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A Quantitative Analysis of the SAILS (Seamless Alignment of Integrated Learning Support)
Program Collaboration in a Community College Setting

A dissertation

presented to

the faculty of the Department of Educational Leadership and Policy Analysis

East Tennessee State University

In partial fulfillment

of the requirements for the degree

Doctor of Education in Educational Leadership

by

Kelley Elise Thomas

May 2017

Dr. Hal Knight, Chair

Dr. Cheri Clavier

Dr. Bethany Flora

Dr. Pamela Scott

Keywords: SAILS, dual enrollment, college remediation, learning support

ABSTRACT

A Quantitative Analysis of the SAILS (Seamless Alignment of Integrated Learning Support)

Program Collaboration in a Community College Setting

by

Kelley Elise Thomas

In 2007, the Seamless Alignment and Integrated Learning Support (SAILS) program was implemented on a small scale at both Chattanooga State Community College (ChSCC) and Cleveland State Community College (CSCC) with the primary focus of implementing college remediation methods with area high school students during their senior year (ChSCC, n.d.). In cooperation with Governor Bill Haslam's "Drive to 55" initiative within the State of Tennessee, the SAILS program expanded in 2013 to include 13 community colleges across Tennessee and has been touted as a possible solution to reducing the number of incoming college freshman who are required to participate in college remediation (Drive to 55 Alliance, 2016).

The purpose of this study was to examine the student enrollments, withdrawals, final grades, and course completions as well as the gender and ethnicity of the SAILS versus Non-SAILS students who enrolled in the Math 1530, Probability and Statistics, course at one of six rural or urban community college campus locations at one community college in East Tennessee. The intent of the study was to provide additional insight regarding whether the SAILS program produces comparable student outcomes when compared to the Non-SAILS program students and whether the SAILS program adequately prepares the high student academically for a college level math course.

This study included 833 students (349 SAILS and 484 Non-SAILS) at both rural and urban campus locations enrolled in Math 1530, Probability and Statistics. In general, the SAILS students performed comparably to the Non-SAILS students academically, although the proportion of Non-SAILS students overall tended to be higher in most comparisons. Gender was found not to vary significantly within the SAILS and Non-SAILS students, however race and ethnicity was highly skewed with 95% of students being White-Non-Hispanic. This study provides information regarding the effectiveness of the SAILS program and offers insight into how high school students may perform in a college-level math course upon completion of the SAILS program.

DEDICATION

To my Lord and Savior, Jesus Christ, for whom I remain devoted and truly thank for each and every opportunity and blessing that He has bestowed upon me. With God, all things are truly possible.

In memory of my wonderful father, Dr. Bob F. Thomas, who passed away on June 27, 2015, and who always encouraged me to reach for the stars. Now that you are with our God in heaven, I hope that you will truly have the best seat in the house as I walk across the stage on graduation day. This one is for you, Dad...

To my beautiful mother, Dr. Constance D. Thomas, who has always stood strong with an encouraging word, hug, and shoulder to cry on, especially when my father passed and when I was diagnosed with cancer four months later. In difficult and in happy times, my mom has always been there and has repeatedly stated throughout my entire life... "You can do this!"

To my amazing husband, William "Hadley" Martin, for whom I am eternally grateful for his encouragement when I experienced periodic meltdowns and for always standing by me, laughing with me, crying with me, and loving me no matter what I was facing.

To my special brother, Michael C. Thomas, for always making me laugh until my belly hurt, even when it seemed almost impossible to ever smile again.

To my puppy dogs... Roadie and Ya Ya... who served as constant companions and supplied plenty of kisses and laughs while I sat at my computer. Your devoted paws on my feet and your periodic scrambling of my papers made me laugh at even the most serious of times.

Thank you ALL so very much... I love you more than words can express...

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CHAPTER 1

INTRODUCTION

As workforce demands become increasingly more complex, the state and federal government, private industry, and educational institutions have recognized the need to collaborate closely to resolve the apparent skill shortages that currently exist across the United States (Ganzert, 2014). Economists are predicting a greater demand for postsecondary education to meet these needs with some proposing the possibility of future jobs remaining unfilled without individuals who are equipped with the necessary skill sets (Pretlow & Wathington, 2014). Thus, policymakers and administrators have begun to implement educational programs that are geared towards satisfying future workforce projections, recognizing that this groundwork is critical for the economic sustainability and growth not only across the United States, but internationally as well (Myran & Ivery, 2013). Accordingly, secondary and postsecondary programs that are focused on college and career readiness and that will help develop and support a sustainable workforce are in demand and have become more commonplace (Gunn-Wright & Gault, 2013).

One way in which educational institutions are attempting to address academic and career-related training within their communities is by offering dual enrollment opportunities whereby high school students can obtain both high school and college credit simultaneously (An, 2015). Although the implementation of dual enrollment programs may vary across institutions, the prospect of high school students attaining early college credit has become increasingly popular (Karp, 2012). According to the most recent data by the National Center for Educational Statistics (NCES), 46 % of the 1650 institutions polled were participating in a dual enrollment program (Marken, Gray, & Lewis, 2013). For the 2010-2011 academic year, NCES reported that approximately 136,400 students took a dual enrollment course at a postsecondary institution

while approximately 1,277,100 students were able to participate in dual enrollment directly at their high school (National Center for Educational Statistics (NCES), 2013).

Within the State of Tennessee, approximately 16,404 students participated in dual enrollment during the 2010-2011 timeframe nearly doubling the 6,000 students who had been reported the previous year (Karp, 2012). As of the 2015-2016 academic year, the Tennessee Board of Regents (TBR) reported over 29,000 students participating in dual enrollment with college classes being offered on both high school and college campuses across the State of Tennessee (Tennessee Board of Regents (TBR), 2016a). Although numbers may vary across the nation, Karp's (2013) report examining dual enrollment programs specifically within Tennessee and other peer states including Florida, Georgia, Kentucky, North Carolina, and Texas, highlighted stakeholder commitment to dual enrollment programs and emphasized that program delivery could be improved by developing strategies that are "well supported and well implemented at both the state and local levels" (p. 16). Furthermore, Karp (2013) noted that structuring dual enrollment programs to help students achieve specific outcomes in support of college completion should serve as an optimal goal for Tennessee as well as for other states across the country.

With declining financial support from local, state, and federal governments, public education continues to explore and streamline academic training options while still being able to adequately train the future workforce (Sponsler, Pingel, & Anderson, 2015). In fact, some states are combining efforts and reducing costs by linking dual enrollment and workforce development opportunities. Michigan, for example, a partnership between Wayne County Community College and Detroit Public Schools has created workforce development centers to "accelerate the pipeline of trained and certified workers to obtain jobs and increase the employment rate across

the region” (“New 21st century workforce,” 2014, para. 1). These centers are offering educational opportunities in dual enrollment, adult education, Career and Technical education (CTE), and special education, all directed towards meeting the demands of the area workforce (“New 21st century workforce,” 2014). At Calhoun Community College in Alabama, a workforce development grant has provided dual enrollment opportunities for students who would like to major in certain business and technical fields (Calhoun Community College, 2016). Some of the programs being offered include training in robotics, welding, industrial maintenance, and office systems technology (Calhoun Community College, 2016).

In the Upper Cumberland region of Tennessee, high school administrators partnered with local business and industry and tailored their programs of study to meet area workforce demands while creating more dual enrollment opportunities for their students (Norwood, 2015). In 2014, the Tennessee Career and Technical Education (CTE) Division revised their standards to require more rigorous math and literacy guidelines for secondary education, focusing heavily on work-based learning (Tennessee Department of Education (TDOE), n.d.). In support of this effort, the Upper Cumberland area expanded their dual enrollment options to include local workforce training opportunities to meet current labor shortages that included the Certified Nursing Assistant (CNA) and Mechatronics certifications (Norwood, 2015). By implementing these types of initiatives, some students may enter employment immediately upon high school graduation while others may choose to enhance their skills by pursuing additional training in postsecondary certificate and degree programs. As described by Melissa Paz, a Warren County High School dual enrollment instructor, “These kids can go out and have a career for life” (Norwood, 2015, para. 7).

Along with targeting existing workforce demands and labor shortages, there are also the academic advantages in helping to prepare students as early as possible for college coursework. Nationally, approximately two-thirds of community college students are reported as being required to participate in some type of remedial coursework (Schnee, 2014). With many of the community colleges being designed around the philosophy of open enrollment, a common practice for “screening” potential candidates has been the college entrance exam that allows the institution to place first-time freshmen into the appropriate level of college coursework (Guy, Puri, & Cornick, 2016). Although the need for college remediation and the associated statistics varies across the literature, most agree that adequate preparation for students entering postsecondary training is problematic. For instance, in 2003, some reports indicated that approximately 75% of postsecondary institutions within the United States were reported as having remedial courses in both mathematics and English (Howell, 2011). Later research conducted by NCES in 2013 indicated that current remediation methods were working and had resulted in a reduction in 2007-2008 to only 24% of first-year undergraduate students needing remediation as opposed to 30.4% in 1999-2000 (Sparks & Malkus, 2013). However, a similar study from NCES in 2015 appeared to dispute this claim by suggesting that approximately 41% of degree-seeking students at a two-year college were in need of college remediation (Skomsvold, 2015). However, a study conducted by the Complete College Research Center (CCRC) in 2015 indicated that nearly 70% of all incoming college freshman were in need of college remediation (Rodriguez, Bowden, Belfield, & Scott-Clayton, 2015). Even with the varying assessments of the extent of the problem, what is apparent throughout the literature was the continuous insistence from stakeholders that educational programs needed to be improved to adequately prepare students for college coursework (Rodriguez et al., 2015).

Over the last several years, many of the four-year colleges have recognized major drawbacks of college remediation and have tried to eliminate these course offerings altogether by relying on their partnering community colleges (Scott-Clayton, Crosta, & Belfield, 2014). Especially within public education, the direct costs related to remediation have become a major issue (Scott-Clayton et al., 2014). Estimates have ranged anywhere from \$15 million in 2000 to approximately \$7 billion in 2012 (Scott-Clayton et al., 2014). Coupled with the fact that community colleges typically receive less public funding support than the four-year universities, the college remediation model appears stretched to the limit with little evidence proving the overall effectiveness of this approach (Stewart, Lim, & Kim, 2015). In fact, a study of 105 semester-based community colleges that offered developmental programs throughout California indicated that only approximately 58%-60% of students passed the developmental coursework in math during their first attempt (Bahr, 2012). Furthermore, the 40%-42% of students who did not pass during their first attempt were at a higher risk of dropping out of college altogether (Bahr, 2012). Within Tennessee, the structured design of 27 technology schools with designated program curriculum have been highlighted as producing strong student outcomes while embedding remediation into the training components (Gonzalez, 2012). Although community colleges may maintain a broader mission of preparing transfer students, the technology centers have seemingly been able to address remediation within their program model by yielding 75%-83% graduation and placement rates respectively (Gonzalez, 2012). Especially in times of economic turmoil, educational stakeholders continue to demand increased accountability and proven methods for developmental programs that are worthy of financial support (Moss, Kelcey, & Showers, 2014).

Academic opportunities for students in postsecondary education may also be limited by the inadequate preparation that they receive in secondary education. Arguably, many blame this “pervasive need for college remediation on poor K-12 quality and lack of rigor” (Bettinger & Long, 2009, p. 737). However, the lack of proper preparation for college students appears to be evident in both secondary and postsecondary education throughout the literature (Kurlaender, Jackson, Howell, & Grodsky, 2014). Maruyama (2012) maintained that “the effectiveness of postsecondary education increases when students aspiring to attend college have developed academic skills preparing them to succeed” (p. 252). In contrast, if a student lacks the necessary skills and is required to take more than one subject area in remediation, it may add an additional semester or more to the amount of time necessary to complete a degree (Ferguson, Baker, & Burnett, 2015). As Bahr (2012) emphasized, the issue of student persistence and drop-out rates could become a challenge for all involved when students are faced with the additional time, energy, and expense of taking remedial courses as a requirement at the postsecondary level. Therefore, adequate preparation of students for postsecondary coursework as soon as possible should be an immediate concern for all stakeholders (Howell, 2011).

With both the sizable costs of remediation to educational institutions and the overwhelming research that has questioned the overall efficacy of college remediation, there is a national push to reform remedial programs (Scott-Clayton & Rodriguez, 2015). Furthermore, the current and future skill sets required to sustain workforce development demands are approaching critical limits with states benefiting from educational programs that have sought to effectively improve both secondary and postsecondary outcomes in this regard (Sponsler et al., 2015). Certainly, if educational institutions can identify opportunities to partner with other local, state, and federal organizations to streamline educational methods while ultimately helping to

support workforce demands, financial burdens and student outcomes may be improved overall. In fact, Hu and Wolniak (2013) theorized that favorable postsecondary experiences for students may be closely linked to an increase in career-earning potential and more favorable life choices that may ultimately lead to an enriched and progressive economy. While students become more engaged in educational opportunities and experiences, they may also envision how their educational efforts impact their future sustainability (Karp, 2012).

One such effort to improve educational outcomes within the State of Tennessee is the Seamless Alignment of Integrated Learning Support (SAILS) which has been touted as a possible solution for college remediation (Chattanooga State Community College (ChSCC), n.d.). This initiative encourages strong partnerships between the secondary and postsecondary institutions by implementing college remediation methods at the high school level (Pearson Education, 2016). In addition, students with increased confidence levels may decide to participate in dual enrollment opportunities, potentially yielding students who are more adequately prepared for postsecondary education and training in a quicker timeframe.

Seamless Alignment of Integrated Learning Support (SAILS)

When elected in 2011, Governor Bill Haslam of Tennessee was determined to make education a top priority within his administration (Pierce, 2015). In doing so, Haslam developed a campaign called “Drive to 55” that focused on raising the number of Tennessee residents attaining a college credential from 32% to 55% by the year 2025 (Drive to 55 Alliance, 2016). Specifically, three areas were targeted within Haslam’s campaign including (a) access to higher education; (b) student completion, including for first generation students and adults; and, (c) workforce and economic development (“Haslam Announces,” 2015). In September of 2013 while addressing a group of key educational stakeholders within Tennessee, Haslam emphasized

his concerns by reporting that “Nearly 70 percent of Tennessee students entering community college need remedial classes before they can take college level courses” (TN Office of the Governor, 2013, para. 3).

Offering a potential solution for college remediation, the Seamless Alignment and Integrated Learning Support (SAILS) initiative was first implemented at Cleveland State Community College (CSCC) and Chattanooga State Community College (ChSCC) from 2007-2011 and focused on improving college remediation methods to reduce the number of first-year freshman who were required to participate in remedial coursework (Squires, 2014). The SAILS model addressed the math component of remedial learning support and was grounded in the theory that identical online requirements for remedial work at the college level could conceivably be embedded into the already existent “Bridge Math” program at the high schools (ChSCC, n.d.). With both efforts concentrating on adequately preparing students for college by helping them to achieve the required 19 ACT benchmark in math, the SAILS model attempted to streamline the process by using high school instructors to facilitate the college level online program and addressing student remediation issues prior to high school graduation (ChSCC, n.d.).

With encouraging results, such as ChSCC’s reduction in college remediation from 2500 students in 2009 to less than 1400 students during the fall of 2014, Governor Haslam felt strongly that additional dollars were needed across the State of Tennessee to support a larger pilot with similar remediation methods (Squires, 2014). In 2012, a small pilot of 500 students was conducted that only included four Tennessee community colleges with approximately \$100,000 allotted for programmatic implementation (ChSCC, n.d.). In 2013, Haslam decided to expand the SAILS program to include all 13 community colleges and allocated 1.1 million

dollars in support of these efforts (Squires, 2014). Similarly, Haslam awarded 2.5 million dollars for SAILS during the following academic year, yielding an estimated 83% completion rate for approximately 13,500 students who participated during the 2013-2014 and 2014-2015 academic timeframes (Center for Education Policy Research (CEPR) at Harvard University, 2015; Osborne, 2014). In February of 2014 during a stakeholder meeting, Haslam appeared to proclaim the success of the SAILS program by sharing pertinent estimates that “SAILS could save Tennessee students 3.5 million a year in college tuition” (Osborne, 2014, para. 8).

The SAILS program began in August of 2012 at the community college that is the data source for this study and this institution was among four community colleges included in the initial pilot of 500 high school students (CEPR at Harvard University, 2015). The majority of the 150 students involved in this pilot at the respective community college graduated from high school having completed SAILS, but were not heavily involved in dual enrollment due to the focus and timeframe of the pilot (Squires, 2014). However, during the 2013-2014 and 2014-2015 academic years, approximately 350 students who completed SAILS also chose to enroll in Math 1530, Probability and Statistics at the community college within this study. Accordingly, the majority of students chose to enroll in Math 1530, Probability and Statistics, because it would typically satisfy the core math requirement for many college programs and required no other college pre-requisites at the respective community college. As a dual enrollment course, Math 1530, Probability and Statistics, also served as the students’ high school senior math requirement (Roberts, 2014). Therefore, examining the academic and demographic indicators of the SAILS students who chose to enroll in this course was critical to the study to determine how prepared these students were for a college level math course.

Statement of the Problem

With community colleges reporting an estimated 70% of their students requiring some type of remediation, the lack of preparation for college is an apparent obstacle for many incoming freshman (Crisp & Delgado, 2014). Clearly, it is critical for underprepared students to complete the required coursework in a timely manner to attain college readiness. Maruyama (2012) maintained that “the effectiveness of postsecondary education increases when students aspiring to attend college have developed academic skills preparing them to succeed (p. 252).

Throughout the years, community colleges have been plagued with a variety of logistical and academic cost factors with regard to college remediation (Abraham, Slate, Saxon, & Barnes, 2014a). Creating a renewed opportunity for a close partnership between the secondary and postsecondary school systems may yield students who become college ready in a quicker timeframe while eliminating some of the costs that are involved to both the students and institutions (Hagedorn, Lester, & Cypers, 2010). With prevailing concerns regarding the effectiveness of current remediation methods across the United States, it is important to examine resultant outcomes for similar remediation methods that are simply shifted to the high school level and claim to prepare students adequately for college level coursework (Ngo & Melguizo, 2016). Although the SAILS model has shown some promise, sufficient, in-depth research is lacking to determine if the SAILS approach is effective and yields comparable outcomes with students who do not require college remediation.

Therefore, the purpose of this study was to examine the student enrollments, withdrawals, final grades, and course completions as well as the gender, race, and ethnicity of the SAILS versus Non-SAILS students with a 19 ACT math score who enrolled in a Math 1530, Probability and Statistics, course at one of six rural or urban community college campus locations at one

community college in East Tennessee. Specifically, the intent of the study was to provide additional insight regarding whether the SAILS program produces comparable student outcomes when compared to the Non-SAILS program students, and whether the SAILS program adequately prepares the high school student academically for a college level math course. The Math 1530, Probability and Statistics, course was chosen as a critical component of the study for two primary reasons. First, students who were not majoring in a STEM (Science, Technology, Engineering, and Math) program in college were encouraged to take Math 1130, College Algebra, or Math 1530, Probability and Statistics, upon SAILS completion because both of these courses served as a core math course requirement for many college majors and would transfer to most four-year institutions within the State of Tennessee (TBR, 2016b). However, the number of students who chose to enroll in Math 1130, College Algebra, during the timeframe of the study was minimal due to the additional pre-requisite of Math 1000, Algebra Essentials, that was required at the community college. Second, the Math 1530, Probability and Statistics, course was chosen because the examination of student outcomes for this course allowed the researcher to draw certain conclusions regarding the SAILS students' preparation for a college level math course in comparison to students who did not need college remediation. In addition, the rural and urban campus classifications within the research questions were included to help determine if students in various geographic locations exhibited any significant differences when comparing SAILS versus Non-SAILS students who participated in the Math 1530, Probability and Statistics, course.

Research Questions

A causal-comparative research design was employed by examining whether or not there were significant academic or demographic differences with regard to the SAILS versus the Non-

SAILS students who enrolled in a Math 1530, Probability and Statistics, course during the 2014-2015 and 2015-2016 academic years based on the rural or urban campus location where the course was taken. This quantitative, cause and effect, research approach was applicable because the researcher sought to draw conclusions from pre-existing, categorical, and nominal data under conditions that would not permit an experimental research design (McMillan & Schumacher, 2010). Specifically, the following questions were targeted within this particular study:

Research Question 1:

Is there a significant difference in the proportion of enrollments for SAILS versus Non-SAILS students enrolled in Math 1530, Probability and Statistics, at a rural campus location?

Research Question 2:

Is there a significant difference in the proportion of enrollments for SAILS versus Non-SAILS students who enrolled in Math 1530, Probability and Statistics, at an urban campus location?

Research Question 3:

Is there a significant difference in the proportion of withdrawals for SAILS versus Non-SAILS students who enrolled in Math 1530, Probability and Statistics, at a rural campus location?

Research Question 4:

Is there a significant difference in the proportion of withdrawals for SAILS versus Non-SAILS students who enrolled in Math 1530, Probability and Statistics, at an urban campus location?

Research Question 5:

Is there a significant difference in the proportion of SAILS versus Non-SAILS students with successful course completions with a final grade of A, B, or C, or unsuccessful course completions with final grades of a D or F in the Math 1530, Probability and Statistics, course taken at a rural campus location?

Research Question 6:

Is there a significant difference in the proportion of SAILS versus Non-SAILS students with successful course completions with a final grade of A, B, or C, or unsuccessful course completions with final grades of a D or F in the Math 1530, Probability and Statistics, course taken at an urban campus location?

Research Question 7:

Is there a significant difference in the gender of SAILS versus Non-SAILS students who enrolled in Math 1530, Probability and Statistics, at a rural campus location?

Research Question 8:

Is there a significant difference in the gender of SAILS versus Non-SAILS students who enrolled in Math 1530, Probability and Statistics, at an urban campus location?

Research Question 9:

Is there a significant difference in the race and ethnicity of SAILS versus Non-SAILS students who enrolled in Math 1530, Probability and Statistics, at a rural campus location?

Research Question 10:

Is there a significant difference in the race and ethnicity of SAILS versus Non-SAILS students who enrolled in Math 1530, Probability and Statistics, at an urban campus location?

Significance of the Study

Although there have been studies over the years that have been able to quantify certain effects of remediation and dual enrollment programs, there is limited research available with regard to the high school student who completes the SAILS program at the high school level and then decides to dual enroll in a college level math course such as Math 1530, Probability and Statistics. The SAILS program design has been touted as a critical model in which the State of Tennessee may help educational institutions reduce the number of high school students who will require some type of remediation when entering postsecondary training (Osborne, 2014). With such a monumental claim that is predicated upon a similar learning support strategy that has produced questionable student outcomes at the college level, it is essential to continue to measure the actual impact of the SAILS program as it is implemented in area high schools.

Definition of Terms

There are a number of terms that are specific to this study that may be unfamiliar to the reader. Although there can be a variety of interpretations for some of these expressions throughout the literature, the following definitions will help to clarify their meaning for the purposes of this particular study.

Course Completion: The act of satisfying all required components of a particular high school or college course and the receipt of a passing grade in accordance with TBR (2016b) and NCES (2011) standards for the college coursework. Specifically for the SAILS program, this would include the completion of all five of the Pearson Education modules (Pearson Education, 2016). For the Math 1530, Probability and Statistics, course, this would include the letter grade of A-D in accordance with TBR Policy 2:01:00:00 (TBR, 2016b, Section IV).

Dual enrollment: Dual enrollment refers to a high school student's participation in a

college-level course, such as the Math 1530, Probability and Statistics, course within this study and the earning of college credits while still enrolled in high school (Waits, Setzer, & Lewis, 2005). For this particular study, dual enrollment courses may have been taught on ground or in a hybrid format (both on ground and online methods are used) by either a high school or college faculty member who was approved to teach by possessing the proper academic credentials to teach college coursework (Plucker, Chien, & Zaman, 2006).

Ethnicity: Refers to the cultural factors of an individual, including their nationality, and follows the NCES (2008) ethnicity code classification for this particular study. The ethnicity of the respective students within this study is combined with their race classification within the data collection process (NCES, 2008).

Final Grade: The analysis and documentation of student intelligence with regard to a specific exam, subject matter, or grading period, and specifically refers to the actual grade awarded for the Math 1530, Probability and Statistics, course within this study in accordance with TBR Policy 2:03:01:01 (Jung, Leung, & Miller, 2016; TBR, 2014, Section II: Quality Point System).

Gender: Student designation of either male or female as documented in the Banner data collection system and in accordance with the NCES (2011) classification system (Ellucian, 2016).

Learning support (commonly used interchangeably with college remediation and developmental studies): Courses or services provided for the purpose of assisting underprepared college students to attain their academic goals (Boylan, 2002). Learning support is currently defined by the Tennessee Board of Regents (TBR) (2016) as “academic support needed by a student to be college ready as established by the ACT college readiness

benchmarks and standards” (p. 1).

Non-SAILS students: For the purposes of this study, non-SAILS students are those who already possessed a 19 ACT in math and were not required to take college remediation (ChSCC, n.d.).

Race: The race of the respective students within this study is combined with their ethnicity classification within the data collection process and includes Alaskan Native, American Indian, Asian or Pacific Islander, Black-Non-Hispanic Origin, Hispanic, White-Non-Hispanic Origin, and Not Specified (NCES, 2008).

Rural Location: An area designation for the campus locations within this study that is not heavily commercialized or populated and generally is under 50,000 in population (United States Census Bureau, 2015).

Seamless Alignment and Integrated Learning Support (SAILS): A program that targets high school seniors who have not attained college readiness benchmarks and implements college remediation methods with these students during their senior year (ChSCC, n.d.).

Urban Location: An area designation for the campus locations within this study that is densely developed territory, and includes residential, commercial, and other non-residential urban land uses and generally represents at least 50,000 in population (United States Census Bureau, 2015).

Withdrawal: The act of a student leaving a high school or college program prior to completing a diploma, degree, course, or subject area (Pocock, 2012). The designation of a withdrawal is typically indicated by a “W” on a high school or college transcript and is in accordance with the TBR Policy 2:03:01:01 for the purposes of this study (TBR, 2013, Section V: Drop and Withdrawal Standards).

Limitations and Delimitations

One of the primary limitations within this study was the availability and accuracy of the pertinent information recorded both at the community college and at the participating high schools. Both the demographic and academic information was pulled from archival data and limited additional comparisons that may have been beneficial to the study, such as the determination of socioeconomic factors and learning disabilities, that possibly affected student outcomes (An, 2013). Likewise, the use of letter grades within the archival data collected for the study limited the variability that numeric grade comparisons perhaps could have provided.

Another consideration of this study included the lack of oversight and control that the researcher had over the students and campus locations where the SAILS program and the Math 1530, Probability and Statistics, courses were administered. Each of the campus locations chosen was largely based on the geographic proximity of each student and was typically selected as a matter of convenience by the student. Said, Kirgis, Verkamp, and Johnson (2015) surmised that instructional methods and outcomes may vary depending on the course formats. The inherent inconsistencies that would likely exist within diverse teaching practices were a limitation within the statistics reported and may have been more controlled in an experimental research design (Heyvaert, Wendt, Van den Noortgate, & Onghena, 2015).

The primary delimitation of this particular study was the scope. The study included data from one two-year community college. Therefore, the results reported may or may not be applicable to other institutions that have either participated in or plan to participate in the SAILS program.

Finally, the campus location was an additional delimitation within the study. The results of the study only represented the campus locations where SAILS students participated in the

Math 1530 course. Although the classifications of the rural and urban campus locations were based on the United States Census Bureau definition, the students within the study should be recognized as individuals and may or may not have responded in a manner according to their living arrangements or categorical classification.

Overview of the Study

The research within this quantitative study focuses on the actual results that occurred while implementing the SAILS initiative in area high schools within the East Tennessee area. The organizational design of this dissertation includes five chapters, each providing a unique and vital component to the results of the overall study. Chapter 1 includes an introduction to the study, statement of the problem, research questions, significance of the study, definitions of terms, limitations and delimitations, and an overview of the study. Chapter 2 includes a review of the literature that is relevant to the study along with a brief explanation of how the concepts of dual enrollment, postsecondary remediation, and standardized instruction were integrated within the SAILS initiative. Chapter 3 includes the research methodology and design used to obtain the results examined in the study. Chapter 4 includes an actual analysis of the data collected. Chapter 5 includes the research findings, conclusions, and recommendations based on what was discovered within this study.

CHAPTER 2

LITERATURE REVIEW

Dual enrollment and college remediation serve as prime examples regarding the manner in which educational institutions have expanded educational opportunities for both the high academic achiever and the struggling student (Hagedorn, et al., 2010; Hughes, Rodriguez, Edwards, & Belfield, 2012; Norton, 2011). Although these students may appear to reside on opposite ends of the educational spectrum in terms of their academic proficiency, blending students who have progressed more readily with those who require additional academic preparation may prove beneficial to both in terms of the students' overall improvement and self-esteem (Bettinger & Long, 2009). In addition, many of the recommendations within the literature involved early exposure of the high school student to college coursework while also expressing an opposition to waiting until college to place a lower achieving student into remedial coursework (Abraham, et al., 2014a; Royster, Gross, & Hochbein, 2015). With higher drop-out and completion rates being reported at the college level for students in remediation combined with an increase in dual enrollment endeavors across the country, forming a partnership in these efforts may prove a viable option for improved student outcomes. Dual enrollment provides the opportunity for students to earn college credit prior to graduating from high school whereas remediation offers students a chance to receive additional academic assistance to attain the skills necessary for postsecondary training.

Thelen (1989) proposed that “The challenge of history is to recover the past and introduce it to the present” (Thelen, 1989, p.1123). To fully understand the integration of dual enrollment and college remediation within the Seamless Alignment and Integrated Learning Support (SAILS) initiative, it is important to understand some of the history and obstacles of

dual enrollment and college remediation programs. In addition, this literature review highlights topics that were pertinent to the research that was conducted within this particular study including standardized testing, the theoretical framework of student persistence and retention, and ultimately the culmination of each of these topics and how they are relevant to the SAILS program.

Brief Overview of Dual Enrollment

Ndiaye and Wolfe (2016) described early college programs as combining “high school and college in rigorous yet supportive environments that embrace acceleration over remediation to increase college enrollment and persistence rates of students underrepresented in higher education and high-paying careers” (p.33). Throughout the literature, early college credit has often been termed interchangeably with dual enrollment to describe the process in which students have attained college credit prior to high school graduation.

A variety of viewpoints exist throughout the literature regarding the first early college credit program. Contributing to the confusion may be the mutual exchange of terminology over the years and the manner in which educational institutions have awarded early college credit. Some researchers date these accelerated programs back to 1876 when Daniel Coit Gilman, the first president at Johns Hopkins University, established a three-year collegiate program (Greenberg, 1988; Johns Hopkins University, n.d.). Almost two decades later in 1891, William Rainey Harper, the first president of the University of Chicago, placed his ground-breaking philosophy of the junior college into action by encouraging area high schools to include the first two years of college within their high school curriculum (The University of Chicago Centennial Catalogues, n.d.). Both of these college presidents believed that education and research within an institution were interconnected and necessary for students and employees to progress

favorably within the institution (The University of Chicago Centennial Catalogues, n.d.; Johns Hopkins University, n.d.). Additionally, each president felt that high school standards needed to be improved and expanded with more rigorous academic curriculum that complimented their visions for education at the college level (The University of Chicago Centennial Catalogues, n.d.; Johns Hopkins University, n.d.).

Beginning in the early twentieth century, there were early college credit opportunities available for high school students although most programs were designed to target those who were academically gifted (Howley, A., Howley, M., Howley, C. & Duncan, 2013). This selectivity of students was consistent within the historical perspective of early college credit coupled with a semblance of prestige being attributed to the participating institutions (Howley et al., 2013). During the 1950s, one of the initial and more common methodologies of early college credit included Advanced Placement (AP) courses and examinations that were designed to assess student mastery of certain college introductory courses (Boswell, 2001). Another alternative included the advancement of students into college more quickly by allowing them to skip or be “promoted to” certain secondary grade levels (Boswell, 2001).

It was not until later in the twentieth century that these accelerated educational concepts were recognized as an opportunity to engage a wider array of students (Howley et al., 2013). During the 1980s, for example, some regions within the United States began to allow high school students to enroll in college coursework concurrently, even though it was still limited to a select number of 11th and 12th grade students who met the established criteria (Howley et al., 2013). Accordingly, it was this concept of students being concurrently enrolled into high school and college courses from which the term “dual enrollment” was primarily derived (Lewis, Morgan, & Overman, 2008). In fact, similar to the common exchange of terminology shared between

early college credit and dual enrollment, some states still use the terms of “concurrent” and “dual” enrollment interchangeably.

Examples of Early College Credit Models

The evolution of dual enrollment over time has led to a variety of academic options for high school students to attain their college and career goals. Students can take college classes either at the high school or on the college campus, or both, depending on instructor availability and the method of course delivery (Ganzert, 2014). Programs may also vary in terms of the number of students allowed to participate, the academic requirements for each course, and the instructor qualifications to teach the course (Ferguson, 2014). Just as the terminology used to refer to dual enrollment may vary (e.g. dual and concurrent enrollment), the formats that exist across the United States to implement these programs may fluctuate considerably from program to program.

Among some of the renowned early college credit programs, the Bill and Melinda Gates Foundation has long served as a proponent to inspire improved educational completion rates by implementing early college high schools that are meant to help dissuade students from dropping out of high school and not continuing on to college (“Gates foundation,” 2002). In March of 2002, the Bill and Melinda Gates Foundation announced that it was poised to create 70 early college high schools by allocating 40 million dollars dedicated to graduating students with both a high school diploma and an associate degree (“Gates foundation,” 2002). Similar effects began in Massachusetts where public education implemented early college high schools by actively partnering with outside stakeholders (Leonard, 2013). Leonard (2013) discussed the approach that Massachusetts took to combat financial constraints by securing outside support from stakeholders, including monetary buy-in from students and parents. This model sought to

develop and improve student outcomes by not only examining plausible financial and strategic approaches to offering dual enrollment but also by expanding the number of dual enrollment opportunities for all interested students, even those who may not be able to afford the costs of college.

Similar to the schools in Massachusetts, other secondary schools have expanded their dual enrollment course offerings to diverse populations and have not limited the program to high-achieving students. For example, in 2008, the James Irvine Foundation in California started the Concurrent Courses pilot program that placed an emphasis on examining the effects of both early college credit and completion outcomes once the participating students entered college (Hughes et al., 2012). This program involved a three-year study that identified seven fundamental parameters for dual enrollment that have become more common in many early college credit programs across the country. These primary areas of focus included (a) expanding Career and Technical Education (CTE) dual enrollment participation to low-income and underrepresented students, promoting broad eligibility for college courses; (b) ensuring rigor, authenticity, and transferability of college courses; (c) integrating rigorous academics and career/technical subject matter, combining college preparatory academics with career/technical and applied learning; (d) creating strong collaborative relationships among college and secondary partners; (e) providing support to help students be successful in their college courses and college transitions; (f) creating program sequences that span high school and college classes; and (g) collecting data on students' secondary and postsecondary outcomes and participating in an evaluation (Hughes et al., 2012, p. 10). One of the most critical outcomes that surfaced as a result of the Concurrent Courses pilot was the idea of collecting, measuring, and tracking students not only when taking dual enrollment courses, but also when they progress to

postsecondary training. Similar to the SAILS initiative, this program targeted students who were struggling academically in an effort to improve the students' high school efforts and to engage them in postsecondary educational pursuits (Hughes et al., 2012).

In June, 2015, another innovative strategy for dual enrollment was initiated through the Go to High School, Go to College Act (Kelley, 2015). This bill focused on trying to eliminate some of the common barriers that students face when trying to participate in college coursework (Kelley, 2015). Certainly, many advocates have emphasized the benefits of dual enrollment and that these efforts may help students become more engaged and comfortable with college coursework, creating a higher likelihood that they will continue on this path (An, 2013; Ganzert, 2014). Furthermore, research has shown that students are often able to save money by taking college courses prior to entering college by getting some of their core and remedial courses out of the way (Cauley, 2014). However, the cost of college tuition when taking a dual enrollment course(s) has been identified as one of the most common barriers for students who would like to participate (Cauley, 2014). As a result, Senator Rob Portman proposed making the Pell Grant available to students while they are still in high school so that they can benefit from this financial assistance (Kelley, 2015). The Pell Grant is one of the most popular forms of federal financial aid used across the country based primarily on specified income criteria that, in most cases, does not have to be repaid (Federal Student Aid, n.d.). Historically, this form of financial aid has not been available for high school students to take college courses through dual enrollment. By making this money available to students while they are still in high school, the cost factors involved may be alleviated or eliminated altogether.

Other states that have also recognized the importance of making funding available to potential college students while still in high school. Tennessee was chosen as one of two dozen

states to participate in President Obama's experimental initiative that targets lower income students by making Pell Grant funding available for them to participate in dual enrollment (Kerr, 2016). Likewise, Senator Gary Peters and Senator Bill Cassidy recently introduced a bipartisan bill that would allow the Department of Education to create grant programs for dual enrollment at the high school level ("Congress to consider," 2016). The Obama administration clearly acknowledged the potential advantages of offering dual enrollment by making 20 million dollars available to serve approximately 10,000 dual enrollment students across the United States (Kerr, 2016). In January, 2016, a memo from the Obama administration outlining specific changes to the Pell Grant included the statement that "Finishing faster means more students will complete their education at a lower cost and likely with less student debt" (Camera, 2016, para. 9). Moreover, President Obama emphasized the close connection between college and workforce preparedness during his final State of the Union address by asserting that "real opportunity requires every American to get the education and training they need to land a good-paying job" (Camera, 2016, para. 3).

Each of the aforementioned examples of dual enrollment has depicted unique approaches to help target and fulfill the educational and workforce demands of the local communities. Indeed, educational stakeholders have recognized the critical link between the early preparation of students for college and helping them to fulfill the path towards future economic prosperity (Wang, Chan, Phelps, & Washbon, 2015). Accordingly, the early days of only permitting a select few to engage in early college credit opportunities have seemingly been transformed into allowing a greater and more diverse population of students to be served due to the associated benefits that these programs may offer (Jones, 2014).

Benefits and Obstacles of Dual Enrollment

Researchers have highlighted successful dual enrollment programs that have not only benefited the high school student but have also helped to bridge the gap between educational stakeholders. A number of studies have indicated that students may become more prepared for college as a result of participating in dual enrollment. For example, Johnson and Brophy (2006) proposed that dual enrollment may be beneficial for students in rural areas by offering a flexible college schedule that will allow them time to work so that they may also cover associated expenses. An (2013) surmised that dual enrollment may serve as a possible remedy for what is commonly referred to as the “senior slump” or “senioritis” whereby high school seniors tend to become less motivated in their final semesters of high school. In this regard, dual enrollment may motivate and invigorate students in pursuing their educational goals by offering an early opportunity toward college endeavors (Dare & Nowicki, 2015). Similarly, Wang et al. (2015) argued that high school seniors who lack concentration during their final semester, especially with an added summer break, could experience a general loss of momentum, motivation, and knowledge during their first semester of college. By examining the academic paths of dual enrollment students at a two-year technical college in Wisconsin, Wang et al. (2015) were able to demonstrate a direct link between student participation in dual enrollment and favorable outcomes in student momentum, completion, and four-year retention rates.

Those individuals who have been personally involved in dual enrollment programs have also reported favorable insight. Offering an instructor’s perspective, a high school administrator at George Mason University shared her previous interaction with a dual enrollment program by describing the increased interest and participation experienced by the students coupled with a renewed enthusiasm from the students’ parents, the K-12 district administrators, the college

administrators, and the dual enrollment instructors (Lukes, 2014). Lukes (2014) disclosed how she was able to witness firsthand how college administrators began to view dual enrollment as an opportunity to recruit and assist high school students in becoming more prepared for college and high school administrators started recognizing academic benefits to students in both their high school and college coursework. From a student's perspective, a qualitative study conducted at a California community college offered direct insight into how dual enrollment students may benefit by becoming more familiar with the college atmosphere and the skills needed to pursue educational aspirations while also becoming less likely to falter academically during their first semester(s) in college (Kanny, 2015). Similar studies have reported students experiencing a greater sense of self-fulfillment, initiative, and personal commitment as a result of dual enrollment participation (Dare & Nowicki, 2015).

Certainly, there are reported advantages accruing to various stakeholders as a result of operating a dual enrollment program. Dual enrollment may provide an excellent opportunity for both the students and educational institutions by keeping students engaged and helping them to prepare for both high school and college. In addition, administrators may use dual enrollment as an opportunity to execute, revitalize, and develop related high school and college programs that target the necessary skill sets needed within local communities as well as in the global economy (Cauley, 2014). Additional benefits of dual enrollment may include smoother transitions to college, higher persistence rates, monetary savings, and increased options toward career pathways and workplace opportunities (Leech, 2014).

Despite the beneficial aspects of dual enrollment, there are those who question this approach, especially when it comes to the rigor for college coursework and the consistency among program outcomes being measured. For example, Whissemore (2012) emphasized that

the effectiveness of dual enrollment may depend largely upon where the students take their classes, how the college classroom is managed, and whether the college rigor is maintained throughout course delivery. Researchers at the National Center for Postsecondary Research (NCPR) and the Community College Research Center (CCRC) suggested that even though dual enrollment may be beneficial for students, the general administrative and instructional methodologies used for the implementation of dual enrollment programs may vary drastically from one institution to the next (Whissemore, 2012). Khazem & Khazem (2014) noted that variances in coursework may be especially apparent when the college courses are being offered at multiple high school and college campuses with a variety of procedural policies being implemented at each location. Furthermore, dual enrollment instruction in general may vary in terms of the instructor, the location, and the resources available to the student (D'Amico, Morgan, Robertson, & Rivers, 2013). With obvious inconsistencies in program formats and course delivery, it does make it difficult to measure how optimal the student outcomes actually are as compared to other students across the country. Indeed, similar concerns of varying administrative processes and inconsistent instructor methods have been documented when comparisons of dual enrollment programs have been made within the same states, regions, and local educational agencies (LEA) (Kingston & Anderson, 2013).

As dual enrollment has become more popular over the years, there have been efforts to standardize methods and strategies to try to increase program credibility. Among dual enrollment practitioners, the most commonly renowned organization that serves as an accrediting agency for dual (concurrent) enrollment is the National Alliance of Concurrent Enrollment Partnerships (NACEP) (NACEP, 2016). NACEP was first organized in 1999 with the goal of developing and streamlining national standards and accreditation for dual enrollment (Swanson,

2010). One of the primary goals for NACEP has been to “ensure that college courses taught by high school teachers are as rigorous as courses offered on the sponsoring college campus” (NACEP, 2016, Standards section, para. 1). Similarly, NACEP also tries to guarantee that the instructors teaching dual enrollment meet the academic requirements that are maintained by the sponsoring postsecondary institution (NACEP, 2016). Thus, dual enrollment does have support for standardization if warranted, but many institutions have chosen not to participate because the membership requires a detailed eligibility process along with annual membership dues and responsibilities such as progress reporting and following certain procedures (Whissemore, 2011; NACEP, 2016). Furthermore, some institutions prefer the flexibility that dual enrollment programs may offer and have found that the potential rigidity that may accompany additional governance creates potential conflicts with their primary policies and procedures (Smith, 2015). As a result, certain variations continue to exist across dual enrollment programs that do make it difficult for educational institutions and researchers in terms of defining and measuring program success rates consistently.

Offering dual enrollment may also create problem areas for students and administrators when dealing with college course transferability and poor participation outcomes (Smith, 2015). Some four-year institutions require specified courses in order for students to gain college credit. Without the proper matriculation agreements in place, students may become frustrated because the course either does not transfer or does not count towards their specific area of study (Royster et al., 2015). Another related problem is the misalignment of dual enrollment courses, including both secondary and postsecondary courses, because each institution may have their own set of curriculum standards and course objectives for respective courses (Kingston & Anderson, 2013). This process may become a potential area of confusion when trying to coordinate classes for

credit both before when the courses are being aligned with the secondary course(s) and after when the student begins college and is seeking college credit. Perhaps even more frustrating, some students participating in dual enrollment may begin their college experience by receiving a poor grade because they are not adequately prepared to participate in a college course (An, 2013). This situation could lead to additional struggles for students by possibly lowering their high school and college Grade Point Average (GPA) or causing students not to be able to graduate from high school. Certainly, not being able to graduate from high school due to a failing grade in a dual enrollment course that also counts toward a required high school credit needed to graduate is a potential area of concern. Therefore, clear communication with dual enrollment students, appropriate faculty, and school districts should become a top priority for those working with dual enrollment programs so that the students' participation can be enhanced and productive toward their intended goals (Lukes, 2014).

Another common argument remains present throughout the literature regarding how well student participation in dual enrollment actually prepares the high school student who is considering college (Ganzert, 2014). Dual enrollment proponents encourage students to take as many college courses as possible, thinking that a larger number of courses will better prepare students for college (Kretchmar & Farmer, 2013). For example, a policy change in the Commonwealth of Virginia was poised to expand dual enrollment participation with the goal of improving persistence and completion rates for college students. However, a study examining the results of this policy indicated that even though student participation and the number of credit hours taken in dual enrollment did increase significantly, there was no uniformity in student outcomes and the overall number of students matriculating to postsecondary training was only minimally affected (Pretlow & Wathington, 2014). Similarly, researchers at the University of

North Carolina (UNC) at Chapel Hill suggested that there may be a point of diminishing returns with regard to the number of dual enrollment courses taken (Kretchmar & Farmer, 2013). Their study of 3,626 students demonstrated that once a student had taken approximately 10 or more college courses, there was no positive impact on academic progress. Therefore, they encouraged addressing possible obstacles with students up front and explaining to them that taking more courses are not always the better option. Likewise, studies have shown that students who engage in both high school and college coursework simultaneously may sometimes experience depleted motivation and energy levels potentially causing them to “burn out” early in the college process (Kanny, 2014). Clearly, this effect could become counterproductive to one of the primary purposes of dual enrollment which is to engage students early in their college endeavors.

Even though dual enrollment does appear to offer many positive opportunities and advantages for students, parents, and administrators, the process may become complex and multifaceted. Factors may include (a) coordination of proper course alignment and course location, (b) determining instructor availability and eligibility, (c) addressing socioeconomic issues, and (d) embodying diverse student participation (Lukes, 2014, p. 20). Although there are obviously advantages and barriers that should be carefully considered when evaluating dual enrollment options, a common theme throughout the literature was the potential that dual enrollment may offer when trying to deliver an adequately prepared student for college (An, 2013; Hess, 2016; Smith, 2015). Thus, a thorough understanding of what it means for a student to become ready for college is certainly an important element to consider when designing a dual enrollment program because of the ultimate academic impact that it may have on the participating students.

College Readiness

In 1899, the College Board (CB) was established to help students transition from high school to college more readily (Royster et al., 2015). Initially, this board consisted of representatives from 12 universities and three private high schools that were charged with determining a specific set of standards that would indicate student mastery of high school content (Cheng, 2014). Today, the CB has over 6,000 institutions and organizations worldwide within its membership (College Board, n.d.). Even with the substantial growth that has occurred within the CB over the years, the primary goal has remained consistent by continuously seeking to determine and monitor the actual competencies needed for students to succeed in college (CB, n.d., para. 3). Venezia and Jaeger (2013) defined college readiness as the preparation needed for a student to become successful in a college program without needing any type of remedial or developmental courses upon entrance into college. However, the specific standards for college readiness may differ across educational institutions (e.g., Stanford University vs. a rural community college) (Hess, 2016). There does, however, appear to be some components of college readiness that are shared among researchers. For example, both Karp (2012) and Leonard (2013) referenced Conley's (2003, 2007) philosophy of college readiness that incorporates (a) cognitive strategies, (b) content knowledge, (c) academic behavior, and (d) contextual skills and knowledge (p. 4). Karp (2012) emphasized that each of these critical elements should be carefully considered for college readiness to be achieved. Ultimately, even though each student may differ in their skill level, these individuals need to be able to apply the learned concepts of secondary school in a manner that satisfactorily helps them to accomplish their college level coursework. Furthermore, Karp (2012) asserted that becoming ready for college may also mean that the student must learn to (a) navigate complex postsecondary

requirements, (b) implement new strategies for study skills and time management, and (c) engage in new forms of social relationships. With new postsecondary students becoming quickly exposed to unique characteristics and requirements within the college environment, even those who appear to be academically prepared may face the possibilities of needing additional preparation to become college ready (Karp, 2012; Levin & Calcagno, 2008).

Brief History of College Remediation

For decades, educators and administrators have been seeking a college remediation solution that will ensure that students are adequately prepared for postsecondary coursework upon high school graduation (Levin & Calcagno, 2008). Similarly, educational institutions and organizations have tried to determine the exact terminology and methodologies needed to define and resolve college remediation (Hess, 2016). Some researchers suggested a fundamental explanation of remediation by referring to the term as the lack of academic preparedness for postsecondary coursework in the primary subject areas of English, reading, and math (Hess, 2016; Shaw, 2014). While this interpretation may hold true, the National Association for Developmental Education (NADE) described developmental education as much more by including the following within their definition: (a) promotes the cognitive and affective advancement for postsecondary learners, (b) identifies the special needs of individual learners and addresses those needs, (c) includes diagnostic and exam preparation, (d) teaches general and discipline-specific learning strategies, and (e) includes supplemental education such as mentoring, tutoring, and academic counseling (National Association for Developmental Education (NADE), 2013).

Similar to college readiness, researchers continue to profess differences in opinion regarding college remediation and possible solutions. Arguments date back to the 1830s when

Ezra Cornell, the founder of Cornell University, expressed his concerns that students were not prepared for college coursework (NADE, 2013). It was during that time that Cornell was candidly told by one of his college professors, “If you wanted to teach spelling, you should have founded a primary school” (Brier, 1984, p. 3). Perhaps similar opinions over the years have caused college remediation to continue to surface in postsecondary education. In 1976, over a century after Cornell had expressed concerns over unprepared college students, college remediation was still apparent during the first meeting of the National Association for Remedial/Developmental Studies in Postsecondary Education (Tierney & Garcia, 2011). Two years later, the *Journal of Developmental Education* was first published indicating that remediation still needed to be addressed more formally (Tierney & Garcia, 2011). Furthermore, it was during this same timeframe that educators appeared to begin publically voicing their concerns as well. For example, Wiener (1972), who was an Assistant Professor of English at a New York community college during that time, formally expressed his excitement “beyond measure” regarding the expository essay topics being covered in his courses such as “women’s liberation” and the “new wave” of open admissions policies within colleges (p. 660). However, he also acknowledged that many of his students were performing at the remedial level, insisting that the students within his college English course begin with learning how to develop a solid, single paragraph. “Most students with a writing problem read poorly too,” (p.661) declared Wiener as he further explained that many of his freshman students could not conceptualize and understand the formality that was necessary for college level coursework.

Likewise, in March 1998, the New York mayor at the time, Rudolph Giuliani, underscored the remediation dilemma when he publically proposed the future elimination of all remedial coursework within six community colleges (Wright, 1998). Giuliani was extremely

disillusioned that four out of five students had participated in some type of remediation coursework within the six New York community colleges and that 87% of the incoming freshmen had failed at least one of the three basic skills exams upon entrance into college (Wright, 1998). In association with Giuliani's concerns, Wright (1998) emphasized why the community college administrators, instructors, and the public at large needed to be concerned due to the apparent shifting of responsibility and the exorbitant costs that were linked to college remediation. Many of the same political and logistical arguments are still evident almost two decades later while the apparent obstacles of college remediation continue to surface for all involved (Hassel & Giordano, 2015).

Addressing College Remediation

Obviously, ensuring that students are prepared for college is a difficult barrier to overcome or historical discussions and methodologies regarding remediation would have yielded viable resolutions decades ago. It is estimated that nearly 60 % of all freshman students who are entering college within the United States are required to take at least one remedial course (Logue, Watanabe-Rose, & Douglas, 2016). However, the completion rates for these courses have historically been low with the struggles of remediation either prolonging the amount of time needed toward college completion or sabotaging the student's plans for college altogether (Bettinger, Boatman, & Long, 2013). The President of Alliance for Excellence in Education, Robert E. Wise, likened the remediation process to "running an extra lap around the track before the race even starts" (Shaw, 2014, p. 38). A common presumption among researchers is that educational institutions simply cannot accept the status quo of underprepared students that have seemingly been apparent for decades (Levin & Calcagno, 2008; Tierney & Garcia, 2011). Facing the increased costs of remediation to both students and institutions, the extended

timeframe of college completion and the forgone earnings to the student, and the fact that one in three students may never even graduate, educational stakeholders are seeking ways to improve the apparent epidemic of college unpreparedness (Crisp & Delgado, 2014; Shaw, 2014).

Attempting to address the apparent obstacles of college remediation, researchers and educators alike have offered staunch viewpoints and opinions. For example, Bettinger et al. (2013) indicated that mixed reviews and outcomes in earlier research have demonstrated the need for policy makers to redesign developmental programs. In fact, some studies have indicated that students may be unknowingly participating in either too many developmental courses or are in programs that are not helping them meet their academic goals (Crisp & Delgado, 2014; Shaw, 2014). Being required to take college remediation has led to an estimated 50% of these students never completing the intended course sequence (Crisp & Delgado, 2014). Furthermore, of those 50% who are required to take a remediation sequence, 30% of them do not end up taking courses at all (Crisp & Delgado, 2014).

Leonard (2013) contended that implementing learning support at the beginning of the freshman year in college and combining this developmental coursework with the student's additional college course load is still the most effective model. By waiting until college for remediation methods, the student may become more familiar with the college environment while also building a stronger academic foundation (Leonard, 2013). Bettinger and Long (2009) studied an Ohio college and found that by grouping first-year remedial college students with others who are faced with similar learning deficiencies yielded positive student outcomes overall. By separating the weaker students, instructors were able to tailor the instructional methods to specifically address the needs of this targeted audience. Furthermore, they

determined that students participating in remediation courses seemed to possess stronger persistence rates than their academically similar peers (Bettinger & Long, 2009).

Additional remediation approaches within the research have included (a) summer bridge programs, (b) learning communities (LCs), (c) educational counseling, (d) academic tutoring, (e) targeted orientations and (e) supportive services such as childcare and financial aid assistance (Bettinger et al., 2013; Cooper, 2011; Shaw, 2014). The Summer bridge programs allow students to concentrate on the developmental coursework during the summer months when there is typically a break from school and some knowledge may be lost (Schnee, 2014). Initially, Summer bridge programs were designed to target the low-income, minority, and first-generation students; however, over the years, some programs have begun to incorporate remedial students in general (Cabrera, Miner, & Milem, 2013). Although the programmatic components may differ within Summer bridge programs, many essential elements for college readiness are integrated into the students' academic preparation such as study skills, time management, general college requirements, tutoring, and collaboration with college faculty and administrative staff (Cabrera et al., 2013). While sharing similar goals, LCs place an emphasis on providing a nurturing environment and a sense of belonging among students by teaching them to discover deeper meaning within their experiences and the instructional content (Schnee, 2014). Remediation efforts such as the Summer bridge programs and LCs may enlighten and educate students so that they feel more comfortable and prepared for college level participation. Moreover, the associated benefits of supportive services, such as counseling, financial aid, and childcare, may assist students by alleviating some of their anxiety with regard to necessary responsibilities both in and outside of the classroom (Cooper, 2011).

Conversely, strong criticism regarding current remediation methods is apparent within the literature. Some researchers oppose the viewpoint of overloading students with information that should have been learned progressively during K-12 instruction and blame the necessity of college remediation on the poor quality and unsatisfactory rigor of secondary education (Bettinger & Long, 2009). Cooper (2011) asserted that with three out of five high school students needing remediation as a college freshman, it would appear that the proper instruction at that point is a little too late. She suggested concentrating on the rigor and content at the secondary level and establishing standards that will ensure that the core curriculum being taught to students is relevant and consistent across the United States, similar to what was being proposed with the Common Core Standards in 2010. Furthermore, Cooper (2011) argued that even though many colleges address remediation in some manner, “broadly” grouping students together to accommodate similar academic deficiencies does not effectively address the individual capabilities of each student to experience academic success. In fact, this collective environment may discourage some students. Likewise, most educators, administrators, and researchers do recognize that each student is an individual and may vary with others of similar age in terms of their unique personalities, skill levels, and the manner in which they process information (Norton, 2011). Thus, suggestions have been proposed to group students at the secondary level according to their skill level and academic capabilities as opposed to merely placing students by grade level and age (Shaw, 2014).

Although student individuality is certainly a factor that educators face, the current educational system in the United States appears to proclaim that each student should be measured by the same, or similar, standards academically (Norton, 2011). However, disagreements exist with regard to assessing college remediation levels as well. Some studies

suggest that relying on an arbitrary assessment, such as a college entrance exam, may require students to take too many remediation courses that are not necessarily effective toward the students' goals. Ballou and Springer (2015) concluded that "No evaluation instrument is perfect; every evaluation system is an assembly of various imperfect measures" (p. 77). Bahr (2012) recommended an analysis of student skill sets on a deeper level with respect to the remediation problem. He proposed that the lack of knowledge regarding the variations in college-level skill attainment among remedial students who exhibit either a low or high skill level needed to be further explored (Bahr, 2012). In other words, even though the students may be participating in the same remediation program, academic performance may vary because each student possesses different skills at the point of entry.

Until relevant discrepancies can be addressed to level the playing field within our student preparation and assessment measures, students will likely continue to struggle in some manner (Bahr, 2012). As a result of so many differing variables among students, some researchers suggested measuring students' academic development by a variety of factors that can provide a better, more comprehensive baseline for the student (Ballou & Springer, 2015). In a similar context, Scott-Clayton, et al. (2014) declared that minimal attention has been given to the diagnostic value of standardized testing and recommended the review of other educational records, such as high school transcripts and course participation, in addition to college entrance exam results.

Standardized Testing: The Debate Continues

Although harsh criticism of standardized testing exists within the literature, this method continues to be one of the most recognized assessment measures to indicate college-level mastery (Royster et al., 2015). Standardized testing evolved from earlier intelligence testing

such as the Intelligence Quotient (IQ) test and achievement tests that became popular in the 1920s. In 1917, the United States began relying on large-scale testing due to the additional recruitment of soldiers needed for World War I, yet discovered that there were occasional differences between the actual results recorded and the unique aptitudes exhibited among those soldiers who tested (Feingold, 1924). Since that time, standardized testing has remained heavily debated as a primary tool to accurately assess an individual's capabilities, including those students who plan to attend postsecondary training (Levin-Epstein, 2015).

One of the most significant influences of education that appeared to invigorate standardized testing in the United States (US) was the 1983 report, *A Nation at Risk*, that sought to reexamine the status of education in the US because of public speculation that the educational system was inadequate and failing (Peltier & Noonan, 2003). This report emphasized the close connection between secondary and postsecondary education and tried to ensure more consistency in benchmarks across educational systems (Peltier & Noonan, 2003). With similar focus of improving education, President George W. Bush signed the No Child Left Behind Act (NCLB) into law in January of 2002 that was the first time in US history that K-12 educational outcomes were based on standardized assessments (Duckworth, Quinn, & Tsukayama, 2012). This legislation propelled standardization and evaluation of students into an entirely new realm by not only measuring student outcomes, but also by holding educators accountable for the standardized exam results (Dee & Jacob, 2011). Proponents of NCLB claimed that by publicizing school-specific characteristics and test results, educational institutions became more focused and productive regarding the educational outcomes of their students (Ballou & Springer, 2015). Conversely, opponents of the legislation argued that certain incentives to increase test scores may cause inferior academic methodologies to be developed and may eliminate the individuality

of course instruction and students' needs (Dee & Jacob, 2011). Furthermore, measuring the quality of an instructor based on student exam results left many secondary instructors arguing that the standardized exams, standardized scores, and related content were beyond their control (Ducksworth et al., 2012). Similar to some of the criticisms made regarding standardized exams, NCLB left some instructors arguing that this legislation led to insufficient indicators of student success rates and that additional information such as student report cards, level of intelligence, and self-discipline, also needed to be considered and reported (Ducksworth et al., 2012).

Even with the apparent contention across the country regarding the negative impact of NCLB, positive statistical measures of student and program success have been reported (Klein, Zevenbergen, & Brown, 2006). For example, Dee and Jacob (2011) showed significant increases in math achievement at the fourth grade level and moderate increases at the eighth grade level due to NCLB. Furthermore, some of these increases were indicated for students of diverse ethnic backgrounds and lower socioeconomic factors (Dee & Jacob, 2011). However, recent criticism of required standardized testing and the effects of NCLB at the local level has indicated that certain institutions have taken a stronger stance and have chosen to "opt out" of standardized exams due to weak predictive outcomes (Neill, 2016). Neill (2016) indicated that local school systems were trying to exert more control over this requirement and noted that more than 620,000 students had chosen not to participate in standardized testing within the states of Colorado, New Jersey, New York, and Washington. Thus, the requirements surrounding standardized testing continue to be debated.

Theoretical Framework for Student Persistence and Retention

In 1973, Tinto attempted to explain student attrition, retention, and persistence by developing what has been commonly referred to in the literature as either the student departure

theory or Tinto's model of departure (Metz, 2005; Tinto, 1987). Within his theory, student departure from an educational institution is primarily viewed as a result of the student's interaction within the corresponding academic environment (Tinto, 1987). Tinto (1987) declared that a student will interact within the social structure of the college based on his/her personal goals, intentions, demographics (e.g. gender), and academic skill sets and that their experiences likely dictated whether the student would persist through their academic aspirations. Moreover, Tinto's theory emphasized student performance indicators (e.g. ACT, GPA) as viable predictors of student persistence (Maruyama, 2012). Tinto's later work suggested an integration framework that posited that students may become more connected to an institution based on two different dimensions: (a) academic interactions, and (b) social interactions (Tinto, 1997).

Some higher education researchers including Lee, Donlan, and Brown (2011), discounted Tinto's integration framework as mutually exclusive and found that financial constraints and family obligations contributed greatly to student success rates. However, Karp et al. (2011) supported the importance of academic and social interaction for students within the community college environment along with plenty of opportunities to do so. For most students within this study, it was likely their first interaction with a community college. In addition to the quantitative outcomes yielded within the study to describe the effect of the SAILS program on math college readiness, Tinto's theoretical framework offers an additional perspective in which to consider when examining the holistic viewpoint of student outcomes and why students are or are not successful in a college course upon completion of SAILS. Tinto's theory behind retaining a college student may offer a theoretical perspective from which to derive additional evaluative suggestions for this study as well as to develop future empirical research in relation to the SAILS program (Tinto, 1997). Hill and Woodward (2013) and Bahr (2012) suggested that

student retention and remediation are closely linked and that researchers should employ theoretical frameworks and examine research conclusions to propel remediation efforts into a solid, more effective future for students.

Cooper (2011) proclaimed that students recognize how ill-prepared they are for college coursework when they participate in their first college class. Students who feel inadequately prepared and become overwhelmed in a college course may drop the respective course never to return (Shaw, 2014). The National Student Clearinghouse (NSC) representing 3,600 colleges and universities primarily in the United States reported that of the freshman students who started college in the fall of 2014, 39.4% of students were not retained in their first year of college (National Student Clearinghouse, 2016). According to Tinto (2013) and Demetriou and Powell (2014), additional research in diverse strategies, partnerships, and potential theoretical roadmaps that will help to retain and engage students in college level coursework is sorely needed. Moreover, partnerships and strong interaction between secondary and postsecondary systems to help integrate policies, streamline methods, and, most of all, to develop and encourage eager and prepared college students, may help educators and administrators deliver consistent and effective outcomes for their respective students (Demetriou & Powell, 2014). In conjunction with Tinto's theoretical viewpoint to help explain resultant outcomes, the logistical viewpoint of dual enrollment, college remediation, and standardized testing and how each concept worked collaboratively within the SAILS program was critically important to this particular study.

The SAILS Initiative: A Collaborative Effort

In 2007, the Tennessee Board of Regents (TBR) received grant funding for an initiative called the Improvement of Postsecondary Education and partnered with the National Center for Academic Transformation for the purpose of redesigning the developmental studies program at

the postsecondary level (Squires, 2014). One of the primary focuses of this initiative was to help bridge the gap between secondary and postsecondary school systems by developing early learning support strategies for at-risk students (Squires, 2014). In support of this effort, both Cleveland State Community College (CSCC) and Chattanooga State Community College (ChSCC) piloted a novel approach to college remediation by offering the online developmental coursework used at the college level to a select group of high school students within their area (Squires, 2014). Having reported encouraging results, such as higher course completion and a reduction in college freshmen needing math remediation, ChSCC began working closely with Governor Haslam of Tennessee, the Tennessee Board of Regents (TBR) and the Tennessee Higher Education Commission (THEC) and in 2012 implemented an expansion of this remediation approach in four Tennessee community college areas (ChSCC, n.d.). Referred to as Seamless Alignment and Integrated Learning Support (SAILS), this new approach integrated the TBR math competencies for learning support with the Department of Education Bridge Math standards at the high school level and included online college remediation facilitated by a high school instructor while the students were still in high school (Roberts, 2014; State of Tennessee, n.d.). Proponents of this approach noted that the fundamental difference between high school and college remediation was the timeframe of these two programs. The college level learning support was required during the student's freshman year in college and the secondary Bridge Math program was being required as a high school senior (Tennessee Board of Regents (TBR), 2012; Tennessee State Board of Education, Tennessee's State Mathematics Standards, 2014). With similar content being taught in both programs, the primary intent of both remediation strategies was to help students attain the 19 ACT college readiness benchmark in math (TBR, 2012; Tennessee State Board of Education, Tennessee's State Mathematics Standards, 2014).

The SAILS initiative provided a unique opportunity to streamline secondary and postsecondary remediation efforts as well as potentially offered an earlier solution for college remediation (Roberts, 2014). Mike Crause, Assistant Executive Director of Academic Affairs for THEC, stated “Instead of waiting for students to show up at a community college and then requiring them to take remedial math, why not go down to their senior year and eliminate the remediation for free” (Roberts, 2014, para. 3).

In 2012, an identical SAILS approach that had been piloted at both CSCC and ChSCC between 2007 and 2011 was expanded to include additional community colleges in Tennessee (Squires, 2014). Initially, a small statewide expansion with a regional focus (e.g. East Tennessee, Middle Tennessee, and West Tennessee) targeted 500 students that were identified from area high schools associated with four specific community colleges, including students from high schools in East Tennessee that were associated with the community college within this study (ChSCC, n.d.). During the expansion, ChSCC served as the “gatekeeper” of records and reported an overall increase in completion of college remediation from 48% to 65% for those colleges that participated (ChSCC, n.d.). Encouraged by these results, Haslam decided to expand the SAILS program in the fall of 2013 to include all 13 community colleges and allocated 1.1 million dollars in support of this endeavor (Center for Education Policy Research (CEPR) at Harvard University, 2015; Osborne, 2014). As a result, approximately 8,500 students in 120 high schools participated in the program during the 2013-2014 academic timeframe (Squires, 2014). Similarly, during the 2014-2015 academic year, the Governor allocated approximately 2.6 million dollars to expand the SAILS initiative into 185 high schools with approximately 13,500 students participating in the program (Squires, 2014).

There was close collaboration between TBR, THEC, Tennessee State Department of Education, and the Tennessee high schools and community colleges to develop and implement the SAILS initiative (Squires, 2014). In support of the SAILS efforts, TBR revised and adopted a new version of the developmental studies policy in August 2010 (presently referred to as learning support) to include the following: “The delivery of learning support must be based on proven methods of integrating technology and learner-centered pedagogy” (TBR, 2012, F. Learning Support, line 7). TBR also sought to emphasize the necessity of close collaboration between community colleges and local education areas (LEAs) for high schools by requiring them to partner in the development of early intervention systems in support of learning support (TBR, 2012). Both the secondary and postsecondary stakeholders needed to ensure that the content being taught within the SAILS curriculum would fulfill both the high school and college requirements simultaneously in preparing the student for college level math (ChSCC, n.d.).

Likewise, there was collaboration in terms of the content of SAILS. Researchers have found that math learning support is more frequently needed in comparison to other subject matter within postsecondary remediation coursework (Benken, Ramirez, Li, & Wetendorf, 2015; Abraham et al., 2014a). It is fairly common within academia that students fear math more than other secondary and postsecondary courses and may be more reluctant to participate in courses that require math competency (Benken et al., 2015). Taking these factors into account, ChSCC sought initial input from various educational stakeholders during the early implementation of SAILS in 2007 and decided to focus on the math component of college remediation (Roberts, 2014).

A partnership with Pearson Education was also critical in terms of the online delivery format for SAILS (Roberts, 2014). With standardized delivery methods in either a web-based or

software format having become more commonplace, Squires (2014) described the self-paced technological software from Pearson Education as one of the primary reasons for success within the SAILS program (Cox, Jordan, Cooper, & Stevens, 2006). The Pearson Education software allows students to work at their own pace to complete the educational learning modules and exams while working with a high school instructor to facilitate the overall learning process. Upon completion of the five learning modules required for math competency, a student is deemed college ready in math, regardless of the student's previous ACT math score that deemed them in need of college remediation (Pearson Education, 2016).

Finally, the timing of SAILS was an important factor, especially in terms of building student momentum and persistence (Tinto, 2013). Tinto (2013) suggested that students are similar to the philosophy of Newton's *First Law of Motion* in that "students at rest tend to stay at rest and students in motion tend to stay in motion" (p. 1). Many of the participating students in SAILS started and completed the SAILS component during the first semester of their senior year in high school (ChSCC, n.d.). As part of the learning support policy, TBR recommends that "Students are expected to enroll in the appropriate college-level course immediately upon completion of the learning support or in the next term" (TBR, 2012, F. Learning Support, line 6a). Accordingly, many of the SAILS students during the 2013-2014 and 2014-2015 academic years chose to participate in a dual enrollment math course during the last semester of their senior year in high school (ChSCC, n.d.). Consequently, both the timing of SAILS completion for students as well as their participation in math dual enrollment served as critical factors within this particular study. Simply put, the researcher wanted to examine the effectiveness of the SAILS model to determine if students were ready for college math based on their SAILS participation. For the purposes of this particular study, the majority of students took Math 1530,

Probability and Statistics, because this course will typically fulfill a core requirement for many college programs and was highly recommended within the SAILS model (ChSCC, n.d.).

Although the research regarding the SAILS initiative outcomes is limited, having just been implemented statewide in Tennessee since 2012, the research behind the components of SAILS does provide a rich, historical overview of how these concepts have either worked independently or have overlapped in some cases (Squires, 2014; Abraham, Slate, Saxon, & Barnes, 2014b; Norton, 2011). However, the research regarding how college remediation, standardized exams, and dual enrollment work together collectively within the SAILS model is still limited. Dixon (2016) examined the student success rates in four learning support models, including the SAILS model at Walter's State Community College, and found that the Math 1530, Probability and Statistics, students were not as well prepared in comparison to other learning support models. Although Dixon (2016) surmised a number of factors behind this conclusion, including the content of the corequisite remediation model coupled with no probability and statistics course requirement in high school math, one of his recommendations was to explore alternative pathways for non-traditional students and students who scored below 15 on their ACT (Dixon, 2016). Certainly, Dixon's (2016) study supports the position that additional research is needed to evaluate the actual results of students who complete the SAILS remediation component and choose to take a college math course.

By concentrating on the subject area of remedial math within the SAILS program, the State of Tennessee has been able to reduce the number of first-time college freshman required to take remedial coursework in math (Fain, 2013; Sparks, 2014). The SAILS program has been touted as an ingenious approach, yielding approximately 91% of the participating students as college ready in math upon completion (Bradley, 2016). From a theoretical perspective such as

Tinto (1987; 1997; 2013), the SAILS model may provide the academic substance and familiarity with college that is needed to encourage student momentum, persistence, and completion by integrating the concepts of college remediation, standardized methods, and dual enrollment. However, the reviews of SAILS are mixed and the student success rates are not satisfactorily substantiated at this point. Therefore, the intent of this study was to offer additional insight into whether or not the SAILS model really does serve as an effective stepping stone to help prepare students for their intended college pathway and goals.

CHAPTER 3

METHODOLOGY

The purpose of this study was to examine the number of student enrollments, withdrawals, final grades, and course completions as well as the gender, race, and ethnicity of the SAILS versus Non-SAILS students with a 19 ACT math score who enrolled in a Math 1530, Probability and Statistics, course at one of six different rural or urban community college campus locations within East Tennessee. Specifically, the researcher sought to provide additional statistical insight regarding whether or not (a) the SAILS philosophy yields comparable student outcomes in comparison of the SAILS versus the Non-SAILS students, and, (b) the SAILS program adequately prepares the high school student academically for a college level math course. The Math 1530, Probability and Statistics, course was chosen as a critical component of the study for two primary reasons. First, students who were not majoring in a STEM (Science, Technology, Engineering, and Math) program in college were encouraged to take Math 1130, College Algebra, or Math 1530, Probability and Statistics, upon SAILS completion because both of these courses served as a core math course requirement for many college majors and would transfer to most four-year institutions within the State of Tennessee (TBR, 2016b). However, the number of dual enrollment students who chose to enroll in Math 1130, College Algebra, during the timeframe of the study was minimal due to the additional pre-requisite of Math 1000, Algebra Essentials, that was required at the community college. In addition, the Math 1530, Probability and Statistics, course was chosen because the examination of student outcomes for this course allowed the researcher to draw certain conclusions regarding the SAILS students' preparation for a college level math course in comparison to students who did not need college remediation.

Additional information pertinent to the study included the score of 19 on the ACT that served as the required eligibility benchmark to participate in the Math 1530 course. Students within the study had achieved the equivalent of a 19 ACT either by participating in SAILS or by taking the ACT exam prior to enrolling in the Math 1530 course. The Non-SAILS students with an ACT score exceeding 19 were not included in this study. In terms of the timeframe of the study, the academic years of 2014-2015 and 2015-2016 were targeted to examine dual enrollment math indicators due to when the SAILS program was fully implemented statewide (2013-2014) and allowing a full year for program start-up and implementation.

One of the fundamental purposes of a quantitative study is to explore if there is a valid relationship between variables and that the respective variances that occur are a direct result of this association (Punch, 2005). Accordingly, the researcher sought to examine the academic variables, gender, race, and ethnicity to determine if there were any significant differences within the comparison of the SAILS versus the Non-SAILS students within the study based on the campus location where the Math 1530 course was taken. Within her study, Silva (2013) chose to explore the educational obstacles of youth in working class areas indicating that minority students in poorer, more rural geographic areas often felt overwhelmed and “cheated” by the bureaucracy in the current educational system. Furthermore, studies have shown that geographic location may limit students’ academic attainment based on “education deserts” and insufficient instructional methods that are “disproportionately located in the nation’s poorest and most racially minoritized communities” (Hillman, 2016, p. 988). Therefore, the rural and urban campus classifications were included to help determine if the SAILS versus the Non-SAILS students exhibited any significant differences based on geographic location. The gender was chosen to explore whether or not there were significant differences in the male and female

academic outcomes of SAILS versus Non-SAILS students. Analyzing the race and ethnicity of the students was included to determine if the SAILS philosophy revealed significant differences in the SAILS versus the Non-SAILS students based on certain student populations. To this end, Chapter 3 covers many of the research tools used to collect the data within this study including the quantitative research design, the research questions and null hypotheses, the sample population, the data collection and analysis, and a brief chapter summary including subsequent chapters.

Research Design

A causal-comparative research design was employed to examine whether or not there were significant academic or demographic differences with regard to the SAILS versus the Non-SAILS students who enrolled in a Math 1530 course during the 2014-2015 and 2015-2016 academic years based on the rural or urban campus location where the course was taken. This quantitative research approach was applicable because the researcher sought to draw conclusions from pre-existing, categorical, and nominal data under conditions that would not allow for an experimental research design (McMillan & Schumacher, 2010).

Research Questions and Null Hypotheses

Ten research questions were posed to determine any significant differences in the academic progress, gender, race, and ethnicity, within the SAILS versus the Non-SAILS students who enrolled in the Math 1530 course at a rural or urban campus location. Specifically, the following questions were employed within this particular study:

Research Question 1:

Is there a significant difference in the proportion of enrollments for SAILS versus Non-SAILS students enrolled in Math 1530, Probability and Statistics, at a rural campus location?

H₀ 1: There is no significant difference in the proportion of enrollments for SAILS versus Non-SAILS students who enrolled in Math 1530, Probability and Statistics, at a rural campus location.

Research Question 2:

Is there a significant difference in the proportion of enrollments for SAILS versus Non-SAILS students who enrolled in Math 1530, Probability and Statistics, at an urban campus location?

H₀ 2: There is no significant difference in the proportion of enrollments for SAILS versus Non-SAILS students who enrolled in Math 1530, Probability and Statistics, at an urban campus location.

Research Question 3:

Is there a significant difference in the proportion of withdrawals for SAILS versus Non-SAILS students who enrolled in Math 1530, Probability and Statistics, at a rural campus location?

H₀ 3: There is no significant difference in the proportion of withdrawals for SAILS versus Non-SAILS students who enrolled in Math 1530, Probability and Statistics, at a rural campus location.

Research Question 4:

Is there a significant difference in the proportion of withdrawals for SAILS versus Non-SAILS students who enrolled in Math 1530, Probability and Statistics, at an urban campus location?

H₀ 4: There is no significant difference in the proportion of withdrawals for SAILS versus Non-SAILS students who enrolled in Math 1530, Probability and Statistics, at an urban campus location.

Research Question 5:

Is there a significant difference in the proportion of SAILS versus Non-SAILS students with successful course completions with a final grade of A, B, or C, or unsuccessful course completions with final grades of a D or F in the Math 1530, Probability and Statistics, course taken at a rural campus location?

H₀ 5: There is no significant difference in the proportion of SAILS versus Non-SAILS students with successful course completions with a final grade of A, B, or C, or unsuccessful course completions with final grades of a D or F in the Math 1530, Probability and Statistics, course taken at a rural campus location?

Research Question 6:

Is there a significant difference in the proportion of SAILS versus Non-SAILS students with successful course completions with a final grade of A, B, or C, or unsuccessful course completions with final grades of a D or F in the Math 1530, Probability and Statistics, course taken at an urban campus location?

H₀ 6: There is no significant difference in the proportion of SAILS versus Non-SAILS students with successful course completions with a final grade of A, B, or C, or unsuccessful course completions with final grades of a D or F in the Math 1530, Probability and Statistics, course taken at an urban campus location?

Research Question 7:

Is there a significant difference in the gender of SAILS versus Non-SAILS students who enrolled in Math 1530, Probability and Statistics, at a rural campus location?

H₀ 7: There is no significant difference in the gender of SAILS versus Non-SAILS students who enrolled in Math 1530, Probability and Statistics, at a rural campus location.

Research Question 8:

Is there a significant difference in the gender of SAILS versus Non-SAILS students who enrolled in Math 1530, Probability and Statistics, at an urban campus location?

H₀ 8: There is no significant difference in the gender of SAILS versus Non-SAILS students who enrolled in Math 1530, Probability and Statistics, at an urban campus location.

Research Question 9:

Is there a significant difference in the race and ethnicity (a combined indicator) of SAILS versus Non-SAILS students who enrolled in Math 1530, Probability and Statistics, at a rural campus location?

H₀ 9: There is no significant difference in the race and ethnicity (a combined indicator) of SAILS versus Non-SAILS students who enrolled in take Math 1530, Probability and Statistics, at a rural campus location.

Research Question 10:

Is there a significant difference in the race and ethnicity (a combined indicator) of SAILS versus Non-SAILS students who enrolled in Math 1530, Probability and Statistics, at an urban campus location?

H₀ 10: There is no significant difference in the race and ethnicity (a combined indicator) of SAILS versus Non-SAILS students who enrolled in Math 1530, Probability and Statistics, at an urban campus location.

Population

The subjects within this particular study included those students who were enrolled in the Math 1530 course at the East Tennessee community college during the 2014-15 and 2015-16 academic years who had either participated in the SAILS program or possessed a 19 ACT in math prior to enrolling in the Math 1530 course. Pertinent information including the number of Math 1530 enrollments, withdrawals, final grades, and completions as well as the students' gender, race, and ethnicity was collected from the statewide Banner system used for tracking student records within the State of Tennessee and the Office of Institutional Research at the community college within this study (Ellucian, 2014). In order to protect and ensure student anonymity, all personal identifiers were removed from the subjects within the study.

Data Collection

Upon approval from the Institutional Review Board at ETSU and the community college within this study, the data for this research project were provided by the Office of Institutional Research at the community college as well as collected confidentially through the statewide Banner data system. The data retrieved from Banner included the number of student enrollments, withdrawals, final grades, and completions for a combined total of 48 sections of both regular and SAILS Math 1530 courses over the two year period. The primary semesters targeted during the 2014-15 and 2015-16 academic years were the Spring 2015 and Spring 2016 semesters due to the SAILS design and when the majority of respective students registered for the Math 1530 course. For comparison purposes, the regular Math 1530 course sections with

Non-SAILS students only included those students who possessed a 19 ACT math score prior to enrolling in the course.

The final grade analysis for the students in Math 1530 was based on the academic letter grades of A, B, C, D, and F that were awarded for course participation and assigned in Banner. Students who completed the Math 1530 course with grades of an A, B, C, or D were deemed as having completed the course while students who received either an “F” letter grade for failing the course or a “W” for withdrawing from the course were not counted as student completions. In order to establish an adequate measure of academic progress, the final grades were grouped based on satisfactory and unsatisfactory progress. Although maintaining a 2.75 college Grade Point Average (GPA) is required for Tennessee Dual Enrollment Grant (TDEG) recipients, the researcher chose to assign the grades of the SAILS versus the Non-SAILS students based on the general course transferability policy honored by most community colleges and universities within the State of Tennessee (Tennessee Student Assistance Corporation (TSAC), n.d.; Tennessee Transfer Pathways (TTP), n.d.). In this regard, students achieving a “C” letter grade or higher for the Math 1530, Probability and Statistics, course were assigned as having made satisfactory progress. Conversely, students who made a “D” or “F” letter grade for the course were categorized as either unsatisfactory or failing. Likewise, any students who withdrew with a “W” from the Math 1530, Probability and Statistics, course during the designated timeframe, along with the students’ gender and race/ethnicity, were collected from Banner and recorded as such within the study.

Upon collection of the relevant academic and demographic variables, each student was classified as either SAILS or Non-SAILS students and grouped according to the rural or urban campus location where the student participated in the Math 1530, Probability and Statistics,

course. According to the United State Census Bureau, the rural or urban classification is primarily based on the residential population of the respective area (United States Census Bureau, 2015). Within this study, the campus located in a geographic area with 50,000 residents or more was categorized as an urban campus location and the campus located in a geographic area with less than 50,000 residents was categorized as a rural campus location. Based on the design of Banner and in accordance with federal guidelines, the student race classifications were designated as (a) Alaskan Native, (b) American Indian, (c) Asian or Pacific Islander, (d) Black, Non-Hispanic Origin, (e) Hispanic, (f) White, Non-Hispanic Origin, and (g) Not Specified and the ethnicity classifications were designated along with race as either (a) Hispanic or Latino, or, (b) Not Hispanic or Latino (Ellucian, 2014; NCES, 2008).

Data Analysis

According to McMillan and Schumacher (2010) any slight variation that is not anticipated or accounted for in some way, can lead to unsubstantiated, possibly incorrect, presumptions regarding the sample and overall population. For this particular study, the ACT exam served as an objective benchmark for the researcher by (a) establishing the number of senior level high school students who scored below the 19 ACT in math and who chose to participate in SAILS remediation, and (b) identifying students who possessed the 19 ACT required score for the Math 1530 course at the community college within this study. Likewise, the Pearson Education software served as an objective measure in which to discern which SAILS students were eligible to participate in the Math 1530 course (Pearson Education, 2016). In addition, the academic and demographic classifications within the statewide Banner system served as a consistent way to categorize and analyze subjects within the study (Ellucian, 2014).

Christensen, Johnson, and Turner (2014) described internal validity as the method of assignment in which the researcher may establish a causal relationship. With this purpose in mind, each research question, null hypothesis, and methodology was carefully designed to collect valuable, noteworthy information that could effectively add to the body of literature regarding the SAILS remediation model and exclude the possibility of researcher bias as much as possible. Specifically, a series of chi-square tests of independence were employed to test each null hypothesis. Two-way contingency tables were used on all research questions pertaining to the study with the alpha level set at .05 for each hypothesis. All data with respect to this study were analyzed using IBM-SPSS predictive analytic software, helping to ensure objective comparisons between the dependent and independent variables analyzed within the study (IBM, n.d.).

Summary

Chapter 3 presented essential information regarding the research methodology and design, the research questions and null hypotheses, the population being researched, and the process used for data collection and analysis. Chapter 4 contains the analysis and interpretations of the data that were collected within the study. Chapter 5 provides an overall summary of the study, the conclusions and implications drawn from the findings, and the recommendations for future research studies that may lead to the body of literature regarding the SAILS learning support initiative.

CHAPTER 4

FINDINGS

This study was designed to explore the effectiveness of the Seamless Alignment and Integrated Learning Support (SAILS) model by examining student outcomes at a community college in the East Tennessee region. Within this study, SAILS math remediation students were compared with Non-SAILS students who had achieved a 19 ACT score prior to enrolling in a Math 1530, Probability and Statistics, course during the 2014-15 and 2015-16 academic timeframes. The variables examined within the study included the proportion of student enrollments, withdrawals, completions, and final grades as well as the student gender and race and ethnicity for those students who participated in the Math 1530, Probability and Statistics, course. The Math 1530, Probability and Statistics, course was chosen as a critical component of the study for two primary reasons. First, students who were not majoring in a STEM (Science, Technology, Engineering, and Math) program in college were encouraged to take Math 1130, College Algebra, or Math 1530, Probability and Statistics, upon SAILS completion because both of these courses served as a core math course requirement for many college majors and would transfer to most four-year institutions within the State of Tennessee (TBR, 2016b). However, the number of dual enrollment students who chose to enroll in Math 1130, College Algebra, during the timeframe of the study was minimal due to the additional pre-requisite of Math 1000, Algebra Essentials, which was required at the community college. In addition, the Math 1530, Probability and Statistics, course was chosen because the examination of student outcomes for this course allowed the researcher to draw certain conclusions regarding the SAILS students' preparation for a college level math course in comparison to students who did not need college remediation.

Upon collection of the relevant academic and demographic variables, each student was classified as either SAILS or Non-SAILS students and grouped according to the rural or urban campus location where the student participated in the Math 1530, Probability and Statistics, course. The student race and ethnicity classifications followed the Banner design and were in accordance with federal guidelines (Ellucian, 2014; NCES, 2008). Table 1 includes course enrollment and demographic information for the study population. A breakdown of SAILS and Non-SAILS study information is provided in Chapter 5.

Table 1

Demographics of Study Population (n=833)

Variable	Levels	# of Subjects	% of Subjects
College level Math Course	SAILS	349	42%
	Non-SAILS	484	58%
	Rural SAILS/Non-SAILS	130	16%
	Urban SAILS/Non-SAILS	703	84%
Enrollments	SAILS	349	42%
	Non-SAILS	484	58%
	Rural SAILS/Non-SAILS	130	16%
	Urban SAILS/Non-SAILS	703	84%
Withdrawals	SAILS	33	4%
	Non-SAILS	29	3%
	Rural SAILS/Non-SAILS	7	.01%
	Urban SAILS/Non-SAILS	55	7%

Table 1 (continued)

Course Completions	Successful (A, B, or C grade)	549	66%
	Rural Successful Grades	86	16%
	Urban Successful Grades	463	84%
	Unsuccessful (D or F grade)	230	28%
	Rural Unsuccessful Grades	37	16%
	Urban Unsuccessful Grades	193	84%
Gender	Female	549	66%
	Rural Female	79	14%
	Urban Female	470	86%
	Male	284	34%
	Rural Male	51	18%
	Urban Male	233	82%
Race/Ethnicity	Alaskan Native	1	.01%
	American Indian	6	.07%
	Asian or Pacific Islander	8	1%
	Black, Non-Hispanic Origin	12	1%
	Hispanic	15	2%
	White, Non-Hispanic Origin	789	95%
	Not-Specified	2	.02%

Note. Successful and Unsuccessful grade completions do not add up to 100% due to the number of withdrawals and rounding. Both research questions pertaining to race/ethnicity did not have significant sample size to run a statistical analysis. Numbers shown indicate the overall race represented in the study. Percentages may not total 100% due to rounding.

The data for this study were initially recorded and stored in the statewide Banner Software System database and were collected by the Office of Institutional Research at the community college within the study based on the targeted information needed. Prior to sharing the data with the researcher, the Office of Institutional Research removed all personal identifiers so that subject anonymity would remain protected. The researcher then organized the SAILS versus the Non-SAILS data based on rural and urban campus locations.

Ten research questions were posed, along with the corresponding null hypotheses, to determine any significant differences in the academic progress, gender, race, and ethnicity, within the SAILS versus the Non-SAILS students who enrolled in the Math 1530 course at a rural or urban campus location. Chi-square tests were performed to test each hypothesis with the following questions being targeted within this particular study:

Research Question 1:

Is there a significant difference in the proportion of enrollments for SAILS versus Non-SAILS students enrolled in Math 1530, Probability and Statistics, at a rural campus location?

H₀ 1: There is no significant difference in the proportion of enrollments for SAILS versus Non-SAILS students who enrolled in Math 1530, Probability and Statistics, at a rural campus location.

A two-way contingency table was used to determine if the proportion of enrollments for SAILS versus Non-SAILS students enrolled in the Math 1530, Probability and Statistics, courses varied significantly at the rural campus locations. The variables were grouped according to the SAILS, Non-SAILS, and rural classifications for the enrollment count and entered into SPSS. The proportion of enrollments for SAILS versus Non-SAILS students in the rural campus locations was determined to be significantly related, Pearson $\chi^2(1, N = 130) = 126.02, p < .001$,

Cramer's $V = .99$. Therefore, the null hypothesis was rejected. The proportion of Non-SAILS enrollments was found to be significantly higher than the proportion of SAILS enrollments at a rural campus location.

Table 2 indicates the proportion of enrollments for SAILS and Non-SAILS students based on the rural campus locations.

Table 2

Enrollments for SAILS and Non-SAILS Students Based on Rural Campus Locations (n=130)

SAILS/Non-SAILS	Rural Enrollments	
	Count	% of Enrollment
Rural SAILS	59	45%
Rural Non-SAILS	71	55%
Total	130	100%

Research Question 2:

Is there a significant difference in the proportion of enrollments for SAILS versus Non-SAILS students who enrolled in Math 1530, Probability and Statistics, at an urban campus location?

H_0 : There is no significant difference in the proportion of enrollments for SAILS versus Non-SAILS students who enrolled in Math 1530, Probability and Statistics, at an urban campus location.

A two-way contingency table was used to determine if the proportion of enrollments for SAILS versus Non-SAILS students enrolled in the Math 1530, Probability and Statistics, courses varied significantly based on the urban campus locations. The variables were grouped according

to the SAILS, Non-SAILS, and urban classifications for the enrollment count and entered into SPSS. The proportion of enrollments for SAILS versus Non-SAILS students in the urban campus locations was determined to be significantly related, Pearson $\chi^2(1, N = 703) = 703.00, p < .001$, Cramer's $V = 1.00$. Therefore, the null hypothesis was rejected. The proportion of Non-SAILS enrollments was found to be significantly higher than the proportion of SAILS enrollments at an urban campus location.

Table 3 indicates the proportion of enrollments for SAILS and Non-SAILS students based on the urban campus locations.

Table 3

Enrollments for SAILS and Non-SAILS Students Based on Urban Campus Locations (n=703)

SAILS/Non-SAILS	Urban Enrollments	
	Count	% of Enrollment
Urban SAILS	290	41%
Urban Non-SAILS	413	59%
Total	703	100%

Research Question 3:

Is there a significant difference in the proportion of withdrawals for SAILS versus Non-SAILS students who enrolled in Math 1530, Probability and Statistics, at a rural campus location?

H₀ 3: There is no significant difference in the proportion of withdrawals for SAILS versus Non-SAILS students who enrolled in Math 1530, Probability and Statistics, at a rural campus location.

With only seven withdrawals in the population sample, the proportion of withdrawals for SAILS versus Non-SAILS students at a rural campus location was not large enough to perform an accurate statistical analysis.

Research Question 4:

Is there a significant difference in the proportion of withdrawals for SAILS versus Non-SAILS students who enrolled in Math 1530, Probability and Statistics, at an urban campus location?

H₀ 4: There is no significant difference in the proportion of withdrawals for SAILS versus Non-SAILS students who enrolled in Math 1530, Probability and Statistics, at an urban campus location.

A two-way contingency table was used to determine if the proportion of withdrawals for SAILS versus Non-SAILS students enrolled in the Math 1530, Probability and Statistics, courses varied significantly based on the urban campus locations. The variables were grouped according to the SAILS, Non-SAILS, and urban classifications for the number of withdrawals and entered into SPSS. The proportion of withdrawals for SAILS and Non-SAILS students in the urban campus locations was found to be significantly related, Pearson $\chi^2(1, N = 55) = 55.00, p < .001$, Cramer's $V = 1.00$. Therefore, the null hypothesis was rejected. The proportion of withdrawals for the SAILS students was found to be significantly higher than the Non-SAILS students at the urban campus locations.

Table 4 indicates the number and percentage of withdrawals for the SAILS and Non-SAILS students based on the urban campus locations.

Table 4

Withdrawals for SAILS and Non-SAILS Students Based on Urban Campus Locations (n=55)

SAILS/Non-SAILS	Urban Withdrawals	
	Count	% of Withdrawals
Urban SAILS	30	55%
Urban Non-SAILS	25	45%
Total	55	100%

Research Question 5:

Is there a significant difference in the proportion of SAILS versus Non-SAILS students with successful course completions with a final grade of A, B, or C, or unsuccessful course completions with final grades of a D or F in the Math 1530, Probability and Statistics, course taken at a rural campus location?

H₀ 5: There is no significant difference in the proportion of SAILS versus Non-SAILS students with successful course completions with a final grade of A, B, or C, or unsuccessful course completions with final grades of a D or F in the Math 1530, Probability and Statistics, course taken at a rural campus location?

A two-way contingency table was used to determine if the successful and unsuccessful grades for the SAILS versus the Non-SAILS students enrolled in the Math 1530, Probability and Statistics, courses varied significantly based on the rural campus locations. The variables were grouped according to the SAILS and Non-SAILS students and the successful (A, B, or C grades) and unsuccessful (D or F) grade classifications based on the rural campus locations. The grades for SAILS and Non-SAILS students at the rural campus locations were found not to be

significantly related, Pearson $\chi^2(1, N = 123) = .004, p = .951$, Cramer's $V = .01$. Therefore, the null hypothesis was not rejected.

Table 5 indicates the percentage of successful and unsuccessful grades for SAILS and Non-SAILS students based on the rural campus locations. Figure 1 shows the number of successful and unsuccessful grades for SAILS and Non-SAILS students for the rural locations.

Table 5

Percentage of Successful and Unsuccessful Grade Completions Based on Rural Campus Locations (n=123)

SAILS/Non-SAILS	Rural Grade Completion			
	Successful (A, B, or C)	% of Total	Unsuccessful (D or F)	% of Total
SAILS	39	32%	17	14%
Non-SAILS	47	38%	20	16%
Total	86	70%	37	30%

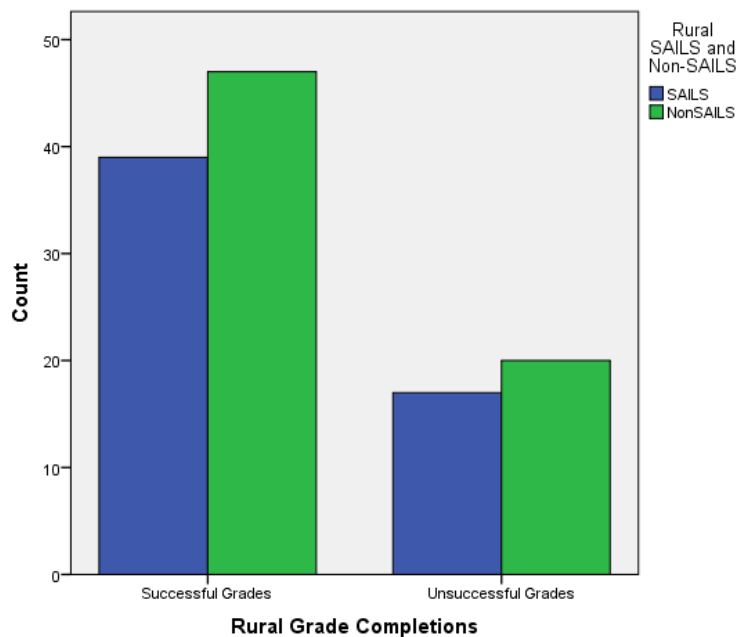


Figure 1 Successful and unsuccessful grade completions based on rural campus locations

Research Question 6:

Is there a significant difference in the proportion of SAILS versus Non-SAILS students with successful course completions with a final grade of A, B, or C, or unsuccessful course completions with final grades of a D or F in the Math 1530, Probability and Statistics, course taken at an urban campus location?

H₀ 6: There is no significant difference in the proportion of SAILS versus Non-SAILS students with successful course completions with a final grade of A, B, or C, or unsuccessful course completions with final grades of a D or F in the Math 1530, Probability and Statistics, course taken at an urban campus location?

A two-way contingency table was used to determine if the successful and unsuccessful grades for the SAILS versus the Non-SAILS students enrolled in the Math 1530, Probability and Statistics, courses varied significantly based on the urban campus locations. The variables were grouped according to the SAILS and Non-SAILS subjects and the successful (A, B, or C grades) and unsuccessful (D or F) grade classifications based on the urban campus locations. The grades for the SAILS and Non-SAILS students at the urban campus locations were found to be significantly related, Pearson $\chi^2(1, N = 636) = 60.814, p < .001$, Cramer's $V = .31$. Therefore, the null hypothesis was rejected. There is a significant difference in the proportion of SAILS versus Non-SAILS successful and unsuccessful grade completions with higher proportions in both for the Non-SAILS students at the urban campus locations.

Table 6 indicates the percentage of successful and unsuccessful grades for SAILS and Non-SAILS students based on the urban campus locations. Figure 2 shows the number of successful and unsuccessful grades for SAILS and Non-SAILS students for the urban campus locations.

Table 6

Percentage of Successful and Unsuccessful Grade Completion Based on Urban Campus Locations (n=656)

SAILS/Non-SAILS	Urban Grade Completion			
	Successful (A, B, or C)	% of Total	Unsuccessful (D or F)	% of Total
SAILS	181	28%	29	4%
Non-SAILS	282	44%	164	25%
Total	463	72%	193	29%

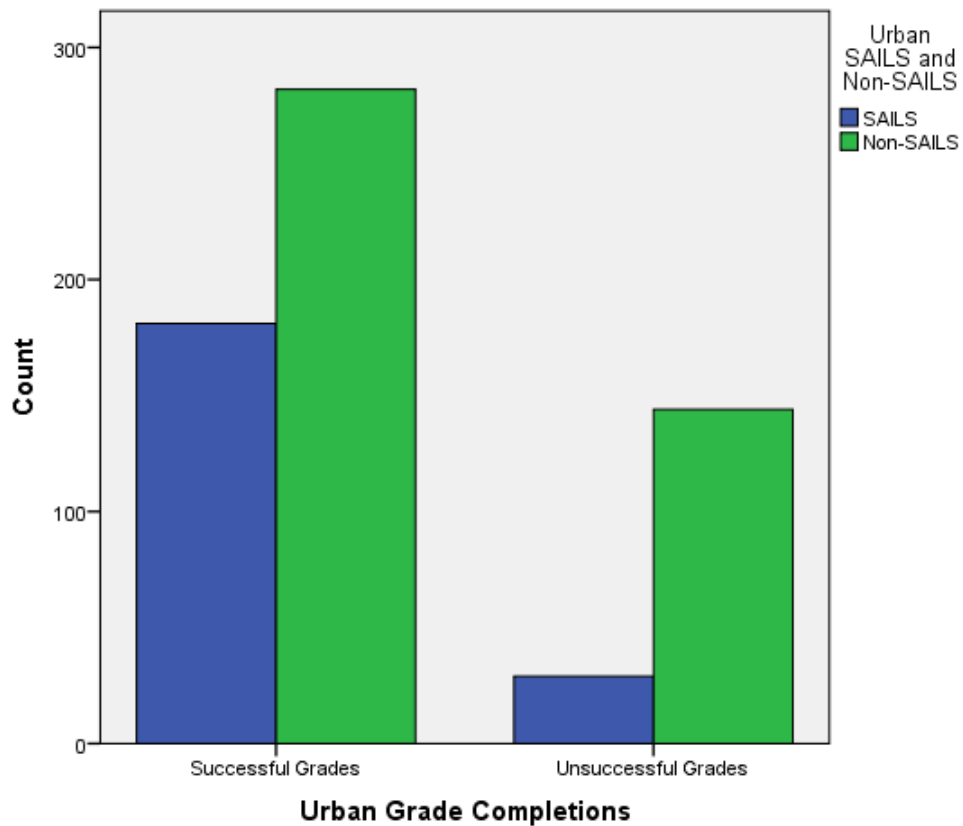


Figure 2 Successful and unsuccessful grade completions based on the urban campus locations

Research Question 7:

Is there a significant difference in the gender of SAILS versus Non-SAILS students who enrolled in Math 1530, Probability and Statistics, at a rural campus location?

H₀ 7: There is no significant difference in the gender of SAILS versus Non-SAILS students who enrolled in Math 1530, Probability and Statistics, at a rural campus location.

A two-way contingency table was used to determine if the gender for the SAILS and Non-SAILS students enrolled in the Math 1530, Probability and Statistics, courses varied significantly based on the rural campus locations. The variables were grouped according to the SAILS and Non-SAILS students and the gender classifications. The gender for SAILS and Non-SAILS students at the rural campus locations was found not to be significantly related, Pearson $\chi^2(1, N = 130) = .095, p = .758$, Cramer's $V = .03$. Therefore, the null hypothesis was not rejected.

Table 7 indicates the percentage of female and male SAILS and Non-SAILS students based on the rural campus locations. Figure 3 shows the SAILS and Non-SAILS gender counts based on the rural campus locations.

Table 7

Gender Percentage of SAILS and Non-SAILS Students Based on Rural Campus Locations (n=130)

SAILS/Non-SAILS	Rural Gender			
	Female	% of Total	Male	% of Total
SAILS	35	27%	24	27%
Non-SAILS	44	34%	27	21%
Total	79	61%	51	39%

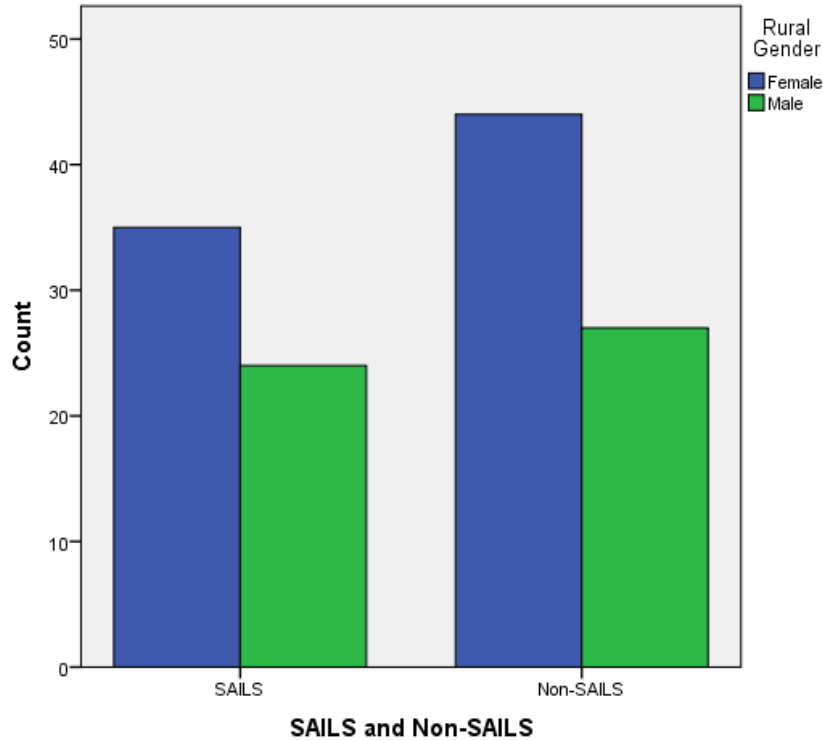


Figure 3 Gender of SAILS and Non-SAILS students based on rural campus locations

Research Question 8:

Is there a significant difference in the gender of SAILS versus Non-SAILS students who enrolled in Math 1530, Probability and Statistics, at an urban campus location?

H₀ 8: There is no significant difference in the gender of SAILS versus Non-SAILS students who enrolled in Math 1530, Probability and Statistics, at an urban campus location.

A two-way contingency table was used to determine if the gender for the SAILS and Non-SAILS students enrolled in the Math 1530, Probability and Statistics, courses varied significantly based on the urban campus locations. The variables were grouped according to the SAILS and Non-SAILS students and the gender classifications. The gender for SAILS and Non-SAILS students at the urban campus locations was found not to be significantly related, Pearson $\chi^2(1, N = 703) = 1.92, p = .166$, Cramer's $V = .05$. Therefore, the null hypothesis was not rejected.

Table 8 indicates percentage of female and male SAILS and Non-SAILS students based on the urban campus locations. Figure 4 shows the SAILS and Non-SAILS gender counts based on the urban campus locations.

Table 8

Gender Percentage of SAILS and Non-SAILS Students Based on Urban Campus Locations (n=703)

Urban Gender				
SAILS/Non-SAILS	Female	% of Total	Male	% of Total
SAILS	206	29%	115	16%
Non-SAILS	264	38%	118	17%
Total	470	67%	233	33%

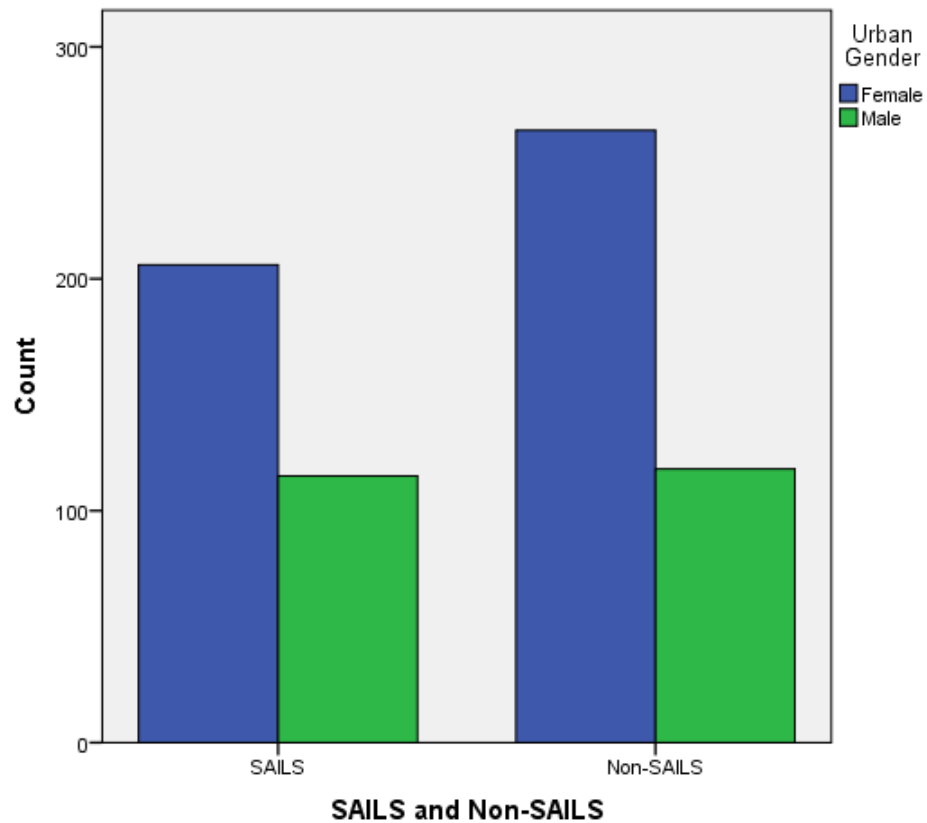


Figure 4 Gender of SAILS and Non-SAILS students based on urban campus locations

Research Question 9:

Is there a significant difference in the race and ethnicity (a combined indicator) of SAILS versus Non-SAILS students who enrolled in Math 1530, Probability and Statistics, at a rural campus location?

H₀ 9: There is no significant difference in the race and ethnicity (a combined indicator) of SAILS versus Non-SAILS students who enrolled in take Math 1530, Probability and Statistics, at a rural campus location.

Due to the limited sample population for each race/ethnicity category for both the SAILS and Non-SAILS students at the rural campus locations, a statistical analysis was not possible.

Research Question 10:

Is there a significant difference in the race and ethnicity (a combined indicator) of SAILS versus Non-SAILS students who enrolled in Math 1530, Probability and Statistics, at an urban campus location?

H₀ 10: There is no significant difference in the race and ethnicity (a combined indicator) of SAILS versus Non-SAILS students who enrolled in Math 1530, Probability and Statistics, at an urban campus location.

Due to the limited sample population for each race/ethnicity category for both the SAILS and Non-SAILS students at the urban campus locations, a statistical analysis was not possible.

CHAPTER 5

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

College remediation has often served as a common roadblock for both students and administrators within secondary and postsecondary education (Crisp & Delgado, 2014). The implementation of successful partnerships between the local, state, and federal government as well as private industry may help foster a vested interest in educational efforts that are sorely needed to improve and sustain an educated workforce (Wang et al., 2015). One such endeavor within Tennessee called the Seamless Alignment and Integrated Learning Support (SAILS) remediation model shifts online college remediation methods to the high school senior level (Squires, 2014). The purpose of this study was to examine the student enrollments, withdrawals, final grades, and course completions as well as the gender, race, and ethnicity of the SAILS versus Non-SAILS students with a 19 ACT math score who enrolled in a Math 1530, Probability and Statistics, course at one of six rural or urban community college campus locations at one community college within East Tennessee. Specifically, the researcher sought to provide additional insight regarding whether the SAILS program produces comparable student outcomes when compared to the Non-SAILS program students, and whether the SAILS program adequately prepares the high school student academically for a college level math course. Closer examination of the research question results coupled with a summary of how the findings may impact future recommendations, practices, and research is provided in this chapter.

Summary of the Findings

Research questions 1 and 2 addressed the proportion of student enrollments for the Math 1530, Probability and Statistics, courses at the rural and urban campus locations. In both cases,

significant differences existed between the proportion of enrollments for the SAILS and Non-SAILS students with a large effect size indicated by the Cramer's V analysis of .99 and 1.00 respectively. The proportion of enrollments for SAILS and Non-SAILS students varied significantly based on the rural or urban locations where the Math 1530, Probability and Statistics, courses were being offered. In this study, the proportion of enrollments for the Non-SAILS students was higher at both the rural and urban campus locations.

Research questions 3 and 4 addressed the proportion of student withdrawals for the Math 1530, Probability and Statistics, course, at the rural and urban campus locations. In research question 3, the sample population for rural withdrawals was not large enough for a statistical analysis. In research question 4, significant differences did exist between the proportion of withdrawals for the SAILS and Non-SAILS students with a large effect size indicated by the Cramer's V analysis of 1.00. The proportion of withdrawals for students varied significantly based on the urban campus locations where the Math 1530, Probability and Statistics, courses were being offered. In this study, the proportion of withdrawals was higher for the SAILS students at the urban campus locations.

Research questions 5 and 6 addressed the proportion of successful and unsuccessful grade completions for the SAILS and Non-SAILS students participating in the Math 1530, Probability and Statistics, courses at the rural and urban campus locations. Letter grades of A, B, or C were designated as successful grade completion and letter grades of D or F represented unsuccessful grade completion. For research question 5, there were no significant differences found at the rural campus locations. For research question 6, significant differences were noted between the SAILS and Non-SAILS students at the urban campus locations. The effect size indicated by the Cramer's V analysis was medium (.31) at the urban campus locations. Successful and

unsuccessful grade completion varied significantly for SAILS and Non-SAILS students based on the urban campus locations where the Math 1530, Probability and Statistics, courses were being offered.

Research Questions 7 and 8 addressed the gender of the SAILS and Non-SAILS students who enrolled in the Math 1530, Probability and Statistics, course based on the rural and urban campus locations. In both cases, the results indicated that no significant differences existed between the genders of the SAILS versus the Non-SAILS students. Therefore, the null hypotheses were not rejected.

Research questions 9 and 10 addressed the race and ethnicity of the SAILS and Non-SAILS students who participated in a Math 1530, Probability and Statistics, course at the rural and urban campus locations. In both cases, the sample population was not large enough to conduct a statistical analysis. In general, the race and ethnicity results indicated a highly skewed representation of students, predominantly within the White-Non Hispanic population, for both the SAILS and Non-SAILS categories. The representation of the minority populations within this study was minimal.

Research Conclusions

The primary purpose of this particular study was to offer additional insight into whether or not the SAILS program prepared students adequately for a college level math course. As such, a comparison was made between the SAILS and Non-SAILS students to determine if the actual participation results in the Math 1530, Probability and Statistics, courses were comparable based on either the rural or urban campus locations where the courses were taken. Overall, the results of this study indicated that the Non-SAILS students performed better than the SAILS students, with the exception of a lower proportion of SAILS students with unsuccessful grades at

the urban campus locations. Students' gender did not vary significantly between the SAILS and Non-SAILS students at either the rural or urban campus locations. In addition, the race and ethnicity for both SAILS and Non-SAILS students did not have ample representation from all race and ethnicity classifications to perform a statistical analysis at both the rural and urban campus locations.

It is important to note that, in each comparison, the proportion of Non-SAILS to SAILS students in general was higher within the study, regardless of the rural or urban campus locations. In terms of the academic performance, the low proportion of rural SAILS and Non-SAILS withdrawals did limit researcher conclusions. With no statistical analysis performed, the researcher could merely conclude that the proportion of withdrawals for both SAILS and Non-SAILS students was lower at the rural campus locations in comparison to the urban campus locations. For the urban campus locations, the SAILS withdrawals were slightly higher than the Non-SAILS withdrawals suggesting that more SAILS students were inclined to withdraw from the Math 1530, Probability and Statistics, courses. With regard to the successful and unsuccessful grade completions, the grade performance did not vary significantly between the SAILS and Non-SAILS students at the rural campus locations, even though there were a higher number of successful grade completions in both groups. At the urban campus locations, the Non-SAILS students appeared to perform better than the SAILS students in terms of successful grades. However, there were also more unsuccessful grade completions for the Non-SAILS students at the urban campuses.

In terms of the demographic indicators, both SAILS and Non-SAILS groups had a higher number of females, even though there were no significant differences found within the gender analysis. Furthermore, with the low minority representation within the SAILS and Non-SAILS

groups, the researcher could only conclude that the sample population for both SAILS and Non-SAILS students was highly skewed with a majority of students being White-Non-Hispanic, regardless of the rural or urban campus locations. Although a breakdown of the campuses into rural and urban locations was beneficial to determine any significant differences between the study groups, it prohibited some analyses due to a smaller proportion of students in the rural locations.

Recommendations for Practice

The SAILS model may have promise in terms of preparing high school remediation students for a college level math course. Although this study is a small representation of students participating in the SAILS remediation program statewide, SAILS students may produce comparable results academically to their Non-SAILS counterparts. However, since the Non-SAILS students within this study appeared to perform better overall, additional data and analyses from more SAILS programs are needed to draw solid conclusions. Recommendations for practice include:

- 1) The community college within this study should continue to monitor and examine SAILS versus Non-SAILS academic success rates with regard to the Math 1530, Probability and Statistics, courses. Continued exploration may provide additional insight into academic strategies that may help improve the SAILS program techniques both locally and regionally.
- 2) Efforts should be made by both secondary and postsecondary administration to try to recruit a more diverse representation of minority populations within both the SAILS program and college level math courses. This study indicated that 95% of the 833 SAILS and Non-SAILS students participating in Math 1530, Probability and Statistics, courses

were White, Non-Hispanic. A qualitative study to examine minority participation could provide greater insight for both the community college within this study and the SAILS program in general.

3) Routine meetings between current and prospective SAILS students at both the community college within this study and at other colleges within Tennessee will allow students to share ideas, success stories, and areas for improvement from a students' perspective.

4) SAILS instructors and administrators need routine opportunities to share ideas and instructional strategies with each other, so that more consistent methods of instruction may be employed across all campus locations. Although the Pearson software is standardized, a curricular change with consistent instructional pace and delivery may be beneficial.

5) A local marketing campaign that helps recognize and reward SAILS students may encourage greater participation from minority and underrepresented groups. It may also encourage greater male participation in SAILS.

6) Assigning success coaches and college mentors for the SAILS and dual enrollment students may help address common barriers that the students encounter. This approach may also encourage an easier college transition for SAILS and dual enrollment students.

Recommendations for Future Research

The results discovered within this study indicated that additional research should be conducted to determine the overall effectiveness of students who complete the SAILS program and choose to enroll in a college level math course. In this particular study, all of the SAILS students participated in the Math 1530, Probability and Statistics, as a dual enrollment course

while still in high school. With better Non-SAILS performance being exhibited within this particular study, additional research should be conducted with regard to SAILS dual enrollment students and SAILS students in general who enroll in a college level math course. Furthermore, this study did not examine the effectiveness of SAILS in terms of other factors such as the students' socioeconomic circumstances, learning disabilities, high school Grade Point Averages (GPAs) and ACT scores prior to participating in SAILS. Additional recommendations for future research that could enhance the general knowledge of SAILS remediation effectiveness are listed below:

- 1) Further examination should include SAILS dual enrollment students and SAILS incoming freshmen in other geographic locations to confirm or dispute rural and urban findings within this study.
- 2) Additional research should be conducted to examine student success rates within the SAILS minority populations since the minority populations were not well represented at the community college within this study.
- 3) A qualitative study should be conducted to determine the human experience of SAILS students to include which recommendations may improve remediation efforts from the students' perspective.
- 4) A comparative study should be conducted by examining SAILS students in comparison to students enrolled in co-requisite remediation math that is an additional remediation effort that is now being required within Tennessee.
- 5) A mixed-methods study should be conducted to explore not only the academic performance of females and males within the SAILS program, but also the female and

male perspectives that may explain why females were more participative in the Math 1530, Probability and Statistics, courses within this particular study.

- 6) The SAILS program is currently piloting English as part of the remediation model while still in high school. Future research should involve a thorough examination of the SAILS English program, to determine if similar outcomes/effects are encountered within the respective student populations.

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