). While an opposition to the dominant culture does not explain all the complexities of the achievement gap, the oppositional culture theory has identified a plausible explanation for the continued disparities of academic achievement between ethnic minorities and the dominant culture (Downey, 2008).

### ***The Achievement Gap and Racial Bias.***

Racial bias has also been considered as a possible cause of the achievement gap. Data have revealed a disproportionate number of ethnic minority students received discipline referrals, which often resulted in suspensions and seemed to support the racial bias theory (Duncan & Murnane, 2011; Losen, 2015; Martinez et al., 2016; Voight, Hanson et al., 2015; Whitford et al., 2016). Research has shown ethnic minority students are more likely to be subjected to negative disciplinary consequences, and with greater severity, than the dominant culture (Fabelo et al., 2011; Fenning & Rose, 2016/2007; Losen & Martinez, 2013; Yeager et al., 2017). The Civil Rights Data Collection of 2013-2014 (U.S., 2016) found African American students were over three times more likely than Caucasian students to be suspended out of school. Whitford et al. (2016) determined ethnicity was a predictor of negative school discipline.

Extensive research has attempted to explain the differences in disciplinary practices between ethnic minority students and their ethnic majority peers. While some regard institutional racism at the root of discriminatory discipline practices, others have considered cultural differences as the reasons for inequitable discipline practices (Whitford et al., 2016). Khalifa et

al., (2016) stated, “And the discipline gap—which is often characterized by racialized disparities in disciplinary referrals, suspensions, expulsions, and court citations—is a direct indication that school cultures are hostile toward minoritized students (p. 1279). Discipline referrals and academic underachievement are both factors of the achievement gap and have been linked in the research to cultural differences. However, educators have been reluctant to forge the links for fear of making generalizations about a specific ethnic group (Guild, 1994).

Another aspect of what appears to be discrimination is structural racism. Merolla and Jackson (2019) defined structural racism as a “social system in which race is a central principle of social organization that serves to sort individuals into positions of relative advantage and disadvantage based on their racial category” (p. 2). Structural racism theorists state the achievement gap is a result of educational places unintentionally designing learning opportunities that favor White students over students of color (Kempf, 2020; Teeger, 2015). Whether intentional or unintentional, the outcomes are the same: successful learning opportunities appear to favor the dominant culture. In order to address cultural differences between ethnic minority students and ethnic majority teachers, ethnic matching has been proposed as a viable option to narrow the achievement gap (Achinstein & Aguirre, 2008; Banerjee, 2017; Eddy & Easton-Brooks, 2011; Gay, 2018; Redding, 2019).

### ***The Achievement Gap and Ethnic Matching.***

There have been a few studies that have supported matching ethnic minority teachers and ethnic minority students. Racial bias, behavior, personal relationships, and perceptions of education inequities are common themes in the research (Gregory et al., 2010; Losen, 2015; Skiba et al., 2011; Voight et al., 2015). Researchers have noted improvement in academic achievement among ethnic minority students when placed with ethnic minority teachers



(Banerjee, 2019; Yarnell & Bohrnsted, 2018). However, Egalitea et al., (2015) acknowledged that the positive results may not be from matching teachers' and students' ethnicities, but differences in teachers' expertise. Other studies have determined that ethnic matching had no statistical effect on academic improvement (Driessen, 2015; Jennings & DiPrete, 2010; Redding, 2019; Wright et al., 2017).

The achievement gap is not just an American issue. It is an international phenomenon. Canada has an achievement gap between the First Nation Peoples (ethnic minority) and European (ethnic majority) descendants of colonists (Mayor, & Suarez, 2019). There is an achievement gap in the Netherlands between the ethnic majority culture, native Dutch, and immigrant ethnic minority groups (De Jong et al., 2016; Van de Werfhorst & Van Tubergen, 2016). Vietnam has also experienced an achievement gap between ethnic minority and ethnic majority students (Trieu & Jayakody, 2019). Turner et al., (2015) found New Zealand's dropout rate of ethnic minority (Pasifika and Maori) students was three times higher than ethnic majority (Asian and Pakeha) students. While some of the disparity may be attributed to racial bias, the research is more indicative of cultural differences between minority and majority cultures, and the lack of cultural assimilation (Lamb et al., 2011; Makarova & Birman, 2015). Conversely, ethnic minority students who adapted, or assimilated, into the dominant culture developed attachments to the educational environment and experienced greater academic success (Bondy et al., 2019; Bryan et al., 2012).

### ***Cultural Impact on Learning***

Throughout the world there is evidence of the lack of integration between the dominant culture, or ethnic majority, and the culture of ethnic minority peoples. Global and local wars have been fought as a result of cultural differences. Attempting to bring cultures together began

early in American history, but in the late nineteenth century, the influx of immigrants presented challenges for the education system. The practice at the time was to sever immigrants' connection to their homeland and culture and assimilate them completely into the American way of life (Moretti, 2015). As a result, the United States became the 'melting pot' of cultures, a term popularized by British playwright Zangwill (Jarczok, 2021; Szuberla, 1995). The melting pot paradigm of learning was ingrained in the American culture and classrooms. Children of immigrants were expected to learn lessons in the well-established Eurocentric way (Moretti, 2015; Patri, 1917). The subtle message that permeated the American classroom was in order to be successful, a student needed to learn as the ethnic majority learned. This cultural mindset remained in place through the 1960s. The Coleman Report (1966) reflected this mindset in education and acknowledged students were expected to assimilate regardless of their culture.

Although the American classroom was culturally Eurocentric, especially in expectations of behavior, academic outcomes, and curriculum (Owens & Weigel, 2018), the Eurocentric concept of education has been at odds with ethnic minority cultures (Daigle & Sundberg, 2017; Stanek, 2019). The Eurocentric education system reflects the cultural values of Caucasians and excludes other cultures in the process. This exclusionary practice sets up a "conflict between the minority students' general learning style and U.S. schools' teaching style" (Torres, 2017, p. 334). Cultural teaching and learning practices between the majority culture and minority cultures creates a disconnection for students who struggle to meet academic standards (Glocke, 2016). Students who assimilated into the Caucasian classroom culture and conformed to expectations were marginalized or accused of abandoning their culture to become more like the White majority (Ford & Harris, 1996; Fordham, 1985; Ogbu & Fordham, 1986; Pinder, 2013; Wiggan, 2007).

In the 1970s America's outlook on culture shifted and a new paradigm emerged in which ethnic cultures were embraced and celebrated (Hirschman, 1983); however, this acceptance of ethnic cultures did little to address the academic disparities between the ethnic majority and ethnic minority students. The research of the time determined that students within ethnic minority cultures had distinct learning patterns, but little changed in the manner in which these students were taught in the classroom (Anderson, 1988; Bert & Bert, 1992; Berry, 1976; Cheng, 2000; Cox & Ramirez, 1981; Griggs & Dunn, 1989; Hale-Benson, 1986; More, 1989; Ogbu, 1978; Shade, 1983; Xiao, 2006; Zhang, 2001). Some earlier researchers explored the cultural implications in education, but the published results placed responsibility for the deficits in learning on families and students and implied that the outcomes would be different if they made cultural changes (Skrentny, 2008; Small et al., 2010). McCaffery (2017) explored deficit theories and suggested that the reasons ethnic minority students struggled was the differences in cultures rather than the students' families or abilities. McCaffery noted educators found it easier to blame the deficits in learning on students rather than explore problems within the education system.

Although research supports different learning patterns for ethnic minority learners, the concern of categorizing students by culture only limited the progress of cultural learning models (Nield, 2009). Lee and Zhou (2016) stated, "Culture was the black box that social scientists were reluctant to open, and as a result, we remained silent about *how* culture matters" (p. 2405).

Decades of research have supported the idea that culture, race, and ethnicity affect learning, and a preferred learning style is embedded in culture (Anderson, 1988; Banks, 1988; Bennett, 1986; Berry, 1976; Browne, 1984; Calliou, 1998; Chiang, 2000; More, 1989; Osborne, 1985; Pepper & Henry, 1986; Reyhner, 1992; Sawyer, 1991; Swisher & Dehyle, 1987; Swisher & Pavel, 1994; Wauters et al., 1989). While the achievement gap was studied extensively, the

role culture played in the gap was largely ignored (King et al., 2018). However, the persistent gap between ethnic minority and ethnic majority students and the failure to narrow the gap between ethnic groups has generated new research on how culture has impacted learning (Hale, 2016; Hill, 2012; Holtbrugge & Mohr, 2010) and cultural learning patterns (Aronson & Laughter, 2016; Nasir & Hand, 2016/2006; Stowe, 2017; Torff, 2014).

Teaching culturally diverse students according to their preferred learning style is not without controversy. In the latter part of the 20th century, researchers began to explore the connection between culture and learning as a means to narrow the achievement gap; however, many were reluctant to link the two for fear of making generalizations about an ethnic group (Guild, 1994). Others cautioned that oversimplification of learning styles applied to a specific group would lead to stereotyping rather than to sound educational experiences (Cox & Ramirez, 1981; Nield, 2009; Mantiri, 2015).

Culture is multifaceted. Culture can refer to buildings and roads, or to specific “social norms, roles, beliefs, values, and traditions that influence the behaviors of a particular social group” (King, McInerney, & Pitliya, 2018, p. 1132). Ethnicity and culture are interrelated, although it must be understood that ethnicity does not necessarily determine culture. Desmet, Ortuno-Ortin, and Wacziarg (2017) noted, “Ethnicity is indeed associated with fundamental differences in values, attitudes, and preferences,” but there are variations in culture based on historical dispersions and political influences (p. 2511). Stating that ethnicity determines learning patterns would be an oversimplification of the issue; however, embedded in culture are factors that contribute to academic success (Bonner, 2014; Brooms, 2014; Clark et al., 2016; Jeynes, 2015; Murat & Frederic, 2015; Naik, 2013; Worrell, 2014). Evidence suggests that cultural

background, and the values embedded within culture, are more significant to the learner than the manner in which educators present lessons (Fang et al., 2016).

One of the cultural factors that has been determined to contribute to academic success of ethnic minority students is the family's religious connection. Jeynes (2015) determined that religion among Hispanic and African American students had a significant effect on the achievement gap and should be considered as a viable factor in the struggle to reduce the achievement gap. In addition, Henry et al., (2016) found schools that had partnerships with faith-based organizations saw improvement in students who were at risk for academic failure.

The cultural connection between faith/spirituality and parental involvement has also been studied. The research concerning parental involvement and its effect on student achievement is extensive (Cripps & Zyromski, 2015/2009; Froiland et al., 2012; Robbins & Searby, 2013; William & Sanchez, 2011). However, when the data were dissected further, the research indicated that faith and spirituality were connected to parental involvement, which translated into the teaching of behaviors that were foundational for academic success (Gutman & Midgley, 2000; Jeynes, 2015; Park & Bonner, 2008). Blandin (2017) found faith was a motivational factor in academic success.

Another cultural factor affecting academic success has been students' sense of belonging within the school environment (Abdollahi & Noltemeyer, 2018; Allen & Bowles, 2012; Lam et al., 2015). The need to belong to a group transcends all cultures and ethnicities. Ethnic minority students often lack a sense of connection to the ethnic majority, and academic achievement is often negatively affected, especially when the belonging factor is a result of culture or ethnicity (Hudley & Chhuon, 2012; Irving & Hudley, 2005; Walton & Cohen, 2007).

The effort to address cultural academic concerns is present in the literature. Research concerning culturally responsive classrooms (Flynn, 2018; Stowe, 2017), multicultural classrooms (Abacioglu et al., 2019), and culturally relevant education (Aronson & Laughter, 2016; Brown et al., 2019), has been launched to determine how to bridge the gap in learning between ethnic minority students and the ethnic majority.

**Cultural capital.** Cultural capital theory has its roots in the work of Bourdieu (1986). Culture is more than ethnicity. The American classroom is representative of the dominant culture, which is most often White and middle-class from which standards of thinking, believing, and behaving are derived (Lane & Tabor, 2012; Olitsky, 2015; Reyhner, 2017). Research has determined that when students' cultures are in sync with the dominant culture, they are more likely to achieve academic success (Alexander et al., 2007; Bourdieu, 1986; Lareau & Weininger, 2003; Monkman et al., 2005). Claussen and Osborne (2012) found that students who lacked cultural capital, or a different culture than that of the majority of students in the school, were more likely to have challenges while in school. When the home or group culture is significantly different from the school culture, students struggle academically (Jabbar & Mirza, 2019; Torres, 2017).

The issue becomes one of linking the school culture and home culture while respecting families' choices in parenting, socialization, and academic achievement. Differences in family structure, parenting practices, and socialization among ethnic minority families have resulted in research that has linked academic deficits to the way in which parents and students interact at home (Burchinal et al., 2011; Cuthrell et al., 2010; Henry, Plunkett & Sands, 2011; Martin, 2012). Research has shown that parenting practices are often a result of embedded cultural

practices (Pong et al., 2005); however, the presumption has been that the ethnic majority is the standard by which other ethnicities must measure success (Jimenez & Horowitz, 2013).

**Culturally responsive teaching.** Suizzo et al. (2016) found that ethnic minority students were the majority in many classrooms and noted, “Understanding the cultural beliefs of these groups is therefore essential to designing effective programs” (p. 348). As a result, ethnic minority students are best served when a culturally responsive teaching pedagogy is employed. Gay (2010) explained culturally responsive teaching as a paradigm that “filters curriculum content and teaching strategies through...cultural frames of reference to make the content more personally meaningful and easier to master” (p. 26). Mackay and Strickland (2018) determined that culturally responsive teaching was effective in teaching students who were culturally diverse.

Culturally responsive teaching validates the students’ cultures and creates a solid foundation for learning (Milner, 2016). A culturally responsive classroom will contribute to academic success for all (Siwatu et al., 2015). Additionally, creating a culturally responsive classroom has the potential to narrow, if not eliminate the achievement gap between ethnic minority and ethnic majority students (Callaway, 2017; Chu, 2011; Edwards, 2014; Frye & Vogt, 2010; Gay, 2010; Siwatu et al., 2015; Ware, 2006).

**Culturally responsive classrooms.** One of the steps necessary in creating a culturally responsive classroom requires teachers to understand the characteristics of classroom behaviors and discipline as defined by family and culture (Bondy et al., 2007; Chiu & Chow, 2011). The majority of educators in this country are Caucasian, but the classroom is increasingly diverse. The dominant culture, and subsequent expectations for behavior and academic outcomes, are not part of the classroom discussion, and students who are part of the ethnic minority may feel their

cultural values are marginalized. This is significant because research has shown that ethnic minority students are subjected to negative discipline referrals more often and with greater severity than the dominant culture (Fabelo et al., 2011; Losen & Martinez, 2013; Wallace et al., 2008).

Bonner et al. (2018) found that culturally responsive teachers understood the marginalization of ethnic minority students and the issues that stood in the way of these students receiving the same education as their ethnic majority peers. This understanding of culturally relevant pedagogy puts educators on the path where at-risk, ethnic minority students find equality in understanding cultural significance and academic achievement (Bonner et al., 2018; Brown, 2007; Gay, 2010).

A culturally responsive classroom encourages open discussions about race and culture and empowers ethnic minority students and legitimizes cultures other than Anglo-European (Green & Green, 2015; Ragoonaden & Mueller, 2017). Because culture is closely related to learning style, the legitimization of a student's culture will bring about legitimization of a way of learning that is different from the ethnic majority culture. A classroom in which all students are valued is the classroom where students succeed personally and academically.

### ***Ethnic Minorities and Cultural Learning***

African American, Native American, and Hispanic American students have been at risk for academic failure for generations (Coleman et al., 1966). Cultural differences in the classroom create diversity and broaden learning experiences for students and teachers; however, cultural differences also impede learning for students who are not of the ethnic majority culture. To properly address the learning disparities between the predominantly White culture and ethnic minorities, cultural learning patterns should be considered.



**African American students.** The history of African American education has been filled with misinformation. Early researchers believed African Americans had limited intelligence and were unable to learn (Carpenter, 1928; Du Bois, 1932; Embree, 1936; Malzber, 1956; Odum, 1913; Viteles, 1928). Terman (1916) suggested that intelligence was a result of race and had little regard for any ethnicity other than Caucasian. Challenging Terman's belief system, Thompson (1928) and Bousfield (1932) published research that dispelled the myth of "the doctrine of an inherent mental inferiority of the Negro" (Thompson, 1928, p. 208), but little changed for many years.

Overcoming the mindset of African American students' inability to learn began as an economic endeavor (Aery, 1936; Brown, 1952; Davis, 1945; Embree, 1936; Knight & Norman, 1941); however, it wasn't until the 1960s and the Civil Rights movement that real progress was realized. *Brown v. Board of Education* (1954) and the Elementary and Secondary Education Act (1965) held educators and school districts accountable for the academic outcome of all students. As equality in education began to be realized, African American students showed marked improvements yet still remained more likely than their Caucasian peers to drop out of school (NCES, 2015). As a result of the marked differences between Caucasians and African Americans, the gap in achievement became a focal point for researchers (Bloomquist, 2017; Bowman et al., 2018; Burchinal et al., 2011; Duncan & Magnuson, 2005; Gordan, 2017; Horton, 2004; Pinder, 2013; Rust, 2016).

Bowman et al., (2016) acknowledged several factors that affected the learning process for African American students and the subsequent achievement gap. One of these factors was culture, and they noted that home culture and school culture were often at odds with one another. Pinder (2013) suggested that the cultural differences between ethnic majority teachers and

African American students were likely to impede these students' academic outcomes. Conversely, cultural compatibility was more likely to encourage academic achievement (Altschul et al., 2006; Arroyo & Zigler, 1995; Chavous et al., 2003; Slaughter-Defoe et al., 1990; Spencer, 1999).

The research has provided a thorough examination of risks in the African American community, but there have been no definitive answers that have addressed the learning outcomes of at-risk African American students. These students have continued to fail to meet proficiency standards as determined by state tests. However, understanding cultural learning preferences may help mitigate the gaps in achievement between African American students and the ethnic majority. Hale (2016) determined that African American students' learning structures included clear authoritarian language, routines, performer style delivery of content, cooperative learning, and open discussions about racial differences.

**Native American students.** Native American students have also struggled to meet state academic standards of learning. Pewewardy (2002) stated, "Learning style researchers have added to understandings of how heredity, experiences, environment, linguistics, and cultural differences affect the teaching and learning of American Indian/Alaska Native students (p. 22). Native American students have a cultural values that often out of step with the traditional American classroom (Swisher & Deyhle, 1987). Research has determined that Native American students are significantly affected by an interpersonal relationship with the educator (Bondy et al., 2007; Kleinfeld, 1975). For the Native American student, a personal relationship denotes a caring adult who respects the student and is invested in academic outcomes (Kleinfeld & Nelson, 1991; Lundberg & Lowe, 2016). Failure to understand the Native American students' culture has hindered their academic success (Lundberg & Lowe, 2016).

Kleinfeld (1975) found that the ability of teachers to effectively educate Native American students rested upon their ability to establish interpersonal relationships. Bondy et al., (2007) determined that ethnic minority students responded to teachers who shared personal information and anecdotes while providing instruction. Establishing a relationship with students is a first step, and one that should be taken for every ethnicity represented in the classroom, not just Native American students. A personal relationship denotes a caring adult who respects the student and is invested in the academic outcomes of the students. This is especially true for Native American students (Kleinfeld & Nelson, 1991; Lundberg & Lowe, 2016).

To ensure success for Native American students, a respect for cultural learning must be in place for the educator. While it is understood that the typical classroom teacher cannot be all things to all people, the educator must be informed of the ways in which students in the classroom understand content and express mastery of learning. Lambe (2003) found that typical methods of teaching among Native Americans were not assumed to be “valid and appropriate for everyone” (p. 309). Rather, it was understood that learning occurred through personal relationships between the teacher and student, and what is correct is open for individual interpretation and truth. Lundberg and Lowe (2016) stated that overlooking Native American culture will hinder the academic success of Native American students.

The Native American student is more likely to embrace the cooperative learning approach rather than the typical American classroom designed around learning objectives and goals (Lambe, 2003). The Native American culture and the American classroom culture have little in common; however, the bridge between the two cultures can be a learning styles approach in the classroom. While there is no learning style that is stereotypically Native American, there are cultural learning patterns that inform the learning process (Greymorning, 2000; Klug &

Whitfield, 2002; Lopez & Bobroff, 2019; Pewewardy, 2002; Walker et al., 1989).

Sawyer (1991) stated the most common preferred learning style for the Native American student is visual learning. Native American students prefer observation, as opposed to auditory, which places the Native American student at a disadvantage (Gentry et al., 2014). Native American students prefer global learning versus analytical learning and prefer to learn holistically with personal stories and anecdotes rather than simply memorizing facts (Pewewardy, 2002). Bert and Bert (1992) stated that Native Americans learn through observation and thoughtful contemplation and “enjoy experiential learning” (p. 13).

**Hispanic students.** As with African Americans and Native Americans, Hispanic Americans are one of the ethnic minority groups in America that continue to score below the ethnic majority on state tests (Bali & Alvarez, 2003; Bankston & Caldas, 1997; Clotfelter et al., 2012; Glick & White, 2003; Hannon, 2015; Koch et al., 2016; Mickelson, 2003; Phillips & Chin, 2004; Reardon & Galindo, 2009). The disparities, as with other ethnic minorities, can be linked to poverty, attendance, school disengagement, and parental involvement in the education process.

Hispanic students represent approximately 25% of the nation’s students (U.S. Census Bureau, 2017) and it is the largest ethnic group whose children live in poverty (Balfanz & Legters, 2006; Greene & Anyon, 2010; Stuart & Hahnel, 2011; U.S. Department of Commerce, 2015). Lopez and Velasco (2011) reported that 37% of economically disadvantaged children were Latino, which is also the largest ethnic minority group at risk for dropping out of school.

Providing a quality education to these students requires an understanding of the culture and expectations from parents concerning the manner in which students are educated. Hispanic parents typically believe their job as parents is to teach respect and appropriate behaviors, and

the school's responsibility is to teach academic skills (Valdivieso & Nicolau, 1992). This cultural distinction differs from the typical ethnic majority, thereby presenting a disconnect between teacher and parent that is often mistaken for disinterest in the educational process (Valencia & Black, 2002; Zuniga, 1998).

As with other ethnic minorities, the culture of learning in the Hispanic community is different from the ethnic majority classroom. In the United States 82.7% of the teaching work force is White Non-Hispanic (U.S., 2012). The percentage of Hispanic students enrolled in public schools in 2015 was 26%. The challenge becomes how to provide a pathway for success for all students in the classroom when the teaching style and learning style are not in sync.

One of the issues in education affecting the teaching and learning of struggling students, including Hispanic students, is the perception that learning is hierarchical, and basics must be mastered before higher order concepts are introduced (Torff, 2014). Grauerholz (2001) proposed teaching the struggling learner holistically and thereby engaging the student "on many levels—emotional, physical, spiritual, and cognitive" (p. 44). Gruerholz defined holistic as a pedagogical approach that engages students in personal exploration that reaches beyond the cognitive and adds meaning to learning. This approach acknowledges and celebrates the whole student, including his/her values, emotions, background, experiences, spirituality, and interests (Bentz, 1992; Friedrichs, 1987; Jeynes, 2007; Lee, 1993; Szabo, 2015).

The learning culture for the Hispanic student includes environmental, emotional, sociological, physiological, and psychological. More specifically, Hispanic students prefer a cool environment, peer learning opportunities, kinesthetic approaches to learning, structured environments, and variety in routines (Dunn et al., 1990; Dunn et al., 1993; Ewing & Yong, 1992).

### *Learning Style and State Testing*

Ethnic minority students generally and consistently score lower than their ethnic majority peers on state mandated tests. This anomaly may be attributed to cultural learning patterns and testing bias that ignores cultural influences (Boer et al., 2018; Stevenson et al., 2016; Van de Vijver & Tanzer, 2004). Although assessing students' academic achievement is not a new concept, the assessment results have recently begun to assess more than a student's mastery of content. These test results have now begun to be used to evaluate teachers' effectiveness (Prizovskaya, 2018), to restructure schools (Jimerson, 2016), and to meet federal funding requirements (Evans, 2019).

The history of mandated testing in America, which acknowledged student achievement, dates back to 1845. Graduating students typically were given oral examinations, but the practice devolved into public displays that did little to document the accomplishments of the students (Kandel, 1936). During this time frame Horace Mann rose to prominence with his vision of education reform. One of the first steps in procuring the reformation of public schooling was to do away with oral examinations and establish written exams. "Using a common exam, he [Mann] hoped to provide objective information about the quality of teaching and learning in urban schools, monitor the quality of instruction, and compare schools and teachers within each school" (Gallagher, 2003, pp. 84-85). The results indicated gaps in student learning and a plan to remedy these gaps was set in motion that would hold teachers and administrators accountable for student learning (U.S. Congress, Office of Technology, 1992). The convenience of testing students to determine growth was appealing, and it made it easy for administrators to collect data that would guide instruction (Gallagher, 2003).

The publishing of *A Nation at Risk* (1983) caused the nation to take action in a way that

was perceived to produce the best possible outcomes. Policy makers in schools and colleges developed higher standards and state educational leaders created standardized tests that would become a part of students' lives from entrance to exit. The unintended consequences were unfair assessment of school performance, instructors teaching only what would be assessed, and resources for education attached to testing results (Diamond, 2016; Hopfenbeck, 2017).

Turnipseed and Darling-Hammond (2015) raised concerns over the effect of testing on students' educational outcomes and noted testing had tripled since the federal No Child Left Behind Act was signed into law.

The intended purpose of testing after *A Nation at Risk* (1983) was published, was to identify pedagogical practices that may have been hindering students' academic achievement; to identify failing schools and give parents a choice to find alternatives for educating students; and to provide higher standards of teaching and learning. Building on *A Nation at Risk* (1983), NCLB (now ESSA) was designed to provide accountability for teachers, administrators, and policy makers based on mandated state test results (Milner et al., 2016/2011). However, instead of looking deeper to determine the reasons students remained at risk, the policy makers stopped searching for answers and instead looked for a simple answer to a complex problem. Dodge (2009) stated, "Numbers on standardized tests seem to satisfy the public thirst for the simple and chartable" (p. 8). The non-educator's need to understand standardized testing and the connection to student achievement was a convenient parallel. The need for numbers to indicate student improvement in reading and math overshadowed the reality of students graduating high school, entering college and needing remedial coursework (Jones, 2009; Kohn, 2000; Nichols & Berliner, 2007).

Regardless of the policies that have been put in place by NCLB (ESSA), achievement in reading and math has not significantly improved, nor has the achievement gap between the ethnic majority and ethnic minorities narrowed (Harman et al., 2016).

### **Summary**

The American education system has historically promoted free and equal education for all, but in the early twentieth century it became apparent that education for ethnic minorities was inadequate. In response to the Civil Rights Act of 1964, Coleman et al. (1966) reported the “lack of availability of educational opportunities for individuals by reason of race, color, or religion” (para. 1). The Coleman Report (1966) also identified a significant learning gap between the majority Caucasian students and students who were part of the ethnic minority and brought attention to the characteristics of students who were at risk for academic failure. The report determined African Americans, Hispanics, and Native Americans were more likely to fail to meet academic standards. In the years following the report there was a surge in research that targeted learning, learning styles, and academically at-risk students (Carruthers, 1990; Dunn et al., 1990; Hanson, 1991; Honigsfeld & Dunn, 2009; Katz, 1990; Nunn, 1995). The research generated multiple theories concerning learning and learning styles, which resulted in a new pedagogy. The primary goal was to meet the academic needs of struggling students and in doing so, diminish the number of students who were failing and dropping out of school.

While the right of all Americans to receive a free and appropriate education is no longer a legal question, the fact remains that African American, Hispanic, and Native American students sit in the same classrooms as White Americans, but test scores indicate a gap in achievement. These ethnic minority, at-risk students are more likely than not to be from a low socioeconomic income family, a single parent home, have decreased parental involvement in school, and have a



history of academic failure. The challenge becomes one of mitigating the negative outcomes of situations beyond the control of the school and educators, while giving at-risk students a clear, unobstructed pathway for academic success.

Part of providing an unobstructed pathway is to narrow the achievement gap between ethnic groups of students. The narrowing of the achievement gap between the ethnic majority and ethnic minority may be as simple as developing teaching practices that are sensitive to the culture and learning styles of at-risk students. The research shows that students who are part of the ethnic majority score significantly higher on state tests than students who are part of the ethnic minority. Classrooms in which cultural and learning styles have been embraced have proven to be effective for ethnic minority students (Irvine, 1990; Smith, 1998; Teach for America, 2011). The logical assumption is that if at-risk students are to be properly educated and state test scores improved, then classroom teaching strategies must include a learning styles approach for all students, and specifically for ethnic minority students. The process by which educators decrease the number of ethnic minority students dropping out of school should begin with an approach to teaching that includes culturally relevant learning styles.

## CHAPTER THREE: METHODS

### Overview

The purpose of this quantitative, casual comparative study was to determine the difference among annual Northwest Evaluation Association (NWEA) Measures of Academic Progress (MAP) Growth assessment in mathematics and English/language arts test scores of at-risk students who have visual, auditory, read/write or kinesthetic (VARK) learning styles. In this chapter, the research design, research questions and hypotheses, participants, and setting are discussed. The instrumentation used in the study, the NWEA MAP Growth assessment and VARK, are described. Finally, procedures and data analysis are discussed.

### Design

A quantitative, causal comparative nonexperimental design was used in this study. Causal-comparative, nonexperimental research, also known as *ex post facto* research, “rel[ies] on observation of relationships between naturally occurring variations in the presumed independent and dependent variables” (Gall et al., 2007, p. 306). This design was chosen to allow the researcher to determine cause-and-effect relationships between ethnic minority, at-risk, sixth-, seventh-, and eighth-grade students’ state test scores in math and English language arts (ELA) and their preferred learning styles. A nonexperimental design was determined the most appropriate design because the independent variable, and the categories which make up the independent variable, are constant and cannot be manipulated (Gall et al., 2007).

The independent variable in this study is the learning styles of students as determined by the VARK questionnaire. Learning styles are defined as a preferred way of learning (Jones & Blankenship, 2018; Romanelli et al., 2009). The Fleming model of learning theorizes learners prefer one of four modalities. Visual (V) learners learn best through maps, graphs, diagrams, and

charts. Aural/auditory (A) learners prefer lectures, group discussions, and talking things through. Read/write (R) learners prefer information displayed in text, reports, essays, and written assignments. Kinesthetic (K) learners prefer multiple sensory, experiential learning or hands-on learning (Fleming, 1995/2001). The dependent variables are academic achievement, defined as academic performance in mathematics and English/language arts and were measured by the NWEA Measure of Academic Progress (MAP) Growth assessment. The NWEA MAP Growth assessment measures academic growth and proficiency levels in math and English language arts. The tests are aligned to Common Core Standards (NWEA, 2018).

### **Research Questions**

**RQ1:** How can end-of-year mathematics achievement results, as measured by NWEA, among ethnic minority, at-risk sixth-, seventh-, and eighth-grade students given their various learning styles, as measured by the VARK questionnaire be improved?

**RQ2:** How can end-of-year English/language arts achievement results, as measured by NWEA, among ethnic minority, at-risk sixth-, seventh- and eighth-grade students given their various learning styles, as measured by the VARK questionnaire be improved?

### **Participants and Setting**

The participants for the study were drawn from a convenience sample of at-risk students of ethnic minorities in a school district located in the central part of the state during the spring semester of the 2020-2021 school year. The sample size needed for this study was 150 sixth-, seventh- and eighth-grade, at-risk students of ethnic minorities. According to Gall et al. (2007), this number exceeds the required minimum, assuming a medium effect size with alpha at .05. The number of participants needed for ANOVA with four groups is 144.

Meeting the requirements for medium statistical effect presented a challenge for the researcher because of the number of rural schools in the state. The state department of education has six types of governance structures, which allows for schools of fewer than 50 students to operate as independent school districts in rural areas.

In addition to the small school districts, the high percentage of Caucasian students and the few ethnic minority students represented in the state, proved to be a challenge. As a result, the researcher contacted the superintendent for Native American students represented in the state. My request to conduct research was denied.

After the denial from the department of Indian Education, initial contact was made with the superintendents of school districts with a larger ethnic minority population. The superintendents left the decision to participate in the research with the principals of the individual schools. Most principals refused to participate, citing pandemic fatigue, reluctance to participate in any ethnic related study, or the researcher was unknown to the district in which the school was located. Eventually, one school district agreed to allow the research to take place after IRB approval.

Working with the superintendent, school principal and/or designees, NWEA data from the 2020-2021 school year were accessed. Students of an ethnic minority in this study were African American, Native American, Hispanic American, Middle-Eastern, Asian, African, Portuguese, Somali, and French. Students who identified as two or more races were included in the data as well. All students who were in sixth, seventh and eighth grade during the 2020-2021 school year were included in the initial recruitment process. The principal of the school worked with the researcher to present the study to the student body. Students were then recruited by email and/or United States Postal Service requesting participation in the study. Only students

who met the requirements of at-risk sixth-, seventh- or eighth-grade students of an ethnic minority were included in the final study. Students were identified through school records. In addition to ethnicity, at-risk status identifiers were low socioeconomic status as determined by free and/or reduced lunch application, chronic absenteeism, including out of school suspensions as determined by school discipline records.

The middle school in which the study took place houses seventh- and eighth-grade students. Students in the sixth grade during the 2020-2021 school year were included in this study because they were in the seventh grade during the data collection process and part of the target school's current student population. The data indicated that during the 2020-2021 school year there were 386 sixth-grade students, 377 seventh-grade students and 381 eighth-grade students in the Jordan School District.

Research has shown students who are identified as having low socioeconomic status, chronic absenteeism, and ethnic minority status are statistically more likely to drop out of school than students who are a part of the ethnic majority, have higher socioeconomic status, and attend school regularly (Hair et al., 2006; Lawson et al., 2017; Martinez et al., 2016).

The Jordan County School District (pseudonym) chosen for the study has one middle school. Sixth-grade students who participated in the study attended one of the six elementary schools before attending Palow Middle School (pseudonym).

The Jordan County School District is located in the central part of a northeastern state. The Jordan County School District demographics during the 2020-2021 school year indicated 50.5% Caucasian, 38.7% African American, 6.3% two or more races, 3.0% Hispanic, 0.8% Asian, 0.3% Native American, and 0.4% Pacific Islander. Socioeconomic status criteria indicated

65.7% of the students were economically disadvantaged. Forty-nine percent of the students were female and 51% were male (State Department of Education, ESSA Report Card, 2020-2021).

Discipline referrals in the Jordan County School District mirrored the research concerning discipline referrals for ethnic minorities (Fabelo et al., 2011; Gregory et al., 2016; Losen & Martinez, 2013). Suspensions by ethnicity were as follows: 26.2% of students who identify as two or more races, 40.8% of Hispanic students, and 19% of African American students. Chronic absenteeism also mirrored the research concerning at-risk ethnic minority students (Gottfried, 2019; Tobin, 2016). During the 2020-2021 school year 48% of students in the district were chronically absent. Of the 48% of students who were chronically absent, 58.1% were economically disadvantaged (State Department of Education, ESSA Dashboard, 2020-2021). Absenteeism by ethnicity was suppressed. If the number of students in a particular category is five or fewer, these data are suppressed.

The 2018-2019 school year was the last recorded testing period for all students throughout the state prior to the pandemic. These assessment scores for all sixth-, seventh-, and eighth-grade students in Jordan County School District determined that 67.6 % of all students were below state standards of proficiency in English Language Arts. The score results in mathematics determined that 81% of all students were below state proficiency standards. Eighty-four percent of African American students tested below proficiency standards on the state assessment for English Language Arts and 91% tested below proficiency standards in math. Data for other ethnicities were suppressed due to lower numbers of each ethnicity and the possibility of student identification. Approximately 75.5% of economically disadvantaged students scored below proficiency standards in ELA. These same students scored 87% below state proficiency standards in math (State Department of Education, ESSA Dashboard, 2019).

Post pandemic assessments were conducted during the 2020-2021 school year by NWEA MAP Growth. The results of those assessments indicated 26.2% of Palow Middle School students were below state standards of proficiency in English Language Arts. The results in mathematics indicated 36.1% of all students were below proficiency standards. At the state level, 15% of students were below expectation in English Language Arts and 18.7% of students were below expectations in mathematics (State Department of Education, ESSA Dashboard, 2021).

Participants in the research included 78% African American and 22% two or more races. There were no Native American, Asian, Hispanic or Caucasian students who agreed to participate in the research.

These assessment results reflected the data from research that has suggested students who are part of the ethnic minority, chronically absent, or live in poverty are more likely to have low academic achievement (Allen et al., 2018).

With the cooperation of the Jordan County School District superintendent's office, and at the request of the researcher, all sixth-, seventh- and eighth-grade students' demographic information, students' NWEA scores, and attendance/discipline records were provided to the researcher.

After the researcher received the student data, it was reviewed and organized. Student data that indicated an ethnic minority and/or low socioeconomic status, and chronic absenteeism, including suspensions, were retained for analysis. Students were considered at risk as a result of low socioeconomic status (Lawson et al., 2017; McLaughlin et al., 2014; Paschall et al., 2017), chronic absenteeism, including suspensions (Balkis et al., 2016; Fabelo et al., 2011; Losen & Martinez, 2013; Wallace et al., 2008), and ethnicity (Cao & Maloney, 2018; Lopez & Velasco,

2011; Walton & Cohen, 2007). Student demographic data that did not reflect at-risk identifiers were disregarded for the purposes of this research.

### **Instrumentation**

Instruments used in any research must have proven reliability and validity. Validity refers to “the appropriateness, meaningfulness, and usefulness of specific inferences made from test scores” (Gall et al., 2007, p. 151). Reliability refers to the “degree of consistency with which it measures whatever it is measuring” (Ary et al., 2006, p. 254). To meet the standard of reliability, testing instruments should have a score of .80 or higher. Cronbach’s alpha is commonly used to evaluate the strength of an instrument used in educational research (Cronbach, 1951; Cronbach & Shavelson, 2004). Acceptable size is an alpha of .65-.80 (Green et al., 1977; Vaske, 2008; Vaske et al., 2017). Rasch analysis is another form of instrument analysis in which “researchers think in more sophisticated ways with respect to the constructs (variables) they wish to measure” (Boone, 2016, p. 1).

### ***NWEA MAP Growth***

This study utilized results from NWEA MAP Growth assessments in English Language Arts and mathematics. MAP Growth assessments are adaptive tests that measure student academic achievement in ELA, mathematics and science. The assessments are untimed and may be given to students up to four times a year. Each test takes approximately 60 minutes to complete (NWEA, 2019). The MAP Growth assessment score is calculated using the Rasch unit (RIT) scale. “The RIT scale allows for the measurement of within and between year growth in student learning” (He & Meyer, 2021, p.8).



## ***Reliability***

NWEA Map Growth assessments have been tested for reliability by ensuring the tests administered to the same students twice will have the same results, two equivalent forms of the test have the same results, and test items measure the test's construct consistently. The MAP Growth assessment also includes decision consistency in determining reliability. Decision consistency focuses on using the test as a tool for making educational decisions (NWEA, 2019).

In order to determine reliability of NWEA MAP Growth assessment the tests were examined by measuring test-retest reliability, marginal reliability, and score precision. Test-retest reliability is important because it demonstrates test consistency over time. NWEA (2019) reported test-retest reliability for reading from winter to spring as follows: grade 6 (0.859), grade 7 (0.856), and grade 8 (0.851). Language usage test-retest reliability was: grade 6 (0.871), grade 7 (0.868), and grade 8 (0.874), and mathematics test-retest reliability was: grade 6 (0.908), grade 7 (0.917), grade 8 (0.920); (NWEA, 2019).

Marginal Reliability or internal consistency measures how well similar test items yield similar results. "Tests are considered of sound reliability when their marginal reliability coefficients range from 0.80 and above" (NWEA, 2019, p. 85). Marginal reliability scores in reading were: grade 6 (0.957), grade 7 (0.957) and grade 8 (0.957). Language usage marginal reliability scores were 0.961 (grade 6), 0.961 (grade 7), and 0.960 (grade 8). Mathematics marginal reliability scores were 0.970 (grade 6), 0.974 (grade 7), 0.976 (grade 8; (NWEA, 2019, p. 86).

Score precision is another measure NWEA uses to determine reliability. "Score precision of MAP Growth scores is measured by the standard error of measurement (SEM), a function of

the relationship among item parameters, the ability of the student, and the number of items administered” (NWEA, 2019, p. 88). Standard error of measurement is related to reliability because it demonstrates how repeated assessments of a student are distributed around the student’s true score.

### ***Validity***

Validity criteria for the NWEA MAP Growth assessment “involves multiple sources including test content, internal structure, and relations to other variables” (NWEA, 2019).

Validity of the NWEA MAP Growth assessment answers the questions to what extent does the content of the assessment match the content area to be assessed (content validity); do the scores from the assessment predict student performance on other assessments of the same content area (concurrent and predictive validity); are the scores generalizable and fit the pattern of relations that we would expect among these constructs (construct validity); can the scores from the assessment be used to make decisions concerning test takes (consequential validity); and do the scores reflect students capabilities within the content area (individual score validity)?

The validity of test content was reviewed internally by NWEA and externally by EdMetric (Egan & Davidson, 2017). “The results showed the MAP Growth assessments have good alignment in terms of categorical concurrence, cognitive complexity, and a range and balance of knowledge” (NWEA, 2019, p. 93).

In addition to test content, NWEA MAP Growth assessments have concurrent validity with several state mandated tests. The average concurrent validity scores in reading are as follows: grade 6 (0.79), grade 7 (0.79), and grade 8 (0.78). Mathematics concurrent validity scores were as follows: grade 6 (0.84), grade 7 (0.84), and grade 8 (0.83).

**Scoring NWEA.** NWEA MAP Growth assessments measure student progress using the Rasch Unit (RIT) scale. The RIT scale was developed based on item response theory, which considers the relationship between student achievement and item characteristics.

### ***VARK***

In addition to the NWEAs, the VARK was used to determine students' preferred learning style. The VARK questionnaire was developed to provide a systematic approach for "learners, teachers, employers, trainers, employees, and others to use when communicating" (Fleming & Bonwell, 2019, Overview). The VARK is intended to guide learners in determining learning preferences for the purpose of facilitating the discussion about learning and thereby removing roadblocks to academic success. VARK is "focused on the different ways that learners *take in* and *give out* or *express* information" (p. 1). The modalities of VARK reflect singular or multimodal learning preferences. Fleming and Bonwell (2019) stated, "All the possible combinations of V, A, R, and K are part of having *Multimodal* preferences" (p. 1). Fleming and Bonwell found approximately 64% of adults taking the VARK are multimodal (p. 5).

The VARK Questionnaire, the VARK Questionnaire for Younger People, the VARK Questionnaire for Athletes, and the VARK Questionnaire for Educators/Trainers (8.01 version) are available online and as a paper/pencil test. All versions of the test have 16 questions based on the four learning modalities: Visual, Aural, Read/write, and Kinesthetic. Each question has four possible answers that present a variety of experiences associated with learning and communication. Participants may choose more than one option for each question (VARK fact sheet, Training Kit, 2019). The VARK Questionnaire for Younger People was used for this study. The questionnaire takes less than 30 minutes for each participant to complete.

While used mostly in education, the VARK has been used across disciplines including economics (Leung et al., 2014), medicine (Liew et al., 2015), biomechanics (Hsieh et al., 2012), maritime business (Kalkan, 2008), business (Fitkov-Norris & Yeghiazarian, 2013), and biology (Breckler et al., 2011). Leite et al. (2010) determined the VARK reliability by using correlated trait-correlated uniqueness model (CTCU) rather than Cronbach's alpha because Cronbach's alpha would underestimate reliability (p. 333). The reliability estimates using the CTCU model for each of the VARK subscales were 0.85, 0.82, 0.84, and 0.77 for visual, aural, read/write, and kinesthetic respectively (p. 334). With scores of 0.77-0.84, the VARK meets the standard of reliability (Miller, 2019, p. 1). Leite et al. also stated, "The preliminary evidence of validity of the VARK scores with respect to dimensionality and reliability found in the current study support the use of VARK as a low-stakes diagnostic tool by students and teachers" (p. 336). In addition, The VARK is user friendly. It is easy to administer, scores are quickly attained, easily understood, and it is not overwhelming for students.

The researcher contacted VARK Learn, Limited and obtained permission to use copyrighted materials (See Appendix A for approval). After permission to use the VARK was obtained, the VARK online subscription to administer the student questionnaire was purchased (see Appendix B for subscription status). The researcher submitted the IRB application and subsequently obtained approval to conduct research (see Appendix C for IRB approval).

### **Procedures**

Prior to submitting the application to Liberty University Institutional Review Board (IRB), the researcher contacted the superintendent of the target school district to determine willingness to participate in the study. Upon IRB approval the researcher contacted the participating school district's office and acquired official approval from the school district (See

Appendix D). After receiving written approval from the participating school district, the researcher contacted district representatives to initiate recruitment procedures.

To protect students' privacy, contact with students and parents/guardians was made through the school district office and followed existing protocols. The researcher did not have direct contact with any student. The recruitment procedures included forwarding documents to the participants' parents/guardians via email and U.S. Postal Service to obtain informed consent (See Appendix E). Information about the study, a timeline for completion, and step-by-step instructions were forwarded to the school's administrator, who then emailed the documents to the students through the district's secure server (See Appendix F). Students were directed to the researcher's VARK subscription site to complete the VARK questionnaire. If students did not have access to email, a hard copy was mailed via U.S. Postal Service with a stamped return envelope in which to place the completed questionnaire.

To accommodate concerns related to COVID, the researcher also developed a website for teachers and parents to access information about the research study. The information on the website included a video explanation of the study. The website also included individual pages for each home language represented in the district. Each page included the parent/student consent form, recruitment letter, and an introduction letter written in the students' home languages.

Included in the information about the study, students were offered an incentive for participation. Research has shown when offered an incentive, participants are more likely to complete the required information (Kelly et al., 2017; Kropf & Blair, 2005; Singer & Ye, 2013). Therefore, the researcher offered students the opportunity to have their names placed in a drawing for a \$50 gift card from a local business of their choice. The superintendent of the

school district, or his designee, drew the names for the raffle. This procedure ensured anonymity for students and objectivity for the researcher.

Working with the target school's liaison, participants were directed to the researcher's online subscription site to complete the questionnaire. Once the questionnaires were completed, the data were analyzed in cooperation with VARK-Learn, Limited. The algorithm used by VARK is statistically-based using means and standard deviations specifically designed for research (Fleming, Training Kit, Scoring Trial, 2009).

As students completed the questionnaire, the researcher began to review and organize the information. The questionnaires were reviewed for completion and for criteria that determined at-risk status, including free/reduced lunch, absenteeism, and ethnicity. The process continued until the minimum number of samples for medium effect size was reached. In this research study the minimum number was 144 participants. The students' names were eliminated from the completed research in order to protect anonymity.

After students completed the VARK questionnaire for Younger People, the results were matched to students' NWEA scores, and differences between the four groups were determined. The data were entered into SPSS 28 using numerical codes. The coding process was guided by research that has determined common characteristics among at-risk student. These common characteristics include socioeconomic status as reported in free/reduced lunch applications, absenteeism, ethnicity, and learning style. Each characteristic was given a numerical code and entered into SPSS 28. The first variable, socioeconomic status, was defined as free/reduced (0) and full pay (1). Absenteeism was coded as chronic absenteeism as determined by the state education agency, which is more than 10% of the school year, (0), and acceptable attendance as determined by the state education agency less than 10% of the school year (1). Ethnicity of

students was coded as African American (0), Caucasian (1), Hispanic (2), Native American (3), and two or more races (4). Learning style descriptors were coded as Visual (0), Aural (1), Read/Write (2), Kinesthetic (3), two modalities (4), three modalities (5) and all four modalities (6).

### **Data Analysis**

The data were analyzed using two, one-way ANOVAs. ANOVA is used when a researcher is interested in examining the difference in dependent variable values, which are measured on a continuous scale, among independent variable categorical groups. ANOVAs were appropriate for this study because the independent variable is categorical and the dependent variables are continuous, measured on an interval scale. Additionally, the researcher was interested in determining if there is a difference in the dependent variables among the categorical groups of the independent variable.

The independent variable in this study was the learning styles of students as determined by the VARK questionnaire (i.e., visual, aural, read/write, and kinesthetic). The dependent variables in this study were the academic achievement results in mathematics and ELA as indicated on the NWEA. As required in ANOVA analysis, these data are continuous and were measured using an interval scale. Gall et al. (2007) determined most educational testing instruments use an interval scale for the purpose of statistical analysis, which aids in the understanding of the data.

Prior to conducting data analysis, the researcher screened the data for missing or inconsistent data. The data were also screened for extreme outliers using a box-and-whisker plot for each dependent variable. A box and whisker plot is a visual representation of the spread of the scores (Salmond, 2007).

Next, assumption tests for ANOVA were conducted. First, the assumption of normality was examined. Assumption of normality presumes a normal distribution of scores of the dependent variables within the four learning style groups and thereby minimizes opportunity for bias (Verma & Abdel-Salam, 2019). Normality was assessed using the Kolmogorov-Smirnov test. The second assumption was equality of variance, which assumes “the variances of the dependent variable are the same for all populations” (Green & Salkind, 2014, p. 164). Levene’s test for equality of variance was used. The researcher used statistics computer software SPSS 28 to test for normality and equality of variances.

After the data met the assumptions, the researcher conducted the ANOVA analysis. Effect size, which is “an estimate of the magnitude of the difference, relationship, or effect in the population being studied” was measured using Eta squared (Gall, et al., 2007, p. 143). Since two one-way ANOVAs were conducted, a Bonferroni correction was needed to guard against Type I error. The alpha level was calculated to be:  $0.05/2 = .025$ , rounded to .03 (Warner, 2013). An alpha level of  $\alpha = .03$  was chosen to determine statistical significance. This alpha level was chosen because it indicates a 97% confidence level that the results were not due to chance. If the ANOVA test had been significant, a post-hoc Tukey test would have been run to determine which group’s dependent variable means were significantly different.



## CHAPTER FOUR: FINDINGS

### Overview

The purpose of this quantitative, casual comparative study was to determine the difference among annual Northwest Evaluation Association (NWEA) Measures of Academic Progress (MAP) Growth assessment in mathematics and English/language arts test scores of at-risk students who have visual, auditory, read/write, or kinesthetic (VARK) learning styles. The dependent variables in this study were academic achievement results in mathematics and English/language arts as indicated on the Northwest Evaluation Association (NWEA) Measures of Academic Progress (MAP). A one-way analysis of variance (ANOVA) was used to test the statistical significance of the data. This chapter discusses the research questions, data screening, descriptive statistics, assumption testing, and results.

### Research Questions

**RQ1:** How can end-of year-mathematics achievement results, as measured by NWEA, among ethnic minority, at-risk sixth-, seventh-, and eighth-grade students given their various learning styles, as measured by the VARK questionnaire be improved?

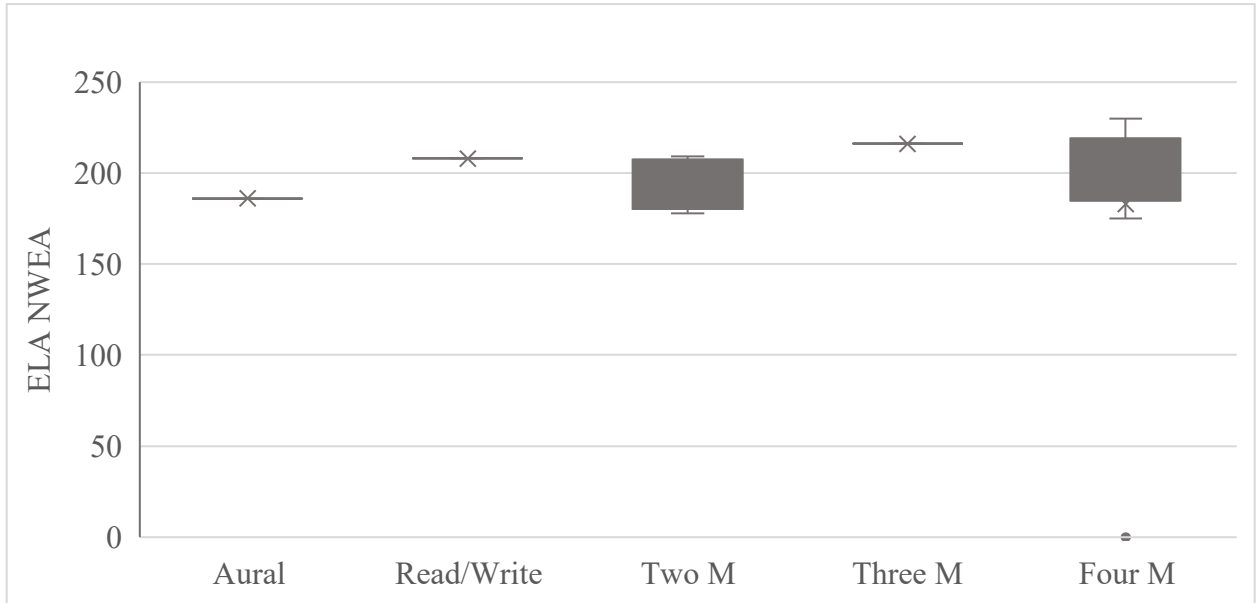
**RQ2:** How can end-of-year English/language arts achievement results, as measured by NWEA, among ethnic minority, at-risk sixth-, seventh- and eighth-grade students given their various learning styles, as measured by the VARK questionnaire be improved?

### Data Screening

Data screening was conducted on each dependent variable. The researcher sorted the data on each variable and scanned for inconsistencies. No data errors or inconsistencies were identified. Box and whisker plots were used to detect outliers on each dependent variable. One outlier was identified (See Figures 1 and 2 for box and whisker plots).

**Figure 1**

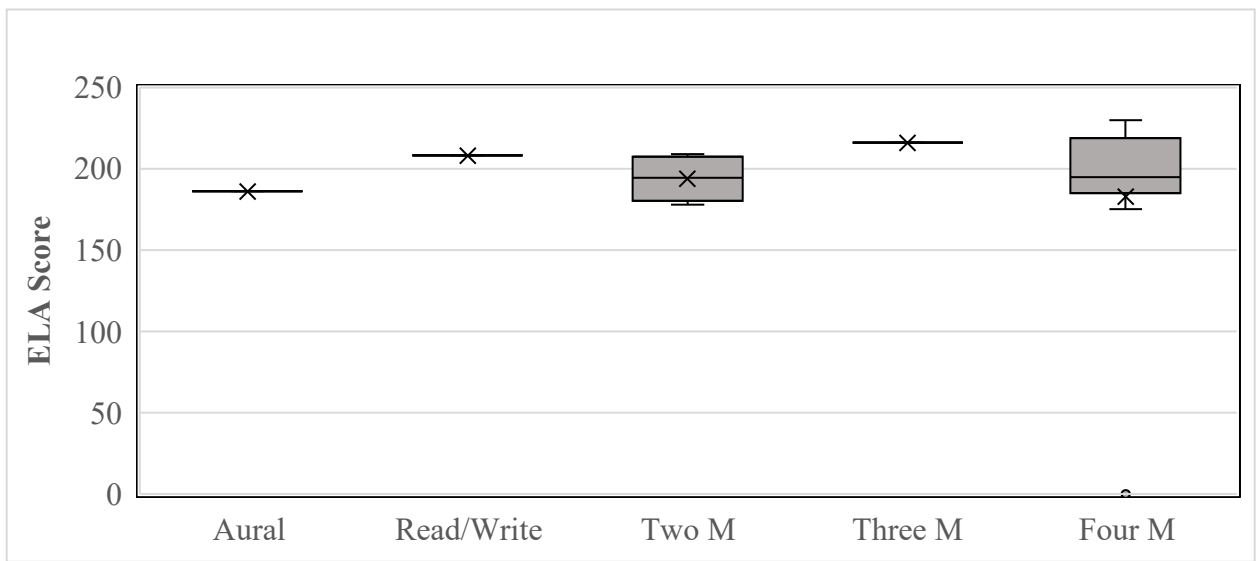
*NWEA ELA Scores/Learning Styles, Box and Whisker Plot*



*Note.* Four modalities were tested: Aural, kinesthetic, read/write, and visual. Only two modalities surfaced in the box and whisker plot. M represents modality.

**Figure 2**

*NWEA Math Scores/Learning Style, Box and Whisker Plots*



*Note.* Four modalities were tested: Aural, kinesthetic, read/write, and visual. Only two modalities surfaced in the box and whisker plot. M represents modality.

### Descriptive Statistics

Descriptive statistics were obtained on the dependent variable for each group. The sample consisted of 18 participants. Scores on the NWEA math and ELA MAP Growth assessments ranged from 0-256. Descriptive statistics for math and ELA may be found in Tables 1 and 2.

**Table 1**

#### *Descriptive Statistics Math*

	Learning Style	<i>n</i>	Minimum	Maximum	Mean	Std. Deviation
Aural	Math Score	1	182	182	182.00	.
	Valid N (listwise)	1				
Read/Write	Math Score	1	210	210	210.00	.
	Valid N (listwise)	1				
Two M	Math Score	4	189	213	199.25	10.404
	Valid N (listwise)	4				
Three M	Math Score	1	189	189	189.00	.
	Valid N (listwise)	1				
Four M	Math Score	11	174	223	201.91	17.155
	Valid N (listwise)	11				

**Table 2**

#### *Descriptive Statistics ELA*

	Learning Style	<i>n</i>	Minimum	Maximum	Mean	Std. Deviation
Aural	ELA NWEA	1	186	186	186.00	.
	Valid N (listwise)	1				
Read/Write	ELA NWEA	1	208	208	208.00	.
	Valid N (listwise)	1				
Two M	ELA NWEA	4	178	209	194.00	14.071
	Valid N (listwise)	4				
Three M	ELA NWEA	1	216	216	216.00	.

	Valid N (listwise)	1				
Four M	ELA NWEA	11	0	230	183.00	62.933
	Valid N (listwise)	11				

## Results

**Research Question One:** How can end-of-year mathematics achievement results, as measured by NWEA, among ethnic minority, at-risk sixth-, seventh-, and eighth-grade students given their various learning styles, as measured by the VARK questionnaire be improved?

### *Assumption Testing*

The ANOVA requires that the assumption of normality be met for each research question. Normality for NWEA mathematics was examined using Shapiro-Wilks. The assumption of normality was met (See Table 3 for tests of normality).

### *Table 3 NWEA Scores*

#### *Tests of Normality Math*

Learning Style		Kolmogorov-Smirnov <sup>c</sup>			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Math Score	Two M	.193	4	.	.960	4	.780
	Four M	.204	11	.200*	.921	11	.323

\*. This is a lower bound of the true significance.

a. Math Score is constant when Learning Style = Aural, Read/Write, Three M. These have been omitted.

c. Lilliefors Significance Correction

### *Assumption of Homogeneity of Variance*

The ANOVA requires that the assumption of homogeneity of variance be met. The assumption of homogeneity of variance was examined using the Levene's test. The assumption of homogeneity of variance was met where ( $p = .22$ ) See Table 4 for Levene's Test of Equality of Error Variance for Mathematics

**Table 4 NWEA Scores***Levene's Test of Equality of Error Variance Math Score*

		Levene			
		Statistic	df1	df2	Sig.
Math Score	Based on Mean	1.600	1	13	.228
	Based on Median	1.481	1	13	.245
	Based on Median and with adjusted <i>df</i>	1.481	1	11.890	.247
	Based on trimmed mean	1.634	1	13	.224

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Dependent variable: Math Score

b. Design: Intercept + Learning Style

**Research Question Two:** How can end-of-year English/language arts achievement results, as measured by NWEA, among ethnic minority, at-risk sixth-, seventh- and eighth-grade students given their various learning styles, as measured by the VARK questionnaire be improved?

**Assumption Testing**

The ANOVA requires that the assumption of normality be met for research question two. Normality was examined using Shapiro-Wilks. The assumption of normality was met (See Table 5 for test of normality for ELA).

**Table 5 NWEA Scores***Tests of Normality ELA*

		Kolmogorov-Smirnov <sup>c</sup>			Shapiro-Wilk		
Learning Style		Statistic	df	Sig.	Statistic	df	Sig.
ELA	Two M	.215	4	.	.954	4	.739
NWEA	Four M	.359	11	<.001	.601	11	<.001

- a. ELA NWEA is constant when Learning Style = Aural, Read/Write, Three M. These have been omitted.
- c. Lilliefors Significance Correction

### ***Assumption of Homogeneity of Variance***

The ANOVA requires that the assumption of homogeneity of variance be met for research question two. The assumption of homogeneity of variance was examined using the Levene's test. The assumption of homogeneity of variance was met where ( $p = .22$ ) See Table 6 for Levene's Test of Equality of Error Variance.

***Table 6 NWEA Scores***

*Levene's test of Equality of Error Variance ELA Score*

		Levene			
		Statistic	<i>df</i> 1	<i>df</i> 2	Sig.
ELA	Based on Mean	.779	1	13	.393
	Based on Median	.407	1	13	.535
	Based on Median and with adjusted <i>df</i>	.407	1	10.042	.538
	Based on trimmed mean	.483	1	13	.499

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

- a. Dependent variable: ELA
- b. Design: Intercept + Learning Style

An ANOVA was run for each dependent variable to determine if there was a significant difference in NWEA MAP Growth assessments in math and ELA and students' preferred learning styles. The independent variable was VARK learning styles and the dependent variables were math and ELA scores on the NWEA MAP Growth assessments. After running the ANOVA to determine effect size the researcher failed to find a statistical difference in NWEA math and ELA scores and students' preferred learning styles. See Table 7 for Tests of Between Subject Effects for math and Table 8 for Tests of Between Subject Effects for ELA.

**Table 7***NWEA Math Scores, Tests of Between-Subjects Effects*

Source	Type III Sum of Squares	<i>df</i>	Mean Square	<i>F</i>	Sig.	Partial Eta Squared
Corrected Model	587.285 <sup>a</sup>	4	146.821	.584	.680	.152
Intercept	288734.729	1	288734.729	1148.697	<.001	.989
Learning Style	587.285	4	146.821	.584	.680	.152
Error	3267.659	13	251.358			

Note. Dependent variable-math score.

**Table 8***NWEA ELA Scores, Tests of Between-Subjects Effects*

Dependent Variable: ELA NWEA

Source	Type III Sum of Squares	<i>df</i>	Mean Square	<i>F</i>	Sig.	Partial Eta Squared
Corrected Model	1594.500 <sup>a</sup>	4	398.625	.129	.969	.038
Intercept	291588.000	1	291588.000	94.295	<.001	.879
Learning Style	1594.500	4	398.625	.129	.969	.038
Error	40200.000	13	3092.308			
Total	683639.000	18				
Corrected Total	41794.500	17				

a. R Squared = .038 (Adjusted R Squared = -.258)

Note. Dependent variable-ELA score.

## **CHAPTER FIVE: RECOMMENDATIONS**

### **Overview**

The purpose of this quantitative, casual comparative study was to determine the difference among annual Northwest Evaluation Association (NWEA) Measures of Academic Progress (MAP) Growth assessment in mathematics and English/language arts test scores of at-risk students who have visual, auditory, read/write, or kinesthetic (VARK) learning styles. The participants for the study were drawn from a convenience sample of at-risk students of ethnic minorities in a school district located in the central part of the state during the spring semester of the 2020-2021 school year. The problem is the lack of research investigating the differences in at-risk students' mathematics and English/language arts achievement scores on state assessments across preferred learning styles. Chapter Five presents recommendations to improve educational practices for students who are at risk for academic failure by addressing the questions of how math and ELA scores can be improved among at-risk students. The chapter concludes with a summary of the proposed recommendations.

### **Recommendations**

#### **Recommendation One**

Although the data for this research study did not show that a preferred learning style affected student math and ELA scores, research has determined that culturally sensitive classrooms do affect academic outcomes. As a result, the researcher recommends developing professional training modules to increase educators' awareness, knowledge and skills of ethnic minority students' cultural learning patterns. Ethnic minority students are more at risk for academic failure than their Caucasian peers (Martinez-Fernandez et al., 2019). Research has determined that geographical regions have learning patterns that are specific to the culture



surrounding the region (Bozkurt et al., 2018; Che et al., 2016; Guo & Reinecke, 2014; Kizilcec, et al, 2013).

Traditional educational practice has been to assimilate ethnic minority students into the mainstream majority culture. With the growing number of ethnically diverse students in the classroom, educators have embraced inclusion practices that proclaimed color blindness as a positive attribute denoting equality in education (Schachner, 2017). This practice is based on Allport's (1954) study that proposed that contact between different cultures reduces prejudice, as long as the groups have equal standing within the group and share common goals.

The results of this educational practice of inclusion encourages friendships across ethnicities, decreases prejudices and discrimination, but also creates a stronger connection to the dominant culture (Schwarzenhan et al., 2018). While the practice may help non-dominant culture students become more like the dominant culture, the unintended outcome is a devaluing of the student's home culture and as a result, the diminishing of cultural learning patterns. The minimizing of home culture and the way in which an ethnic minority student has learned to learn decreases the opportunity for academic success within the majority culture domain.

The researcher has proposed that cultural learning patterns for ethnic minority students may conflict with the majority culture's learning patterns and contributes to ethnic minority students failing to thrive academically. One of the goals of this research study was to develop a better understanding of multiculturalism in the classroom for the purpose of narrowing the achievement gap and increasing academic performance. To accomplish this goal, purposeful training of educators must be organized and implemented. Topics for professional training should include the following:

- Define multiculturalism (culture is not only about ethnicity).
- Address personal biases.
- Define and explore cultural learning patterns.
- Determine how individual cultures represented in the local school celebrate learning.

The benefits of educators learning about multiculturalism include increased acceptance of the minority cultures represented in the classrooms and increased acceptance of alternative learning methods.

### **Recommendation Two**

The number of participants in this study was not statistically significant, but the data collected from participants concerning absences mirrored the research concerning chronic absenteeism and academic failure (Lawson et al., 2017; Martinez et al., 2016 ). Addressing chronic absenteeism through a multi-tiered system of support (MTSS) is recommended as a means to improve math and ELA scores of at-risk students.

Sixty-seven percent of the participants in this study were chronically absent. Chronic absenteeism is defined as missing 10% or more of the required number of days in a school district (Gottfried, 2019; U.S. Department of Education Chronic Absenteeism, 2015). Research has determined that students who are of an ethnic minority or low socioeconomic status are more likely to be chronically absent from school (Chang et al., 2018) and are at risk for academic failure and dropping out of school (Gubbels et al., 2019; Hair et al., 2006; Lawson et al., 2017; and Martinez et al., 2016).

The reasons for chronic absenteeism include student disengagement in learning, safety concerns, peer relationships, avoidance of academic tasks, illness, caring for a family member, mental or emotional issues, or homelessness (Davis et al., 2019; and Eklund et al., 2022).

Chronic absenteeism is complicated, in that it involves students, students' families, communities, and the school environment (Conry & Richards, 2018; Kim & Gentle-Genitty, 2020). Most of the research has focused on the individual student and the behaviors that prevent regular school attendance (Childs & Grooms, 2018; Childs & Lofton, 2021; and Gee, 2018); however, parental beliefs about attendance also has a significant impact on students and their presence at school (Robinson et al., 2018; Smythe-Leistico & Page, 2018; Susman-Stillman et al., 2018).

Research on school-wide support as a framework for addressing attendance concerns has increased since the passage of *Every Student Succeeds Act of 2015* (PL 114-95, 2015). ESSA requires the reporting of chronic absenteeism and in turn provides federal funds to address the issues that affect student failure to attend school. This framework is a multi-tiered approach to issues that affect behaviors that affect chronic absenteeism and includes establishing school-wide expectations, use of evidence-based decision making, and parent engagement (Bastable, et al., 2021).

Multi-Tiered System of Supports (MTSS) is an integrated intervention framework that is focused on preventive and tiered supports for students (Kearney & Graczyk, 2020). MTSS integrates academics, social, emotional, behavioral, and health concerns simultaneously. Kearney and Graczyk (2020) determined an MTSS framework was an excellent model for addressing chronic absenteeism. "The challenge for the future is not whether to blend school attendance and its problems into an MTSS-based framework, but rather to identify best practices and feasible ways for doing so" (Kearney & Graczyk, 2020, p. 330).

The current model for a MTSS framework is implemented at the local school level and is designed to meet the social, emotional, academic, and behavioral concerns of specific students. Addressing the attendance concerns at the local school would involve the following:

- Establishing a multi-tiered system of supports (MTSS) as an early warning system for students who may be at risk for academic failure or chronic absenteeism.
- Recruit MTSS team members including classroom teachers, counselors, and social workers.
- Develop an attendance team that monitors student attendance and provides statistical analysis to the full MTSS team.
- Establish clearly defined goals for MTSS outcomes.

Students who are at risk for academic failure are often ethnic minority, have a low economic status, and are chronically absent. An MTSS framework that includes interventions for attendance has the potential to increase school attendance and therefore improve students' academic success.

### **Recommendation Three**

A third goal of this research was to address the achievement gap between dominant culture students and ethnic minority, at-risk students. Addressing the achievement gap through a faith-based mentoring program is recommended.

The achievement gap between ethnic minority students and ethnic majority students has remained firmly in place despite decades of research and interventions. However, the role of culture, and its impact on the achievement gap has been absent in the research (King et al., 2018). Embedded in students' cultures are factors that contribute to academic success, including religious connections (Clark et al., 2016; Jeynes, 2015).

Historical research has determined there is a strong connection between ethnic minority students' faith and academic achievement (Jeynes, 2003; Johnson et al., 2003; Riggins et al., 2008; and Toldson & Anderson, 2010). DiPierro et al. (2018) found that religion among at-risk

adolescents helped students find purpose and meaning in their lives. Jeynes (2020) conducted a meta-analysis concerning prayer and academic outcomes and stated, “The results suggest that there is a real relationship between prayer and student outcomes” (p. 1231).

While engagement in faith-based practices such as prayer are no longer a part of the U.S. publicly funded education system, research continues to support the connection between faith and positive academic outcomes for students (Horwitz, 2021; Horwitz et al., 2020; Johnson & Reynolds, 2018). Severe (2020) conducted research that explored how at-risk students expressed faith and found that at-risk youth relied on their faith experiences to navigate life. Dumangane (2017) determined that faith had a significant impact on students’ educational outcomes.

To combat the achievement gap between groups of students, Chicago Public Schools, Family and Community Engagement (FACE), and Orange County Florida Public Schools, Faith-Based Adopt a School Initiative have encouraged families and communities to become involved in the lives of students in and out of school through mentorships.

Mentoring has had a significant impact on students who are at risk as a means to narrow the achievement gap (Grey, 2019; Marino, et al., 2020; Preston et al., 2019). In addition, Henry, Bryan, and Zalaquett (2016) determined that joining schools and faith-based partnerships had positive effects on at-risk students. Given the strong connection between faith and ethnic minority students who are often at risk for academic failure, it is a natural progression in thinking to include mentorship programs that are connected to faith-based partners.

The current findings support existing research in the literature concerning ethnic minority students and the determination of at-risk status as a result of low socioeconomic status, ethnic minority status, and/or absenteeism. While research has determined mentoring at-risk students

has had positive results, the target school in this study does not have a connection to a faith-based, nor secular mentorship program for at-risk students.

The establishment of a faith-based mentorship program should include the following:

- Establish a school-community liaison.
- Recruit faith-based organizations with established mentor programs, or a willingness to begin a mentor program.
- The school liaison and community partner need to target at-risk students for the program.
- Recruit parents to participate in the mentor program.
- Gather data as students participate in the mentor program.
- Present data to school and community members.

A faith-based mentorship program has the potential to address the achievement gap by mentoring students and providing academic, social, and emotional support.

#### **Recommendation Four**

Students who are at risk as a result of ethnicity, socioeconomic status, discipline referrals, or attendance and have become disengaged from the school learning environment are candidates for alternate education plans. A fourth recommendation resulting from the research is to establish a pathway for at-risk students to find success through alternative methods of education.

Research has shown that school climate has an overall effect on student engagement and academic achievement (Konold et al., 2018; Voight et al., 2015; Wang & Degol, 2016). The National School Climate Center refers to school climate as the character of a school and reflects the “norms, goals, values, interpersonal relationships, teaching and learning practices, and organization structures” (National School Climate, para 4, n.d.). School climate is especially important for students who are at risk for academic failure as a result of ethnicity or

socioeconomic status (Berkowitz et al., 2017; Shindler et al., 2016). Research indicates that school climate affects student engagement and achievement (Forsberg et al., 2021).

Wang et al. (2019) found that students who were involved in active learning and afterschool activities had better academic and behavioral outcomes. Conversely, students who were disengaged had high absenteeism, low achievement, and long-term employment consequences once they left school (Whatman & Main, 2018). Reimer and Pangrazio (2020) stated, “All students, however, regardless of their reason for disengaging, have the right to quality education” (p. 480). Addressing disengagement should include the opportunity for students to engage in learning patterns similar to their home culture and provide a pathway for school completion (Brandenburg, 2021; Mills et al., 2016).

Strategically planning for re-engaging at-risk students should include the student. Research has determined that involving students in the planning of the implementation of a learning plan re-engages at-risk students (Mills et al., 2016; and Pane et al., 2017). An personalized education plan is more than encompassing national standards. It is a plan that considers students’ cultural learning patterns and learning styles, curriculum choices, and learning spaces.

Creating an alternative education plan for at-risk students would include the following:

- Initiating the multi-tiered system of support to determine which tier the student needs to be academically successful (i.e., whole group, small group, or individual learning).
- Using NWEA data to determine an academic growth plan.
- Including students in a discussion to determine the best level of intervention as determined by the MTSS framework.
- Creating alternate methods for demonstration of learning (learning styles).

Providing students with a personalized learning plan that includes their preferred learning style, clear objectives, alternate learning spaces, and a system of support may reduce the number of students who are at risk for dropping out of school before graduation.

### **Recommendation Five**

The final recommendation is to design and implement comprehensive training for educators that will lead to a decrease in the number of students who are disengaged in the academic and/or social structures of schools. Students at risk for dropping out of school have characteristics that have been noted since the Coleman Report (Coleman et al., 1966). Ethnic minority students, low socioeconomic status, and absenteeism are common factors that lead to academic failure and dropping out of school before graduation.

Research has determined that in-school relationships between educators and students is important for all students, but it is especially true for students who are at risk for leaving school early (Martin & Collie, 2019; Walker & Graham, 2021). In addition, positive student/teacher relationships increase student engagement in the daily activities of the school and increases academic achievement, especially among ethnic minority students (Cook et al., 2018). Research has determined that ethnic minority students who had positive relationships with teachers had increased academic success (Baysu et al., 2021).

Bradley and Kendall (2019) proposed that the development of relationships that positively affected school engagement depended on educators taking the initiative. However, the pathway for creating positive student/teacher relationships has its challenges. Most of the research has focused on elementary students and implementing a training program for teachers to establish relationships with students (Duong et al., 2019). In elementary school students usually have one or two teachers throughout the school day and a natural bonding takes place between



student and teacher (Roorda et al., 2017). However, research has shown that as students progress through school, especially in middle and high school, relationships with teachers are more fragmented because of the number of teachers students encounter throughout the school day.

Comprehensive training and professional development opportunities should be implemented to decrease the number of students who are at-risk and/or disengaged in the academic/social context of the school. To accomplish this goal, educators should participate in ongoing professional development that includes the following:

- Developing surveys in which responses are focused on relationship factors and given to all students.
- Collect the surveys, analyze the results, and share with the teachers.
- Pair specific students with staff for the purpose of developing in-school relationships for the purpose of re-establishing school engagement.
- Track students' attendance, academic records, and discipline infractions to determine progress.

### **Summary**

This research study took place in a school district located in the central part of the state during the spring semester of the 2020-2021 school year. The middle school in which the study took place houses seventh- and eighth-grade students. Students in the sixth grade during the 2020-2021 school year were included in this study because they were in the seventh grade during the data collection process and part of the target school's current student population.

The search for the reasons why ethnic minority students score lower on state assessments than ethnic majority students has been a prevalent theme in the research (Becares & Priest, 2015; Burgess & Greaves, 2013). Each year new ideas have been explored, funding appropriated, and

more research studies published; however, ethnic minority students have continued to fall behind their peers. The problem, and the reason for the current study, is the lack of research investigating the differences in at-risk students' mathematics and English/language arts achievement scores on state assessments across preferred learning styles.

The researcher recommends the following five practices to implement at the school level to address the problem of ethnic minority, at-risk students' achievement gap. It is recommended that the local school district provide opportunities for teachers to increase awareness, knowledge, and skills to determine ethnic minority students' cultural learning patterns. The second recommendation is for the local school to develop a tiered system of support for students who are chronically absent and include families and community members in the ongoing conversation about absences. A third recommendation is to create faith-based partnerships to assist in the mitigation of factors that lead to students dropping out of school. The fourth recommendation is directed at educators addressing students' school disengagement through a personalized learning plan that includes the student in the planning process. Finally, the fifth recommendation is for educators at the local level to develop a plan to construct student/teacher relationships for the purpose of re-engagement in learning for at-risk students.

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## APPENDICES

### Appendix A

#### VARK Copyright Approval

Subject: [External] VARK Copyright Approved

Date: Friday, April 10, 2020 at 4:57:41 PM Eastern Daylight Time

From: Heather Lander

To: Green, Linda

Dear Linda,

Your request to use VARK copyright materials (specifically, the VARK Questionnaire and Helpsheets) in your research is approved.

Please note that you may not place VARK copyright materials online or on another website, whether password protected or not, or on any electronic survey instrument (QUALTRICS, SURVEY MONKEY, MOODLE, YouTube, APPs, SMS, social media, LMS GOOGLE Forms, PDF...).

For legitimate use we ask that you provide this acknowledgement:

© Copyright Version 8.01 (2019) held by VARK Learn Limited, Christchurch, New Zealand.

Best wishes for your research project.

Regards,  
Heather

Heather Lander  
VARK LEARN Limited  
7 Farnswood Place, Redwood, Christchurch 8052, New Zealand  
[www.vark-learn.com](http://www.vark-learn.com)



## Appendix B



### VARK Subscription Site

Dear Linda,

Your VARK Subscription Site has been set up - the details you will need for using it are included below.

The web address for participants is: <http://site.vark-learn.com/?access=liberty>.

And the administration web address for you to use to change the settings, access the results and so on is:

When you go to the administration address, you will be asked for a username and password. Enter the following:

username = (removed for privacy)

password = (removed for privacy)

After logging in, you can change your password to something else, if you want to, by going to the "Subscription Details" option on the staff page.

Participants don't need to enter any username or password to fill in the questionnaire.

So that participants don't have to type in the address and risk getting it wrong, it would be a good idea to provide a hyperlink to the questionnaire either on one of your internal web pages, or in an email to participants.

There are a few things that you may need to do before directing participants to use the questionnaire:

1. Optionally enter one or more groups. The participants can be asked to select a group when they fill in the questionnaire, and the group is then used to group results. Alternatively, if you don't set up any groups, all of the results will be put into one big group (this is the default).
2. Optionally, you can change some of the text shown in the site:  
 When participants fill in the questionnaire, they can be asked to fill in 1 or 2 text fields. You can specify what the labels for those fields are, on the Subscription Details page. By default, the first is labelled "Name", and the second is not used. You might like to change the second to "ID" for example. Or the first to "First Name" and the second to "Last Name".  
 If you have set up groups (in step 1 above), you can also change the label used for that field, from "Group" to "Department" or "Class", for example.

You change other details such as the name of your organization.

You can also enter some text to be shown on the home page, at the start of the questionnaire, and on the results page, if you like.

You can also select which version of the questionnaire is used - the latest version of the standard questionnaire is the default, with the version for younger people and the athletes version also being available - and which version of the helpsheets is displayed - the academic helpsheets are the default with the helpsheets for business also being available.

3. If you want to try out your subscription by entering any test responses etc, it would be a good idea to do this before any participants fill in the questionnaire because then you will be able to clear any test results you have entered without worrying about losing any real responses. A couple of extra participant places have been added so that you can try it out without using up any of your paid-for quota.

Feel free to contact me if you have any problems.

Regards,

Heather Lander

vark-learn.com

## Appendix C

### IRB Approval

# LIBERTY UNIVERSITY

## INSTITUTIONAL REVIEW BOARD

February 22, 2021

Linda Green  
Rebecca Lunde

Re: IRB Approval - IRB-FY20-21-492 A Causal Comparative Study of the Difference in Achievement Scores of At-Risk, Minority Students Based on Learning Styles

Dear Linda Green, Rebecca Lunde:

We are pleased to inform you that your study has been approved by the Liberty University Institutional Review Board (IRB). This approval is extended to you for one year from the date of the IRB meeting at which the protocol was approved: February 22, 2021. If data collection proceeds past one year, or if you make modifications in the methodology as it pertains to human subjects, you must submit an appropriate update submission to the IRB. These submissions can be completed through your Cayuse IRB account.

Your study falls under the expedited review category (45 CFR 46.110), which is applicable to specific, minimal risk studies and minor changes to approved studies for the following reason(s):

7. Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.

Your stamped consent form can be found under the Attachments tab within the Submission Details section of your study on Cayuse IRB. This form should be copied and used to gain the consent of your research participants. If you plan to provide your consent information electronically, the contents of the attached consent document should be made available without alteration.

Thank you for your cooperation with the IRB, and we wish you well with your research project.

Sincerely,

**G. Michele Baker, MA, CIP**  
*Administrative Chair of Institutional Research*  
**Research Ethics Office**

## Appendix D

### School District Approval to Conduct Research



[redacted] Public Schools welcomes applications for a wide range of research projects that will benefit the District. This application is designed to ensure alignment with best practices in community-engaged research, including transparency about project goals, methods, and anticipated outcomes, as well as any proposed changes to project goals, methods, or anticipated outcomes; open communication between researchers and school-based personnel; informed consent to research participants or, in the case of minors, informed parental consent; and a commitment to "do no harm," especially to members of vulnerable populations.

Please complete the request form and obtain the signature of the school based partner and principal, and then submit it to the Superintendent of Schools for approval. Your form must be accompanied by a written description of the project to include: an overview of the goals of the study; methods of data collection and analysis; a description of the participant population; research settings; participant selection; process for informed consent; and confidentiality guidelines. Potential risks and benefits to student participants must be identified. Please include a sample parental release form and copy of any survey being used. You will be notified within 10 days of receipt of the Approval Request Form. Please contact the Office of the Superintendent if you have any questions.

What is your research question?		
<b>RQ1:</b> Is there a difference in end-of-year mathematics achievement results among ethnic minority, at-risk seventh and eighth-grade students given their various learning styles?		
<b>RQ2:</b> Is there difference in end-of-year English/language arts achievement among ethnic minority, at-risk seventh and eighth-grade students given their various learning styles?		
Who is your school contact or partner? Dr. Rebecca Lunde <a href="mailto:rmfitch@liberty.edu">rmfitch@liberty.edu</a>		
Principal Investigator Name: <i>(Please Print)</i>  Linda Green LGreen4@liberty.edu	Anticipated Start Date:  I would like to start gathering data as soon as possible. October/November, 2021.	Anticipated End Date:  December 2021
Address:  [redacted]	City, State  [redacted]	Telephone  [redacted]
School Department Affiliation:  Liberty University, Lynchburg, VA	Zip  04671	Cell #  [redacted]
Reason for research:  This is research for my dissertation for a doctorate in Curriculum and Instruction.		
# of Male Participants TBD	Age of Participants: <i>(check all that apply)</i>	
# of Female Participants TBD	<input type="checkbox"/> Minor (under 18) high school age <input type="checkbox"/> Elementary school age <input checked="" type="checkbox"/> Middle school age <input type="checkbox"/> Adults	
How will the data be gathered and how will it be used?  The data will be gathered through a district designated liason. The data required are student ethnicity, free/reduced lunch status, NWEA scores from Spring 2021, discipline records, absentee records, etc. The students will also take an online or		

<p>paper learning styles test (The VARK). The data will be used to answer the research questions and results published in my final dissertation.</p>	
<p>With whom, and in what format, will the results be shared?</p> <p>All student identifiers will be eliminated from the final dissertation. Results will be in the final dissertation.</p>	
<p>How does this project support the mission of [REDACTED] Public Schools?</p> <p>The mission of [REDACTED] Public School is to ensure student academic and civic success. The [REDACTED] School Committee believes all students can learn and want to succeed. The [REDACTED] School Committee believes learners progress at different rates and in different ways. My proposed dissertation supports this mission by demonstrating at-risk, underserved student groups learn differently and may demonstrate mastery of content differently than the majority of students represented in the schools.</p>	
<p>Schools where study will take place:</p> <p>Students who were in 7<sup>th</sup> and/or 8<sup>th</sup> grade during the 2020-2021 school year. The study will take place at [REDACTED] Middle School.</p>	<p>Who is your faculty advisor for this project?</p> <p>Dr. Rebecca Lunde, Liberty University Professor  <a href="mailto:rmfitch@liberty.edu">rmfitch@liberty.edu</a></p>
<p>Will there be additional investigators working on this project?</p> <p>If yes, please list names of additional investigators:</p> <p style="text-align: right;">Yes      <input checked="" type="radio"/> No</p>	
<p>Parent/Guardian consent if required for work with students if it occurs separately from normal everyday classroom practice. If required, who is responsible for obtaining informed parental/guardian consent, and are the consent forms on file with the main office?</p> <p>FERPA regulations may prevent me from mailing or emailing the consent forms directly to the parents. If that is the case, I will work with a district designated liason to put the consent form in the parent/guardians hands. I will attach consent forms with this application.</p>	
<p>If this research involves communication with non-English speaking participants, please specify how interpretation will be addressed. List name(s) of interpreter and attach credentials.</p> <p>This research does not involve communication with non-English speaking participants.</p>	
<p>Has this project received [REDACTED] College IRB approval? Yes <input checked="" type="radio"/> No (If No, please explain) I am not a student at [REDACTED] College, but my proposal is with Liberty University IRB now.</p>	
<p>Is this project part of a larger research project? If yes, explain</p> <p>No.</p>	

**Checklist:**

**Copy of Informed consent form attached?**

**Successful completion of CITI research modules, "Introduction to Community-Engaged Research" and "Ethical and Practical Considerations in Community-Engaged Research" (required by [REDACTED] College students) or similar research ethics training (for researchers from other institutions)?**

**Signature of Principal Investigator:** The undersigned accepts the responsibility for this study, including the protection of the rights and welfare of human participants in this study.

<i>Signature</i> [Redacted]	Linda Green	<i>Date</i> 9/15/2021
<i>Signature of school-based community partner(s): (to be secured before submission to Superintendent)</i> [Redacted]	Dr. Rebecca Lunde	<i>Date</i> 9/15/2021
<i>Signature of Building Principal: (to be secured before submission to Superintendent)</i> [Redacted]		<i>Date</i> 9/17/21

*Please submit documentation to the Office of the Superintendent, [Redacted] Public Schools ~*

**Completed by Superintendent upon review:**

Project approved as submitted     Project approved with recommended changes:     Project approval denied:

\_\_\_\_\_  
*Signature of Superintendent*  
 Updated 9/5/17 v7

9/21/21  
 \_\_\_\_\_  
*Date*

## Appendix E

### Parent/Student Consent Form

#### Parental/Student Consent

Linda Green, Doctoral Candidate  
Liberty University  
LGreen4@liberty.edu

**Title of the Project:** A Causal Comparative Study of the Differences in Achievement Scores of At-Risk Minority Students Based on Learning Styles.

**Principal Investigator:** Linda Green, Doctoral Candidate at Liberty University

#### Invitation to be Part of a Research Study

Your child is invited to participate in a research study. The students who are invited to participate were in 6<sup>th</sup>, 7<sup>th</sup> or 8<sup>th</sup> grade during the 2020-2021 school year, took the NWEA and who may be at-risk for academic failure as a result of ethnicity, socioeconomic status, discipline referrals, or absenteeism. Taking part in this research project is voluntary.

Please take time to read this entire form and ask questions before deciding whether to allow your child to take part in this research project.

#### What is the study about and why are we doing it?

The purpose of the study to determine the differences between ethnic minority, at-risk students' learning styles who have either visual, auditory, read/write, or kinesthetic learning styles on their state mandated test scores in math and English/language arts.

#### What will participants be asked to do in this study?

If you agree to allow your child to be in this study, I will ask him or her to do the following things:

1. Students who participate in this study will be asked to take a paper or online learning style questionnaire called the VARK. The VARK questionnaire determines if the students' preferred learning style is V-visual, A-aural (auditory), R-read/write, or K-kinesthetic.
2. Students will either log onto the VARK website and answer 16 questions or complete the questionnaire on paper. It will take approximately 15-30 minutes to complete the questionnaire.
3. The link for the questionnaire is here: VARK Questionnaire (<https://site.vark-learn.com/?access=liberty>).

#### How could participants or others benefit from this study?

Participants should not expect to receive a direct benefit from taking part in this study.

#### What risks might participants experience from being in this study?

The risks involved in this study are minimal, which means they are equal to the risks your child would encounter in everyday life.

#### How will personal information be protected?

The records of this study will be kept private. Published reports will not include any information that will make it possible to identify a subject. Research records will be stored securely, and only the researcher will have access to the records. Data collected as part of this study may be shared for use in future research studies or with other researchers. If data collected from the participants is shared, any information that could identify them, if applicable, will be removed before the data is shared.

- Participant responses will be kept confidential through the use of pseudonyms/codes.
- Data will be stored on a password-locked computer and may be used in future presentations. After three years, all electronic records will be deleted.

### How will participants be compensated for being part of the study?

Students who participate in the study will be entered in a raffle to win a \$50 gift card.

### Is study participation voluntary?

Participation in this study is voluntary. Your decision whether or not to allow your child to participate will not affect your or his or her current or future relations with Liberty University. If you decide to allow your child to participate, she or he is free to not answer any question or withdraw at any time without affecting those relationships.

### What should be done if a participant wishes to withdraw from the study?

If you choose to withdraw your child from the study or your child chooses to withdraw from the study, please contact the researcher at the email address or phone number included in the next paragraph. Should you choose to withdraw, data collected from you will be destroyed immediately and will not be included in this study.

### Whom do you contact if you have questions or concerns about the study?

The researcher conducting this study is Linda Green. You may ask any questions you have now. If you have questions later, **you are encouraged** to contact her at [REDACTED] or LGreen4@liberty.edu. You may also contact the researcher's faculty sponsor, Dr. Rebecca Lunde at [REDACTED]

### Whom do you contact if you have questions about rights as a research participant?

If you have any questions or concerns regarding this study and would like to talk to someone other than the researcher, **you are encouraged** to contact the Institutional Review Board, 1971 University Blvd., Green Hall Ste. 2845, Lynchburg, VA 24515 or email at irb@liberty.edu

### Your Consent

By signing this document, you are agreeing to allow your child to be in this study. Make sure you understand what the study is about before you sign. You will be given a copy of this document for your records. The researcher will keep a copy with the study records. If you have any questions about the study after you sign this document, you can contact the study team using the information provided above.

*I have read and understood the above information. I have asked questions and have received answers. I consent to allow my child to participate in the study.*

\_\_\_\_\_  
Printed Child's/Student's Name

\_\_\_\_\_  
Parent's Signature

\_\_\_\_\_  
Date

\_\_\_\_\_  
Minor's (Student) Signature

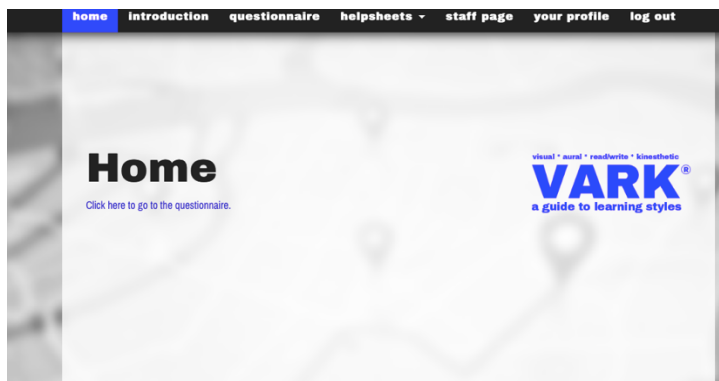
\_\_\_\_\_  
Date



## Appendix F

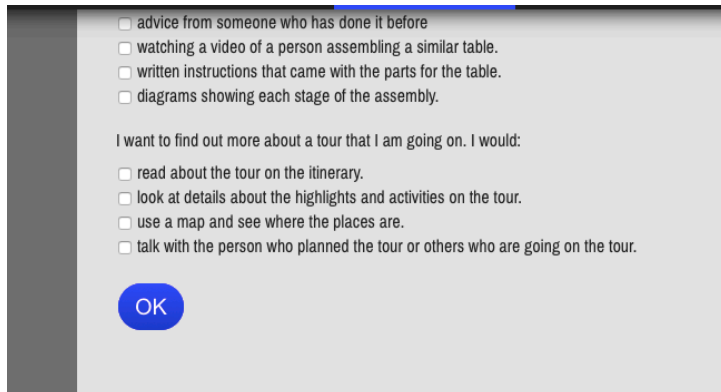
### Instructions for completing the VARK Learning Styles Questionnaire

1. You will receive an email/postal letter explaining the study.
2. Read the consent form before completing the questionnaire.
3. This questionnaire should take you about 15-30 minutes.
4. After reading the consent form, go to the VARK website here <http://site.vark-learn.com/?access=liberty>.
5. The website will look like this.



6. Enter your **first** and **last name** in the box.

7. After you have answered all the questions click OK.



advice from someone who has done it before

watching a video of a person assembling a similar table.

written instructions that came with the parts for the table.

diagrams showing each stage of the assembly.

I want to find out more about a tour that I am going on. I would:

read about the tour on the itinerary.

look at details about the highlights and activities on the tour.

use a map and see where the places are.

talk with the person who planned the tour or others who are going on the tour.

OK

8. You have finished the questionnaire and there is nothing else for you to do. Thank you.