ABSTRACT

Russell Braxton Holloman, IMPLEMENTATION AND EVALUATION OF MODIFIED SCHEDULING WITH YEAR-LONG, LOOPED COURSES TO IMPROVE ACADEMIC PERFORMANCE FOR AT-RISK HIGH SCHOOL STUDENTS (Under the direction of Dr. Hal Holloman). Department of Educational Leadership, March 2019.

School systems have continued to search for ways to increase student achievement by adjusting pacing and course alignment but have continued to find limitations due to scheduling. A multitude of schedules shift the school day to improve performance and increase test scores and address instructional issues. In North Carolina, this restructuring has most commonly been accomplished through the use of the 4x4 block schedule and the traditional day schedule. Although schedules have been manipulated in a variety of ways to increase student achievement, there has been limited overall improvement, especially as it relates to at-risk students.

The primary objective of this descriptive and evaluative study is to analyze the data from a previously implemented pilot scheduling program to determine the degree to which modified scheduling could impact the academic performance of students who have been identified as at-risk during their ninth and tenth-grade year. This study analyzed the data related to the use of a year-long, looped course sequence and improved student academic performance in mathematics and English courses while also improving on-track performance for identified at-risk students as compared to their 4x4 block scheduled peers.

The purpose of this study is to analyze the data related to this pilot program in order to discover if the modified scheduling block with looping had any measurable impact on the academic performance of the cohort. A secondary purpose of the study is to use student performance data from the same cohorts to determine if the impact of year-long, looped course sequence had an impact on student retention and dropout rates. Finally, it is the intention of this

researcher to provide the results of the study to assist other practitioners in the development and implementation of modified scheduling with looping for at-risk students.

Data collected will be used to evaluate if a year-long, looped course sequence with at-risk students resulted in any significant academic gains. Data sources will include the student achievement records of approximately forty at-risk first-year ninth grade students who were part of the pilot course sequence grouped into the year-long, looped mathematics and English courses for the 2016-2017 school year.

IMPLEMENTATION AND EVALUATION OF MODIFIED SCHEDULING WITH YEAR-LONG, LOOPED COURSES TO IMPROVE ACADEMIC PERFORMANCE FOR AT-RISK HIGH SCHOOL STUDENTS

A Dissertation

Presented to

The Faculty of the Department of Educational Leadership

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by

Russell Braxton Holloman

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CHAPTER 1: INTRODUCTION

The objective of this descriptive and evaluative study is to analyze the data from a previously implemented pilot scheduling program to determine the degree to which modified scheduling could impact the academic performance of students who have been identified as at-risk during their ninth and tenth-grade year. This study analyzed the data related to the use of a year-long, looped course sequence to see improved student academic performance in mathematics and English courses while also improving on-track performance for students identified at-risk as compared to their 4x4 block scheduled peers.

The primary purpose of this study is to analyze the data related to the previously implemented pilot program in order to discover if the modified scheduling block with looping had any measurable impact on the academic performance of the cohort. A secondary purpose of the study is to use student performance data from the same cohorts to determine if the impact of year-long, looped course sequence had an impact on student retention and dropout rates. Finally, it is the intention of this researcher to provide the results of the study to assist other practitioners in the development and implementation of modified scheduling with looping for at-risk students.

Data collected will be used to establish if a year-long, looped course sequence with at-risk students saw any significant academic gains. Data sources will include the student achievement records of forty at-risk first-year ninth grade students that were part of the pilot course sequence grouped into the year-long, looped mathematics and English courses for the 2016-2017 school year.

The study has been organized into five chapters focusing on various aspects of the research process and correlating subsections with Chapter 1 functioning as an introduction and overview of the problem of practice and significant background information related to the

study. The initial chapter provides the reader with the essential information necessary to understand the purpose of the study and its relevance to the problem of practice. The significance of the problem and the overall impact related to the problem of practice, potential shortcomings within the study, and eventual procedures utilized for the study design will also be addressed.

Chapter 2 provides the theoretical framework and supporting literature addressing the year-long and looped coursework for students. It presents the perspectives of other researchers and connected studies as they relate to alternative scheduling to provide increased student achievement and on-track student performance. The research related to schedule designs, at-risk student scheduling, and long-term success models outlines the potential connection created from the alternative yearlong looping model provided by the problem of practice. Although it is not meant to be a conclusive statement, it is important to note that it is this literature review that provides the necessary data used in the analysis of the problem and the development of a conceptual framework for this study's problem of practice.

Throughout the literature discussed in Chapter 2, the benefits of alternative scheduling models for successful academic achievement and positive on-track student performance will be reviewed. The primary literature reviewed will focus on connecting the following areas of study: (1) the historical development of high school scheduling in the United States; (2) comparison of alternative scheduling models for academic success; (3) specific identification of on-track academic peformance for high school students; (4) the historical focus on dropout prevention in the United States; and (5) the gap that currently exists in the research to provide support for the utilization of alternative scheduling to improve at-risk student performance and on-time graduation.

Chapter 3 is dedicated to the research design and methodology of the study and will provide a description of the study as it relates to need for the study, purpose, setting, participants, and methods for analyzing the data used in this study and the innovation of combining the year-long course structure with additional looping support for at-risk students. Research questions to guide the study are included in this chapter to help convey the organization of the scheduling framework with supporting instruments and data collection parameters. The scheduling framework has also been included to outline the course sequencing for students clearly. Chapter 4 will provide an analysis of data and Chapter 5 will present a summary of findings, conclusions, and recommendations for further research and practice.

Statement of the Problem

School leaders have searched for ways to increase student achievement by adjusting curriculum pacing and course alignment but have continued to find limitations due to time, resources, and governing regulations. Manipulation of the school schedule with the hopes of increased student achievement is common, and school administrators have used a variety of schedules within their scope of influence to shift the school day to help increase test scores for increased accountability measures.

The shift in school scheduling began when the publication of A Nation at Risk (1983) called for public schools to more effectively use class time in order to improve academic performance. A decade later, the report Prisoners of Time, issued by the National Education Commission on Time and Learning (1994), further indicated the flawed dynamics of the traditional school schedule and pressured more school districts to address the use of the school schedule to impact instructional outcomes. The commission argued the traditional high school day did not provide enough time for core academic instruction and indicated students who

struggled in the traditional high school classroom setting should be afforded additional time to learn if the situation was warranted.

Prior to the discussion of alternative scheduling, the traditional schedule was designed so that students could attend six or seven class sessions each school day lasting approximately fifty minutes for each section. Over the years, many states changed graduation requirements, and students have been encouraged to take more classes during their high school career for additional curriculum exposure (Rettig & Canady, 2003). By the late 1980s districts, including those in North Carolina, began to experiment with block scheduling to meet the needs of the student and to provide additional flexibility.

Pressure to reorganize the school day continued to increase throughout the 1990s. Cawelti (1994) criticized America's high schools as impersonal institutions that accepted below-average student performance, reinforced student passivity, and failed to offer challenging curricula. Alternative scheduling was advocated as a way to provide extended time for exploration of course material and reclaim the academic day for instruction. To address some of the concerns, Cawelti (1994) advocated the implementation of various types of alternative scheduling to enable greater exploration of material and implementation of varied learning and teaching strategies.

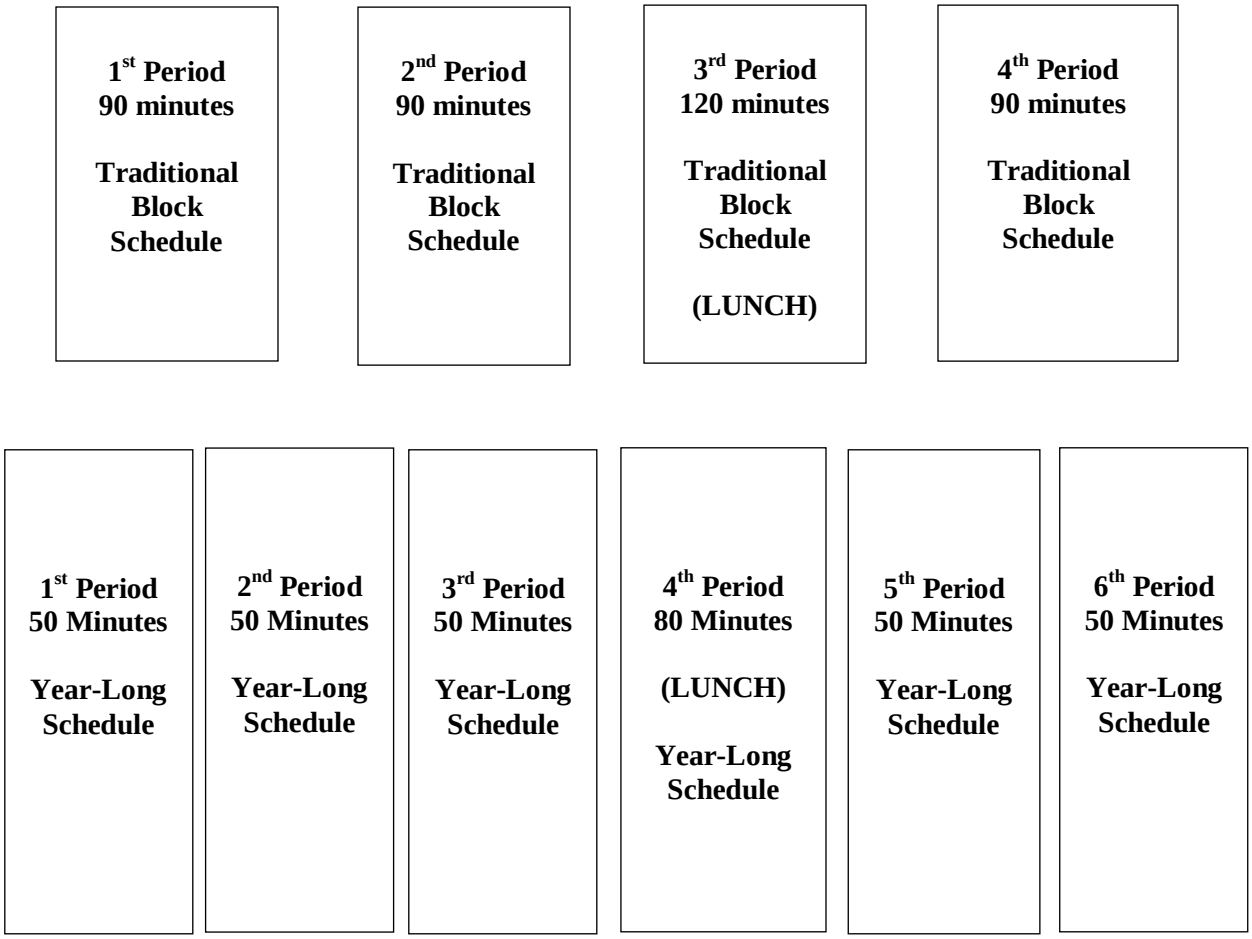
Defining the Problem of Practice

Schools, more than any other organization, are bound by a set number of hours in the day and conscious of the impact the daily schedule can have on learning (Schlechty & Clinton, 1991). The National Education Commission on Time and Learning (United States, 1994) recommended the reinvention and innovation of the school day to be focused around learning,

not time. For decades, state and district leaders have worked to redesign education so that time becomes a positive factor supporting learning, not a boundary limiting a student's success.

For decades, the traditional schedule design was based on a school day that followed a more assembly-line approach. Students would transition from one subject to the next throughout the school day, moving in batches to each classroom location. The school's calendar typically began in the early fall and finished at the end of spring, with summer months off in order to follow the agrarian culture in most areas. Over the years, many states changed graduation requirements and students have been encouraged to take more classes for additional curriculum exposure (Rettig & Canady, 2003). By the late 1980s districts, including those in North Carolina, began to experiment with block scheduling to meet the needs of the student and to provide additional flexibility. In the 4x4 block schedule, students take four courses each semester. Courses in both models last approximately ninety minutes. The course alignment of four courses offered in a ninety-minute setting for approximately ninety days was equivalent to the traditional year courses of fifty-minutes for one hundred and eighty days (see Figure 1).

Although districts and schools have continued to search for ways to increase student achievement by adjusting curriculum pacing and course alignment, they have continually been met with limitations due to time and resources. Many have manipulated school schedules in a variety of ways to increase student achievement and school administrators have used a multitude of schedules to shift the school day to help increase test scores for accountability measures. This is particularly true at the high school level where the 4x4 block schedule and the traditional day are primarily utilized.



Note. Students take four classes each day on the Traditional Block. All classes are approximately 90 minutes in length and follow a set bell schedule. Students shift courses in the spring. Yearlong schedules require students to take the same class all year, but for a shorter amount of time.

Figure 1. Traditional block schedule versus traditional schedule-semester.

The 4x4 block schedule divides the school year into two semesters allowing students to enroll in four courses in the fall semester and four courses in the spring. The course alignment of the four courses offered in a ninety-minute setting for ninety days was equivalent to the traditional year courses of fifty minutes for one hundred and eighty days. The purpose of the block is designed for teachers to provide a variety of teaching strategies for the learner and use the extended time in the class setting to differentiate the learning for each student and his/her needs. The block also limited transition times between classes and was intended to provide a greater period of time during the class to expand on curriculum discussions and activities.

Early advocates of block scheduling argued the model would reduce inefficiency and allow more time for active learning (Canady & Rettig, 1995). Used systematically, block scheduling teaching strategies were expected to enhance student achievement by creating a dynamic, integrated, and personally relevant learning environment that encouraged active student participation (Canady & Rettig, 1995). For at-risk students, the 4x4 block schedule was promoted as a better scheduling model because the time structure enables the use of various teaching methodologies, allows for lab work to be completed within one day, allows students to focus only on four courses, and provides structure for more individualized attention (Queen & Isenhour, 1998). However, a major limitation with block scheduling arises when large gaps of time occur between semesters and summer months for courses that require instructional continuity (see Table 1) This issue occurs when a student takes a math class in the fall of one school year, but does not take the next math course in the sequence until the spring of the next academic year, creating a significant instructional gap where academic progress is lessened. For at-risk students, this instructional gap can be a significant set-back to learning.

Table 1

Typical (4x4) Block Schedule

Fall Semester

Time	Block	Monday	Tuesday	Wednesday	Thursday	Friday
7:45-9:20	1st	Math 1	Math 1	Math 1	Math 1	Math 1
9:25-10:55	2nd	English 1	English 1	English 1	English 1	English 1
11:00-1:10	3rd	Health/PE	Health/PE	Health/PE	Health/PE	Health/PE
11:50-12:15	3rd	Lunch	Lunch	Lunch	Lunch	Lunch
1:15-2:45	4th	Band	Band	Band	Band	Band

Spring Semester

Time	Block	Monday	Tuesday	Wednesday	Thursday	Friday
7:45-9:20	1st	Business	Business	Business	Business	Business
9:25-10:55	2nd	Earth Sci.	Earth Sci.	Earth Sci.	Earth Sci.	Earth Sci.
11:00-1:10	3rd	Culinary	Culinary	Culinary	Culinary	Culinary
10:55-11:20	3rd	Lunch	Lunch	Lunch	Lunch	Lunch
1:15-2:45	4th	World Hist.	World Hist.	World Hist.	World Hist.	World Hist.

Note. During fall semester, the daily schedule represents a typical ninth grade student's year-long course plan if all classes are on a traditional block schedule. During spring semester, the lunch schedule can shift each semester based on the classroom/hallway but is always during the 3rd block course.

The purpose of the block schedule design was initially for teachers to provide a variety of teaching strategies for the learner and use the extended time in the class setting to differentiate the learning for each student and his/her needs. However, a major limitation with block scheduling arises when large gaps of time occur between semesters and summer months for courses that require instructional continuity. This lack of continuity in the mathematics and English curriculum for at-risk students was the foundational focus for this research as it connected several key components of on-track student performance including early academic success in mathematics and English courses, reduced student grade level retention, decreased dropout rates and limited instructional gaps.

Focus on Scheduling to Impact On-Track Student Performance

The importance of successfully completing high school and earning a high school diploma cannot be overestimated in our nation. The diploma and the academic preparation it represents indicate success for not only the graduate who receives it, but it also provides legitimacy for the educational system which confers it. Graduation and the diploma signals an ending to childhood and parental dependence, as well as an official entry into society and adult independence.

For many, dropping out is a process that begins well before high school, and students exhibit identifiable warning signs at least one to three years before they drop out (e.g., Allensworth, 2005; Neild & Balfanz, 2006; Roderick, 1994; Rumberger, 2004). Most students who drop out, tend to do so relatively early in their high school careers, prior to the end of 10th grade (Neild & Balfanz, 2006). Although students in North Carolina have a statutory requirement to attend school until they are sixteen years of age, many have determined their course of action a year or more prior to that date because they are “under credited,” and have not

successfully completed appropriate courses compared to the number of years they have spent in school. This lack of engagement means that they have dropped out for all practical purposes even though they are not legally allowed to do it at that age.

Although there are a variety of dropout prevention programs available to schools, many of them are cost prohibitive or require additional personnel that school systems cannot allocate for at-risk student support. For many students, there are a multitude of reasons that they may consider dropping out of school, but improved academic performance and increased teacher support can be significant factors related to student success. Establishing a clear timeline for support and focusing on solid foundational skills in math and English classes during their 9th grade and tenth grade year are essential to reduce the dropout rate in North Carolina and the nation.

Overwhelmingly, research has shown that ninth grade is a pivotal period in the education of students. When students enter the ninth grade, many are uncertain of any future goals and are already disengaged. School has no meaning or purpose in a student's life (SREB, 2005). Waiting until the ninth grade year to begin a successful transition is deemed too late by many. Balfanz (2009) stated "It is during the middle grades that students either launch toward achievement and attainment, or slide off track and placed on a path of frustration, failure, and, ultimately, early exit from the only secure path to adult success" (p. 13). Poor attendance, behavioral problems, grade retention, and academic failure during middle school are linked to students dropping out of school.

Although many believe that placing a focus on specific on-track student performance in the earlier grades produce the greatest impact, we cannot view all students that enter high school as a hopeless cause. (e.g., Allensworth, 2005; Neild & Balfanz, 2006; Roderick, 1994;

Rumberger, 2004). The question is then what can be done to help at-risk students overcome these barriers at the beginning of their high school career in order to reverse the trend. There is evidence that for many identified at-risk students, successful completion of initial math and English classes are ultimately associated with academic success and more positive life trajectories (Bandura, 1993; Center for Public Education, 2007; Finn & Rock, 1997; McMillan & Reed, 1994). However, there is little research in regards to how the impact of modified scheduling, looping, and year-long courses can directly impact student retention, failure rates, and overall dropout numbers.

During the past two decades, schools have manipulated schedules in a variety of ways to increase student achievement. This has typically been done in order to shift the school day in some manner to help students improve academically. While many researchers focus on limiting high school dropouts by addressing attendance and social issues, there is a compelling need to conduct a project to examine the impact of blending yearlong courses on a traditional schedule with a semester long course using looping at the high school level with at-risk students as it relates to decreased dropout rates. Although there are many student support programs currently in place and multiple schedule formats exist for improved math proficiency and English competency, there is currently limited research on the impact alternative scheduling can have on the academic success of at-risk students and directly related on-track student performance such as dropout rates.

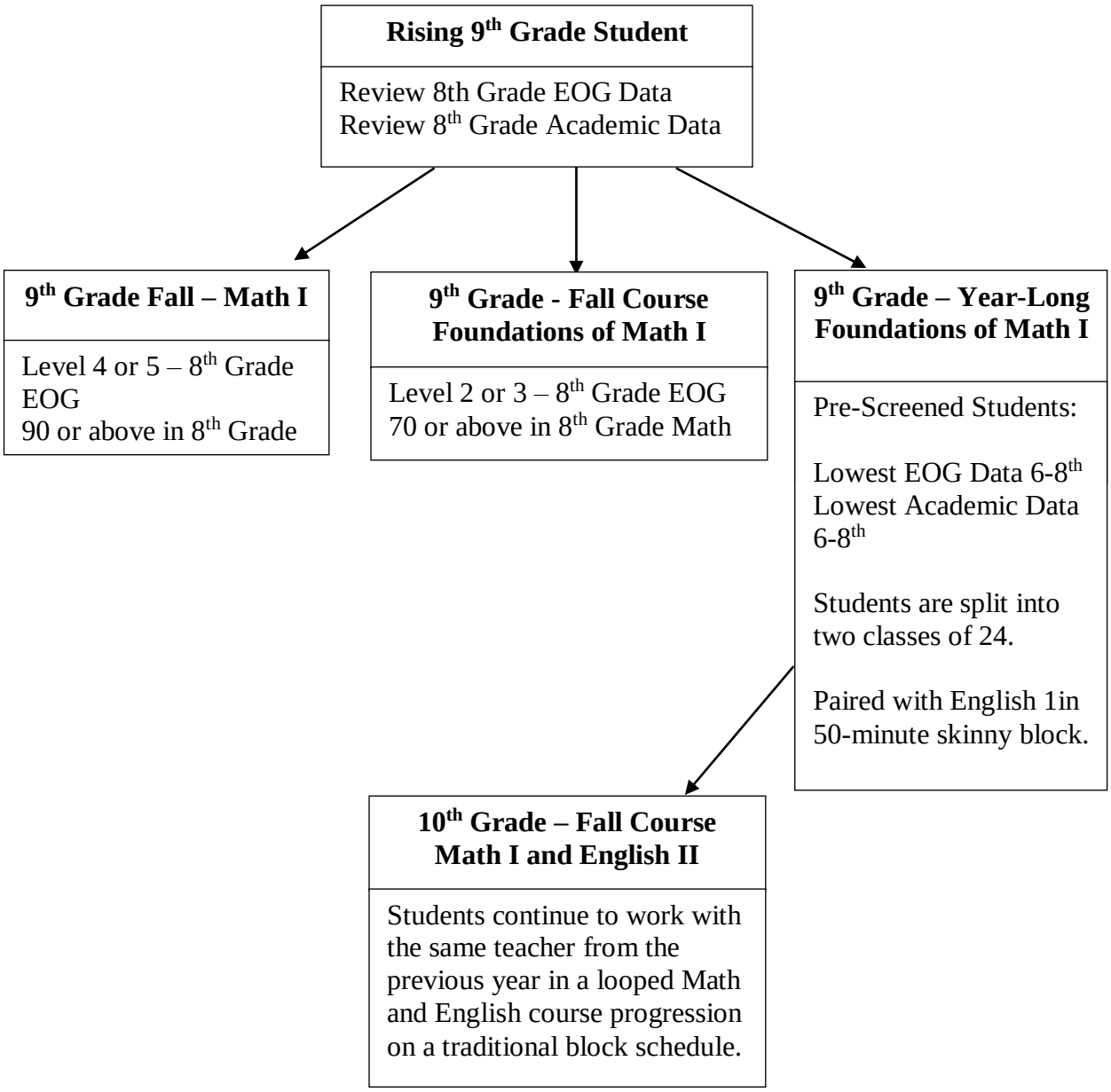
It is the belief of this researcher that secondary schools can significantly impact the number of students that graduate on time and lower the overall dropout rate by creating an optional course scheduling model as it impacts early mathematics and English instruction. This model utilizes early identification of at-risk students in math and English courses to implement

year-long ninth grade support courses for Foundations of Math I and English I on a modified block schedule, or skinny, with an additional looping course of Math I and English II during the tenth grade year (see Figure 2). By doing this, it is possible to see statistically significant gains in course progression and an overall reduction in the dropout rate.

Defining the Purpose of the Study

The purpose of this descriptive and evaluative study is to determine the degree to which year-long, looped scheduling improves student academic performance in mathematics and English courses while improving on-track student performance for identified at-risk students as compared to their 4x4 block scheduled peers. The primary purpose of the study is to compare students scheduled using a traditional course structure and those scheduled in a year-long course structure with enhanced looping the following year. Data sources included the student achievement records of forty at-risk ninth grade students on a 4x4 block schedule during two cohort years from the 2014-2015 and 2015-2016 cohorts. Data sources also included the student achievement records of forty at-risk ninth grade students grouped into the year-long, looped mathematics and English courses for the 2016-2017 school year. All students involved were in their first-year of high school and had recently transitioned from one of the feeder middle schools. No students who had previously taken the courses were included into the pilot program.

The main objective of the study is to discover if the modified scheduling block with looping had any measureable impact on at-risk student performance on the End-of-Course assessment for Math 1 and/or English 2. A secondary purpose of the study is to use the student performance data from the same cohorts to determine if the impact of year-long, looped course



Note. Study Design. Concurrent Triangulation Strategy being implemented for the problem of practice this study will address. Adapted from Creswell (2003) Concurrent Triangulation Strategy.

Figure 2. Hybrid block looping schedule course progression – Math and English.

schedule model had an impact on on-track student performance such as student retention and dropout rates. Finally, it is the intention of this researcher to provide the results of the study to assist other practitioners in the development and implementation of modified scheduling with looping for at-risk students. Some of the specific objectives of this study include the following:

- Describe the steps taken within Franklin County Schools to address Math 1 deficiencies by creating a pilot scheduling program for at-risk students.
- Determine the impact of year-long, looped classes on identified at-risk student performance on Math 1 and English 2 End-of-Course assessments.
- Highlight the existing assessment data within Franklin County Schools and the pilot scheduling program to determine if year-long, looped courses have an impact on student performance.
- Analyze trends from the data gathered to provide practical and effective actions related to alternative scheduling methods for at-risk students that can be implemented by other practitioners.

Foundational Developments and Needs Assessment

Franklin County Schools is a rural, mid-sized LEA in central North Carolina with seventeen schools, serving approximately 8,200 students. Although Franklin County is experiencing substantial growth towards its southern borders near Wake County and Wake Forest, it is still largely considered an economically disadvantaged county. The county seat of Louisburg has seen a declining population during the last decade and the district is currently implementing a STEM (Science, Technology, Engineering and Mathematics) focused middle school and high school curriculum program through a partnership with the North Carolina Department of Public Instruction in order to bolster student enrollment and mathematics focus in

that attendance area. Although results from this shift have yet to show any substantial results in EOG and EOC testing, it does provide evidence that a perspective shift is developing in district leadership and instructional staff towards greater linking between grade levels of science and mathematics instruction and district resource allocation.

Key Challenges in Mathematics Instruction and Scheduling

The issues that initially provided the focus for this study were not specifically limited to Franklin County School nor to North Carolina Public Education. The National Center for Educational Statistics (NCES) is the primary federal organization for collecting and analyzing data related to education. Based on collected data reported the national trends in mathematics achievement have changed significantly for the past three decades (NCES, 2014). Additionally, based on historic data and academic research, classroom math instruction has also changed very little during the last fifty years (Hayes, 1992; Woodward, 2004). As it relates to school performance and college preparedness, improving mathematics achievement of secondary school students has been identified as an unmet need since 1923 (Reyes, & Reyes, 2011). Just twenty years ago, less than 25% of students who graduated high school had taken an Algebra 1 course.

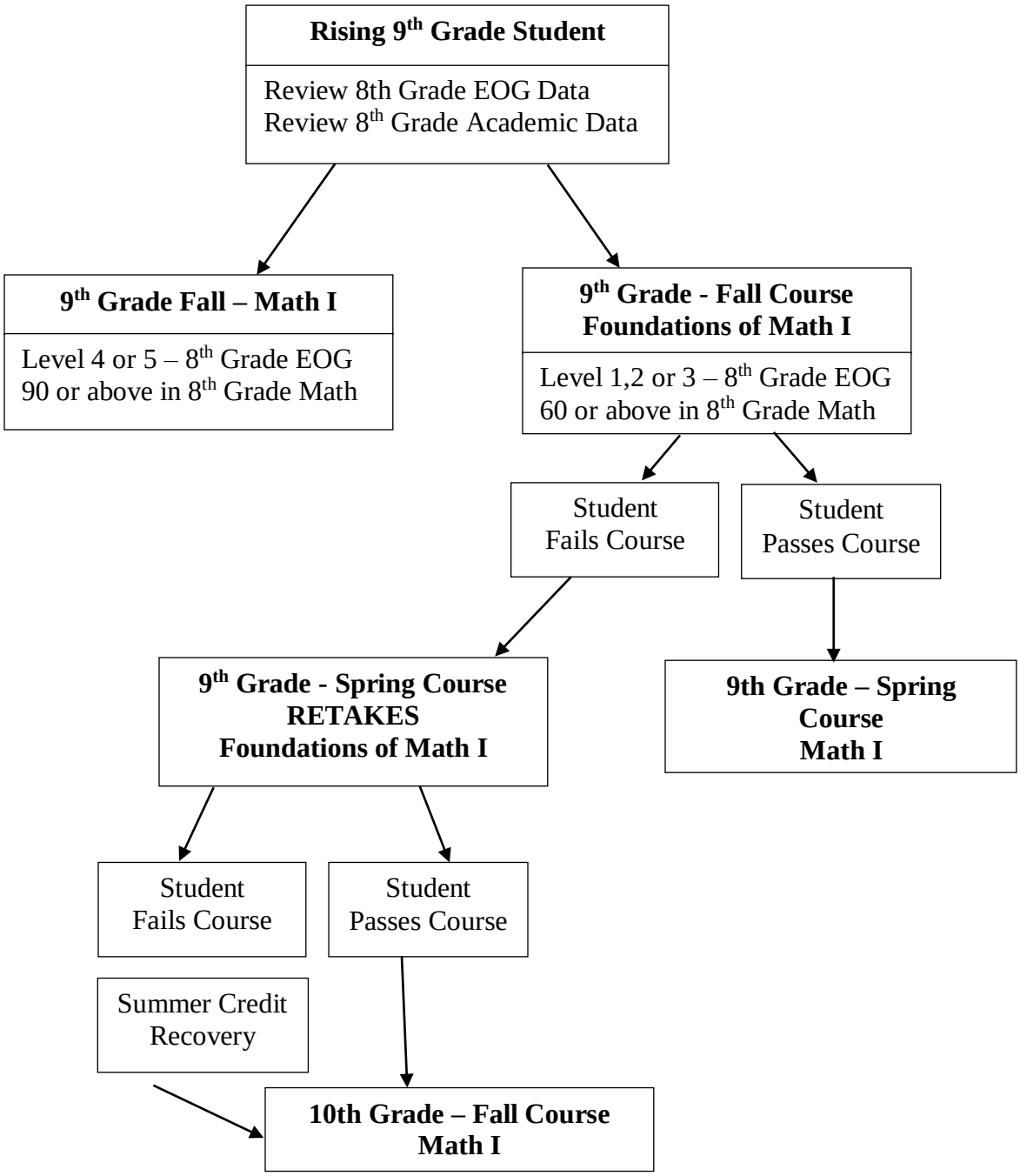
Despite several years of comparative data in North Carolina with similar curricular goals and a similar End-of-Course exam, there has been no significant improvement in student math competency. Performance has actually dropped slightly during the last three years despite a state-wide focus on the Math 1 curriculum and a recent realignment of instructional standards. Some have blamed the plateau on the continual realignment within the Common Core Standards and an End-of-Course assessment redesign. Both areas have placed additional pressure on district level leadership and Math I instructors to focus on the use of aligned benchmarks for greater data

gathering and school remediation programs for students considered at-risk. Although efforts have seen some slight improvements, there has been no significant gain in student performance.

Districts across North Carolina continue to focus on Math 1 curriculum, pacing and the limited proficiency of students on the End-Of-Course exam. Although there has been some discussion regarding course structure, the primary focus has been on the curriculum implementation. Because many districts felt that more time was needed for students to gain mastery knowledge of the subject, they have focused heavily on a double-dose scheduling mentality with little regard for improved relationship building or true mastery learning. In fact, this process of double-dosing as a sole means to improve academic instruction typically leaves many students performing at less than the standard for proficiency (see Figure 3).

As it relates to additional on-track student performance, Rettig and Canady (1998) state that successfully completing the first mathematics course (Algebra 1/Math1) is identified as a key factor for future academic accomplishment. It serves as the first high school mathematics course for most students and by the nature of the subject, continuously builds on daily skills. If a student does not have a good grasp of a concept learned one day, it is difficult to master the next concept. Students who are in the 4x4 block schedule, must learn multiple concepts each day. Most students are not successful at this pace and need time to absorb material and practice concepts before they can move to additional objectives. The block schedule does not allow time for students to absorb the material over a greater term length, but forces students to learn more concepts in a shorter time-frame due to the limited eighteen-week semester as compared to the thirty-six weeks on a traditional schedule.

It is this researcher's belief that combining the positive indicators from a year-long course with an additional looped semester block course during the following school year could



Note. Traditional Math 1 Sequence on traditional block schedule. Requires course availability based on number of students that are unsuccessful in pre-requisite, Foundations of Math 1 Course.

Figure 3. Traditional schedule course progression – Math 1 (Algebra 1).

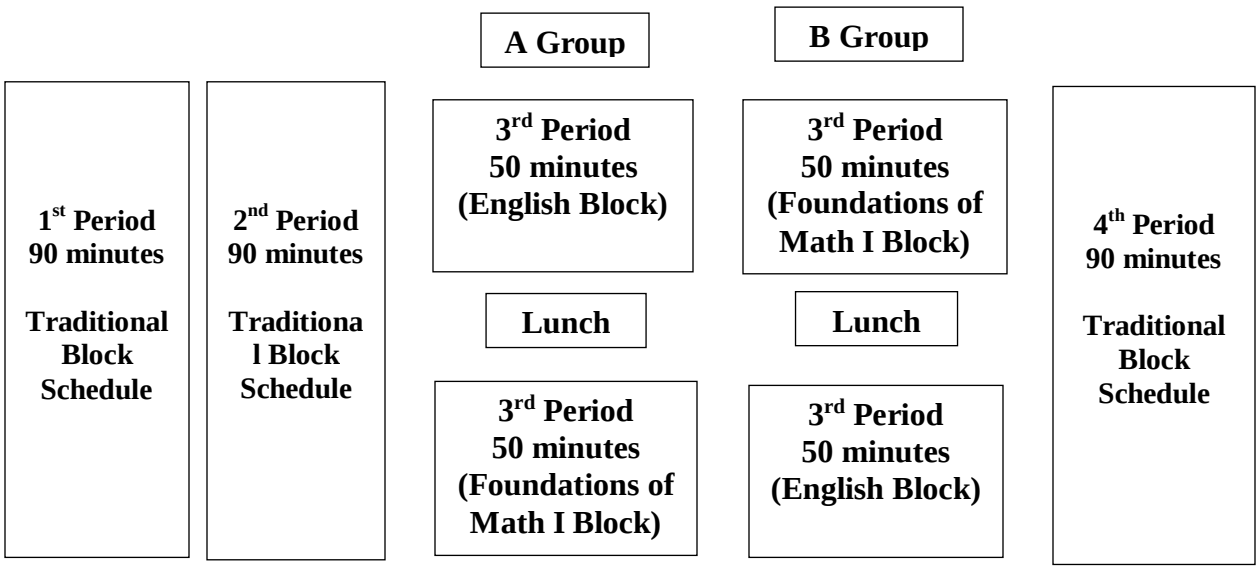
provide substantial academic gains for at-risk students. By combining the advantages of each schedule, it is possible to decrease instructional gaps for at-risk students and improve overall achievement levels for students that would otherwise have limited opportunity to attain these math skills.

Modified Scheduling Plan and Initial Implementation

Initially, the focus on redefining the course sequencing and creating a modified block schedule was directly linked to increasing Math 1 success for historically at-risk students. This plan included the process of creating a modified, year-long block schedule within a 4x4 block period day to improve a student's foundational mathematics skills. This year-long course would then be coupled with enhanced looping semesters in order to complete the Math I sequence (see Figure 4).

The first step of the implementation process was for teachers to review the data for the students that were in the class of rising ninth graders in the spring of the year before they transitioned to high school. Teachers and curriculum staff looked at specific criteria to identify students that might have issues with foundational math skills. These key indicators included EVAAS predictor scores, EOG test scores from sixth, seventh and eighth grade as well as classroom academic performance data. From this information a core group of students were selected that had limited potential of passing the Math 1 End-Of-Course exam.

North Carolina's school districts, public schools, and charter schools receive web-based reporting through the Education Value-Added Assessment System (EVAAS) that offers an objective way to measure student growth and the impact on student learning. EVAAS data provide a statistical analysis of North Carolina state assessments, and then provide schools with growth data an achievement to consider for student performance predictors. "Educators are



Note. Hybrid Block Schedule Outline. Students in A Group take English I during the 1st 50 minutes of the 3rd Period class then transition to Foundations of Math I during the 2nd 50 minutes after lunch. B Group follows the inverse schedule with the same teacher.

Figure 4. Hybrid block schedule outline – Math and English.

able to make data-informed instructional decisions to ensure academic growth and achievement of all students by using EVAAS" (Retrieved from http://www.dpi.state.nc.us/effectiveness-model/evaas/, 2013).

The second step of the implementation process was to utilize the information gathered to select approximately forty of the lowest performing students of the entering ninth grade cohort to participate in the enhanced-looping model pilot. These students were scheduled to take an introductory mathematics course, Foundations of Math 1, for fifty minutes each day throughout the one hundred and eighty-day calendar of the upcoming school year as opposed to those on the traditional block. These students then transitioned to lunch during their "split" time and continued the second half of the modified block period in an English I classroom for fifty minutes (see Figure 4). These students followed the same basic instructional calendar and pacing guide throughout the year, with adjustments made for the more traditional schedule and extended year period. This varied greatly from the traditional course sequence (see Figure 2) where low-performing at-risk students could potentially re-take the Foundations of Math course twice in the same year and then repeat the class the following fall semester.

The final step in the initial implementation process was to schedule the same cohort of students in the second part of the Math 1 course following fall semester with the same teacher. This combined some of the key elements of the traditional schedule for Math 1 and introduced the concept of looping at the high school level.

Throughout the project, teachers and curriculum leadership continued to monitor student performance through standard classroom formative and summative assessments, while district benchmark assessments were monitored to provide comparative data to students that did not participate in the yearlong course with looping.

Research Questions

The purpose of the proposed study was to determine through data analysis whether a year-long, looped course sequence for scheduling had an impact on student academic performance on North Carolina End-of-Course tests and on-track student performance such as retention, promotion and dropout rates in a cohort of high at-risk students. Improved performance would be identified specifically by reviewing the cohort academic achievement as indicated by state-mandated testing, end-of-course grades and course completion rates.

The first area of research is the impact of looping for increased academic performance. Although there is some research that concludes the results of this type of academic schedule have been positive in relationship to improved student achievement in grades K-8, the current research does not provide substantial data for secondary instruction. The limited research on the topic is primarily due to the difficulty of scheduling a looped course at this grade level, especially for students that are on a block schedule.

The second area of research is the comparison of yearlong scheduling versus block scheduling as it relates to improved on-track student performance. This topic has considerable research at the secondary level, but only as an independent area of focus. By extrapolating positive attributes from each research area, it is my hypothesis that combining the two scheduling options will result in a greater benefit for at-risk students to improve academic success as compared to their peers on a traditional, block schedule course sequence.

The research questions for this study are:

1. Did individual student performance on End-of-Course assessments improve for at-risk students in the year-long, looped course sequence compared to students in traditional, block schedule course sequence?

a. Did individual student performance on the End-of-Course Math 1 assessment improve for at-risk students in the year-long, looped course sequence as compared to students in the traditional, block schedule course sequence?

b. Did individual student performance on the End-of-Course English 2 assessment improve for at-risk students in the year-long, looped course sequence as compared to students in the traditional, block schedule course sequence?

2. Did individual student course completion rate in mathematics and English course sequences improve for at-risk students in year-long, looped course sequence compared to students in traditional, block schedule course sequence?

   a. Did individual student course completion rates in mathematics course sequence improve for at-risk students in the year-long, looped course sequence compared to students in the traditional, block schedule course sequence?

   b. Did individual student course completion rates in English course sequence improve for at-risk students in the year-long, looped course sequence compared to students in the traditional, block schedule course sequence?

3. Did individual student on-time promotion rates improve for at-risk students in the year-long, looped course sequence compared to students in the traditional, block schedule course sequence?

4. Did individual student drop-out rate improve for at-risk students in year-long, looped course sequence compared to students in traditional, block schedule course sequence?

Significance of the Study

Schools have implemented block-scheduling models to provide extended instructional time and increase the efficiency of the school day (Nichols, 2005; Zepeda & Mayers, 2006). Proponents contend that block-scheduling models increase student achievement (Mattox et al., 2005), but other research regarding reorganization of the school day contradicts these claims (Zepeda & Mayers, 2006). To date, few studies examined whether block scheduling has an effect on at-risk student achievement (Marchant & Paulson, 2001). The results of the study may be useful for educational leaders attempting to determine whether a modified yearlong course with looping may be an appropriate scheduling model for their schools to positively impact at-risk student performance and improve on-track student performance such as dropout and retention rates.

The need for this project arises from accountability results of the Math 1 scores throughout North Carolina and in Franklin County Schools specifically. Secondary schools can significantly impact on-track student performance for at-risk students by creating an optional course scheduling model as it impacts early mathematics and English instruction. By combining the positive aspects of a traditional, year-long course schedule with the added benefits of looping in a second year course will improve student performance and core subject area performance on the End-of-Course exam while using the same pacing guides and district benchmark assessments.

This model utilizes early identification of at-risk students in math and English courses to implement year-long ninth grade support courses for Foundations of Math 1 and English 1 on a modified block schedule, with an additional looping course of Math 1 and English 2 during the tenth grade year (see Figure 2). By doing this, it is possible to see improvements in End-of-

Course assessment performance and on-track student performance, such as grade level promotion, on-time course progression, and reduced drop-out rates.

Investigation of this type of scheduling model may also assist educational leaders in making informed decisions before making specific scheduling adjustments toward or away from a block scheduling model to a modified course structure. The study contributes to the existing body of literature since little research has been conducted on the efficacy of block scheduling (Zepeda & Mayers, 2006), particularly regarding at-risk student achievement (Marchant & Paulson, 2001). Students at-risk of failure will benefit when educational leaders possess appropriate information to select a scheduling model that fosters academic success and reduces dropout rates.

As an organizational design, looping has recently received more attention in the educational community, but little research is available to support its efficacy. Few formal studies have been conducted that compared the academic achievement of students participating in a looping design with that of their counterparts in traditional one-year classrooms. This study has the potential for providing quantitative information that could be used by the educational community in evaluating one dimension of the effectiveness of the two program designs being compared. Teachers and administrators could benefit from the comparisons made in this study to make better decisions regarding the delivery of instruction in school settings.

Definition of Terms

For the purpose of the research study, operational and integral terms and phrases are used in a unique way. The terms and phrases were defined as follows:

At-Risk Student - A student at risk is any young person who because of a wide range of individual, personal, financial, familial, social, behavioral or academic circumstances may

experience school failure or other unwanted outcomes unless interventions occur to reduce the risk factors. Circumstances which often place students at risk may include, but are not limited to: not meeting state/local proficiency standards, grade retention; unidentified or inadequately addressed learning needs, alienation from school life; unchallenging curricula and/or instruction, tardiness and/or poor school attendance; negative peer influence; unmanageable behavior; substance abuse and other health risk behaviors, abuse and neglect; inadequate parental/family and/or school support; and limited English proficiency (North Carolina Department of Public Instruction, n.d.b).

A/B Block (Alternating Day) Schedule - A scheduling method in which students attended 90-minute classes alternating every other day, and the days of the week are alternated into A days and into B days. In this schedule half of the courses are taken on A days and the other half of the courses are taken on B days, with a full-credit course lasting the entire school year.

Block Scheduling - Block scheduling reorganizes the school day into longer class periods, typically ninety minutes, and students take only four classes each day. While various block-scheduling models exist, the study focused on the 4x4 block schedule in which students take four courses each semester for a combined total of eight courses in the school year (Canady & Rettig, 1995).

Core Subject Area - Core subject areas include English, mathematics, science, and social studies (Gullatt, 2006).

Dropout – Any student who leaves school for any reason before graduation or completion of a program of studies without transferring to another elementary or secondary school.
Education Value-Added Assessment System (EVAAS)—Web-based system that provides

comprehensive and cumulative data for North Carolina students that is utilized by principals, teachers, and central office staff (SAS Institute Incorporated, n.d.).

Graduation Rate - Graduation rate was determined by calculating the percentage of high school students who graduate four years after starting the ninth grade

Looping - Is a course progression primarily used in elementary school scheduling where students remain in a cohort and continue from grade to grade taught by the same teacher. Typically, this is done in transitional grades such as Kindergarten – 1st Grade to allow for greater relationships and focused instructional opportunities.

National Assessment of Educational Progress (NAEP)—Assessments of varying subjects administered nationwide that provides a continuum of data to determine the progress of students in America. The assessments that are administered every two years essentially remain unchanged as to provide a transparent view of students' progress (NCES, 2014b).

North Carolina End-of-Course Test—Tests administered to high school students in public education that is used to determine content knowledge in specific subjects (North Carolina Department of Public Instruction, n.d.b).

Modified Block Schedule - Is a form of block scheduling, but has been altered from the main forms of block scheduling to meet the individual campus needs. For example, modified A/B block schedules may have double blocked classes every day at the end or the beginning of the day to accommodate electives courses, rather than meeting every other day.

On Track Indicator – One of several data points that relate to a student's continual progress towards promotion and graduation, including successful course completion and appropriate cohort promotion.

Traditional Schedule - A scheduling method where students attend seven to eight classes of fifty minutes in length each school day, and these classes are a year in length for one credited unit. Typically, the school year on a traditional schedule begins in the fall (late summer) and concludes at the end of spring or the beginning of the summer. In a traditional schedule, teachers will tend to teach six to seven classes per day and only have one conference period per school day.

Year-Long Course - Any course that meets on a daily basis for the school year or term. This is typically seen in a traditional school scheduling model. Classes can meet for varying times from forty-five minutes to ninety minutes on a year-long schedule, but are designed to provide daily, continual instructional support.

Assumptions

The following assumptions applied to this research study. First, all teachers involved in the study were certified in their instructional content area and teaching within the limitations of their certification. Underlying the first assumption is that academic freedom allows each teacher to employ a variety of strategies to address local and state curriculum standards (Nichols, 2005). Additionally, regardless of the cohort or scheduling type, teachers were assumed to be using time efficiently and employing instructional methodologies that best meet the needs of their students.

Second, all students involved in this study were previously identified as high at-risk for failure and were aligned in a course with a certified teacher in the content area; however, the teachers for each cohort were not necessarily consistent. Underlying the second assumption is that the class work required of students was equally rigorous in the year-long, looped course sequence model as compared to the traditional, block scheduling model. The north-central North Carolina high school that is the focus of the study is subject to state mandated course

requirements, testing requirements and graduation requirements as determined by the local board of education and the North Carolina Department of Public Instruction.

Finally, factors such as student behavior, student absences, teacher absences, and other potential classroom interruptions were not part of this study and were not included in the data collected. All data collected focused on academic performance and on-track student performance.

Limitations of the Study

Several limitations to the study exist. First, the study is a retrospective study limited by the examination of the previously established scheduling implemented to improve mathematics proficiency in at-risk students. The independent variable (i.e., scheduling type) was pre-existing and could not be manipulated. Since the structure of the course sequencing was already established, the sample data to determine the degree to which this impacts academic achievement and on-track student performance cannot be adjusted mid-course and any additional supports could not be created.

Second, the scope of the study included one high school in north-central North Carolina. The school was identified because the researcher was involved in the initial scheduling process at the pilot school and was aware of the previous academic difficulties within the Math 1 course structure. The researcher was also involved in the planning process regarding the functionality of scheduling adjustments made in the pilot. The study consisted of examination of school-based data, cohort predicted EVAAS data, student grades, cohort retention data, and cohort dropout data to determine the at-risk students. While the results of the study may prove to be beneficial, the school may not be representative of other school populations and more extensive analysis on

a larger scale would be necessary to determine the value of the yearlong, looped scheduling sequence.

A third limitation of the study was the inability to expand this study beyond the initial cohort of students selected for the year-long, looped course sequence in math and English classes. The data from the second and third cohorts will not be available until after the initial research phase has concluded. Preliminary data may be accessible at a later date to make longitudinal comparisons and to establish the need for additional research on expanded groups by implementing the process throughout the district.

Overview of the Study

The study is organized into five chapters that focus on various aspects of the research process and correlating subsections with Chapter 1 functioning as an introduction and overview of the problem of practice and significant background information related to the study. This chapter provides the reader the essential information necessary to understand the purpose of the study, its relevance to the problem, significance and impact related to the problem, objective of the study, potential shortcomings, conceptual framework, and eventual procedures utilized for the problem of practice study design.

Chapter 2 provides the theoretical framework and supporting literature addressing the year-long and looped coursework for students and presents the perspectives of other researchers and connected studies as they relate to alternative scheduling to provide increased student achievement and on-track student performance. Chapter 3 is dedicated to the research design and methodology of the study and will provide a description of the study as it relates to need for the study, purpose, setting, participants, and methods for analyzing the data used in this study and the innovation of combining the year-long course structure with additional looping support for

at-risk students. Chapter 4 provides an analysis of data and Chapter 5 presents a summary of findings, conclusions, and recommendations for further research and practice.

CHAPTER 2: REVIEW OF LITERATURE

Introduction and Purpose

This chapter provides the theoretical framework and supporting literature that links several points of research connecting the study addressing the year-long and looped coursework for students. It presents the perspectives of other researchers, outlines historical developments in education, and connects studies as they relate to alternative scheduling to provide increased student achievement and on-track student performance. The research related to schedule designs, at-risk student scheduling, and long-term success models outlines the potential connection created from the alternative yearlong looping model provided by the problem of practice. Although it is not meant to be a conclusive statement, it is important to note that it is this literature review that provides the necessary data used in the analysis of the problem and the development of a conceptual framework for this study's problem of practice.

Historical Overview: High School Educational System

Historically, the primary responsibility for education in America rested with each state, and in turn, each local community (U.S. Department of Education, 2008). This meant that each state had the responsibility and the authority to establish schools, develop curricula, and guidelines for enrollment and graduation. Eventually, the Federal Department of Education was created in 1867 and emphasized the appropriate collection of school information to help states establish effective school systems.

In an effort to establish a more uniform set of guidelines for college admission, The National Council of Education mapped out a "standardized core curriculum for high-school to prepare students for college life and work" (Boyer, 1983). The so-called "Committee of Ten" recommended that public education should offer identical educational

options for all students in order to ensure quality for post-secondary institutions. This idea of identical education opportunities was designed to insure all students received a quality education that would provide them an adequate liberal arts education considered necessary to continue their education at a university level. At the time, this was considered a radical shift by many as it would help assist in equalizing opportunities for more Americans.

In the era of the Committee of Ten recommendations, education for children of the poor and underprivileged was more vocationally oriented. This was especially true in areas of the country where the economy was based on agricultural or relied on manufacturing. The prevailing belief of the day was that only privileged elite, generally Caucasian males, from families with resources available for university study were in a position to benefit from a post-secondary, college curriculum. As an ideal, the revised American school system would help Americanize new immigrants and provide equal educational opportunities for all. The Committee of Ten recommended all students should receive a comprehensive liberal arts education. This was a significant shift from the previous design that provided a college-bound education only to those who were preparing to go to the university level. Others believed high school should focus on providing students with skills designed for immediate employment (Stevens, 2006). An education that provides both preparations for immediate vocational employment and for entrance into college/university studies is valid. However, both types of educational curriculum do not necessarily serve all students equally well.

Student demographics have shifted considerably since the original Committee of Ten report, from primarily "Caucasian, affluent males to virtually all persons between ages fourteen and eighteen" (Stevens, 2006, p. 45). Just as the profile of the American high school student has changed over the years, so have the educational needs. Contemporary political stakeholders and

most educators believe students must have the opportunity not only for a liberal arts curriculum, but for vocational/career/technical education as well. Students must be prepared for postsecondary education and career readiness; while also developing good problem-solving and communication skills required in today's world.

Historical Overview: High School Scheduling

The first attempt to standardize the structure of the high school day resulted from an 1893 report issued by the Committee on Secondary School Studies that recommended what subjects should be taught as well as their sequence and length (Zepeda & Mayers, 2006). Thirteen years later, the Carnegie Foundation defined a course as having to meet a certain number of hours each day and week (The Carnegie Foundation for the Advancement of Teaching, 2011). The Carnegie Unit became the standard for organization of the school day, consisting of one-hundred twenty hours of instruction in classes that meet for forty to sixty minutes over the course of thirty-six to forty weeks (The Carnegie Foundation for the Advancement of Teaching, 2011). Hackmann (2004) indicated the implementation of Carnegie Units resulted from the scientific management era that sought to make the education of students more efficient.

The Carnegie Unit remained the standard for the organization of the public high school schedule until the 1950s when flexible modular scheduling (FMS) became a way for high schools to provide longer instructional periods for curricula that needed more in depth study. It also allowed for shorter periods for less rigorous subjects (Zepeda & Mayers, 2006). The use of FMS continued through the 1960s and peaked in the 1970s when approximately 15% of the nation's high schools used the FMS scheduling model (Hackmann, 2004). The use of FMS declined as school discipline became more difficult to enforce (Zepeda & Mayers, 2006), and the nation's schools returned to the Carnegie Unit system.

The 1980s were the catalyst for another call for more effective use of class time with the publication of A Nation at Risk in 1983. The report by the National Commission on Excellence in Education (NCEE) examined the quality of public schools in America and reported several recommendations for improvement in public schools. They described American schools as academically falling behind schools of other industrialized nations, and called for schools to make changes in order to be more competitive. The commission called for better organization of the traditional schedule and recommended the school day be rethought and recreated to meet the needs of the various student learners within the school systems. Consequently, implementation of block scheduling, which alters the school day to provide extended time for learning, accelerated in American high schools (Nichols, 2005).

Pressure to reform the structure of the school day continued into the 1990s. The report, Prisoners of Time, issued by the National Education Commission on Time and Learning (1994), supported the argument that the traditional school schedule was inadequate for the needs of modern American society. The report further indicated that schools had to begin exploring more innovative ways to use time within the school day. Ultimately, block scheduling became a strongly supported view to modify the school day, and during the 1990s, it became the school scheduling model that was preferred for implementation in high schools (Hackmann, 2004).

Development of School Scheduling Models

In the literature the reoccurring message of addressing changing the basic school day has created such scheduling changes to incorporate more innovative school days, such as; block scheduling, alternative scheduling, trimester scheduling, and other various types of non-traditional scheduling. The traditional and rigid school schedule had begun to become subject to scrutiny and the focus of new research. The concern of the public today and the pressure of

schools for students to perform satisfactorily on mandated standardized tests resulted in efforts to alter the concept of time and schedules in the secondary schools.

Traditional School Scheduling

In a traditional school schedule, students enroll in six to seven courses that meet for fifty to fifty-five minutes daily over the course of the school year. Patterned after the principles of scientific management theory, the traditional school schedule emphasizes efficient use of time and resources (DeMarrais & LeCompte, 1999). In the context of education, scientific management theory is applied for the purpose of eradicating waste in instruction so that student effort results in increased achievement.

Part of eradicating waste is to provide fixed amounts of time for each subject. The application of scientific management principles encouraged the use of Carnegie Units to determine the credits a student earns toward graduation, based upon time spent in class (DeMarrais & LeCompte, 1999). The Carnegie Unit standardized the amount of time needed to earn one course credit, typically one-hundred twenty hours over the course of 36-40 weeks (The Carnegie Foundation for the Advancement of Teaching, 2011).

DeMarrais and LeCompte (1999) criticized the scientific management approach as driven by time rather than students' needs, abilities, and interests. Critics contended the traditional school schedule fostered an impersonal environment and encouraged the teaching of factual knowledge rather than critical thinking, problem solving, and active learning (Cawelti, 1994). The National Commission on Excellence in Education (1983) criticized the traditional school schedule and recommended that the school day be lengthened to accommodate the needs of a diverse student population.

Because students are frequently changing classes and teachers encounter nearly 200 students a day, the traditional school schedule has been criticized as inhospitable and chaotic (Canady & Rettig, 1995). The continuous changing of classes contributes to disciplinary problems as students move from room to room frequently throughout the school day. With graduation requirements increasing, the time available for instruction is limited, so teachers overuse the lecture delivery, and the curriculum is presented in a fragmented manner (Canady & Rettig, 1995). The traditional scheduling model does not provide the time structure that struggling students need to stay motivated to learn (Canady & Rettig, 1995).

Flexible Modular Scheduling

One of the first attempts to alter the traditional school day occurred in the 1960s and 1970s with the advent of flexible modular scheduling (Canady & Rettig, 1995). The purpose of flexible modular scheduling (FMS) was to eliminate the inflexibility of the traditional school schedule and offer courses that ranged from twenty to one hundred minutes in length, depending on the disciplinary focus. By varying the length of courses, a variety of teaching formats could be incorporated (Canady & Rettig, 1995). The use of FMS continued through the 1960s and peaked in the 1970s when approximately 15% of the nation's high schools used the flexible scheduling model (Hackmann, 2004). Canady and Rettig indicated that FMS was abandoned because of disciplinary problems.

Block Scheduling

Block scheduling models reorganize the school day into longer periods. Two basic models of block scheduling exist, the A/B schedule and the 4x4 schedule. In the A/B schedule, students take eight courses, four courses daily on alternating days, with each course period lasting approximately eighty to eighty-five minutes (Canady & Rettig, 1995; Zepeda & Mayers,

2006). Students enrolled in a 4x4 block schedule take four courses per semester, each lasting approximately eighty to eighty-five minutes, for a total of eight courses each year (Canady & Rettig, 1995; Zepeda & Mayers, 2006).

Canady and Rettig (1995) cited several goals of block scheduling. Block scheduling helps eliminate the ineffective use of time by decreasing the number of class changes, the number of students in each class, and the number of courses students are responsible for each day. Time becomes available to incorporate active teaching strategies, and students are provided with adequate blocks of time to learn (Canady & Rettig, 1995).

Queen and Isenhour (1998) determined that the 4x4 block schedule was the best scheduling format for high schools. A 4x4 block schedule structures the school day so that teachers have time to implement differentiated lessons and address the individual needs of students (Queen & Isenhour, 1998). While some have criticized the model as being too fast paced for struggling students, Queen and Isenhour (1998) argued that at-risk students benefited from a 4x4 model because they could focus on only four courses. In the 4x4 model, if students fail a course, they have the opportunity to retake the course and graduate on time.

Proponents of block scheduling argued that the scheduling model encourages the use of active teaching strategies such as cooperative learning and hands-on activities (Canady & Rettig, 1995). Corley (2003) sought student feedback to determine what teaching strategies were being used in a school with a block schedule. Respondents indicated that block scheduling provided more time to learn, opportunities for individualized assistance, and improved grades. Conversely, respondents further indicated frequent use of seatwork, lecture, group work, and discussion while hands-on activities, presentations, field trips, and journaling were used less frequently (Corley, 2003).

Hybrid-Block Scheduling

Hottenstein (1998) defined hybrid block scheduling as, "each one of the core [block] scheduling models can be modified into multiple variations called hybrids" (p. 15). Kenney (2003) equates the hybrid block schedule to the mixing of longer and shorter periods of time to better address the issues related to some formats of classes that work better with lengthier amounts of time, and other classes, that work well with shorter lengths of time. Hybrid schedules can be formatted to meet the needs of individual campuses or even grade levels. Boarman and Kirkpatrick (1995) report on the success of how a large suburban high school in Maryland uses the hybrid schedule. Prior to this schedule, other attempts at other school scheduling formats had occurred such as the zero period, double periods, and the A/B schedule. The hybrid schedule in this school is used to benefit the classes that clearly need the longer modules of class time and how these varied times are beneficial to the instruction of the six thousand students in the high school. Shortt (1995) reveals how a high school has developed a hybrid schedule, where students have the option of three long periods each day and one shorter period per school day. With this type of hybrid block schedule students can meet each day, in the shorter class time, for classes such as music, athletics, band and other electives that require meeting every day and not taking time away from the core or required courses.

Looped Scheduling

Looping as a scheduling model is sometimes referred to as "continuous learning" or "multi-year grouping" is a practice students and teachers track together from year to year. The term, coined by Jim Grant, author of "The Looping Handbook," refers to the increasingly common practice of keeping groups of students together for two or more years with the same teacher. In these classroom settings, the teacher would begin with a group of first-grade students

for a school year. Instead of sending those students on to a new teacher for second-grade, the same teacher would continue with them the following year.

Supporting Research: Block Scheduling

The National Education Commission on Time and Learning (1994) determined schools must explore innovative ways to use time within the school day in order to increase student achievement. The general concern was that at-risk students are more likely to drop out of school when compared to their peers. Block scheduling became viewed as a way to modify the school day, and increased implementation of the block-scheduling model occurred in the 1990s (Hackmann, 2004).

Some studies have indicated block scheduling positively affects student achievement. Lewis et al. (2005) found students with a 4x4 block schedule have greater gains on standardized tests in math and reading compared to traditional or A/B scheduled students. Overall, block scheduling has been shown to have both positive and negative effects on student achievement (Evans et al., 2002; Gruber & Onwuegbuzie, 2001; Mattox et al., 2005; Nichols, 2005; Trenta & Newman, 2002).

Students and teachers generally have positive perceptions of block-scheduling formats. Students appreciate the amount of time teachers have to dedicate to individualized learning needs (Veal & Flinders, 2001). The ability to take more credits, interact with teachers, and participate in a variety of activities have been cited as benefits of the model but making up missed work because of absences was perceived as a significant disadvantage (Evans et al., 2002). Teachers appreciated the longer time period (Veal & Flinders, 2001). Some teachers indicated a block schedule allowed for more in-depth study of content (Evans et al., 2002), but others indicated increased pressure to cover the curriculum adequately (Veal & Flinders, 2001).

Marchant and Paulson (2001) measured student perceptions of A/B block scheduling using a Likert-type survey and focus group interviews. Higher achieving students reported a positive perception of block scheduling (Marchant & Paulson, 2001). Low achieving students reported negative opinions of block scheduling, including difficulties in staying organized, paying attention over longer course periods, and catching up after an absence (Marchant & Paulson, 2001). Rettig and Canady (2003) argued that block scheduling might have a disparate effect on diverse student groups. Disaggregated student data are needed to determine whether block scheduling benefits students at-risk of school failure.

In a qualitative case study, at-risk students indicated that teachers misallocated time on the block schedule (Patterson et al., 2007). Specifically, the students criticized the length of block scheduled classes as too long and a waste of time. Students further indicated that instructional strategies were predominately lecture and note taking, which resulted in boredom and disengagement.

Some researchers demonstrated a positive relationship between student achievement and block scheduling. Evans et al. (2002) collected data from three school districts using a 4x4 block schedule to measure perceptions of block scheduling and the effect on student achievement measures. Teachers held a generally positive opinion of block scheduling and cited fewer behavior issues and more time working with students as benefits.

During the study, students credited block scheduling with providing the opportunity to focus on fewer classes and receive more individualized instruction. Both groups indicated that having a substitute teacher for a block period was difficult, and parental opinion pointed out that a block schedule was too long for students to stay focused (Evans et al., 2002). Student outcome measures were positive. There was an increase in honor-roll students, a decrease in the number

of D and F students, an increase in completed advanced placement courses, an increase in the number of students who passed the high school proficiency test, and a decrease in detentions (Evans et al., 2002).

Mattox et al. (2005) examined mathematics achievement scores in five schools after conversion to either 4x4 or A/B block scheduling. Students in four schools experienced increased mathematics scores after the 1st year of conversion, and students in all five schools experienced increased achievement in the second year (Mattox et al., 2005). In year three, students in two of the study schools experienced a decline in scores, but the scores were still higher than scores on a traditional schedule (Mattox et al., 2005). A limitation in the Mattox et al. (2005) study was that scores between 4x4 and A/B block schedules were not differentiated.

Lewis et al. (2005) conducted a study to ascertain differences between student achievement and scheduling type. Student achievement was measured by analyzing scores from ninth and eleventh grade standardized tests and ACT scores in math and reading. The results indicated that 4x4 scheduled students had small gains in math when compared to A/B and traditional scheduled students, and 4x4 scheduled students had larger gains in reading compared to students in the other scheduling formats (Lewis et al., 2005).

Queen and Isenhour (1998) determined the 4x4 block schedule was particularly beneficial for students considered at-risk of school failure because the model allowed students to focus on fewer courses each day and provided greater opportunity for students to receive individualized attention during the extended class period. They also saw the block schedule model as an opportunity for students to build a stronger relationship with their teacher.

Evans et al. (2002) found block scheduling positively affected student achievement with an increase in the number of students on the honor roll and a decrease in the number of student

failures. Evans et al. further indicated that SAT scores were higher and more students passed the state proficiency test and AP courses. Trenta and Newman (2002) established a positive relationship between block scheduling and student grades in core academic subjects. Trenta and Newman (2002) found no relationship between block scheduling and increased grade point average or ACT scores.

Limitations: Block Scheduling

Other studies regarding block scheduling are less positive. Maltese, Dexter, Tai, and Sadler (2007) found students with A/B and 4x4 block schedules earned lower grades in college than their peers with a traditional schedule. Research regarding student achievement in language arts showed only a small increase in student grade point averages with lower gains for minority students and students from low socio-economic backgrounds (Nichols, 2005). A study by Lawrence and McPherson (2000) revealed students with a traditional schedule had higher test scores in English, history, math, and science when compared to students with block schedules.

Marchant and Paulson (2001) found block scheduling had a positive effect on higher achieving students but a negative effect on lower achieving students. Gruber and Onwuegbuzie (2001) ascertained no difference in grade point average between students with a block-schedule and students with a traditional schedule. Gruber and Onwuegbuzie reported a negative effect of block scheduling on language arts, mathematics, social studies, and science achievement.

Critics of education have advocated restructuring the school day to improve student performance. The background of the problem indicated a need for further research to determine whether block scheduling influences at-risk student achievement. Despite assertions by proponents that 4x4 scheduling is beneficial for at-risk students, there is little empirical evidence.

The purpose of the research was to determine whether scheduling type has an effect on at-risk student achievement indicators.

There have been conflicting results about the efficacy of block scheduling and student achievement. Trenta and Newman (2002) conducted a longitudinal study to determine the effect of 4x4 block scheduling on student core subject grade point averages, ninth grade standardized test scores, ACT scores, and attendance. A positive correlation existed between individual subject grades and block scheduling (Trenta & Newman, 2002). No significant relationship existed between block scheduling and cumulative grade point average, ACT scores, and attendance (Trenta & Newman, 2002). The study was limited because none of the sampled population experienced all four years of high school on a block schedule (Trenta & Newman, 2002).

Student achievement in English and language arts was the focus of a study by Nichols (2005) who examined grade point averages after conversion to either 4x4 or A/B block scheduling. Longitudinal data, two years of data before implementation scheduling and five years after the conversion, were analyzed (Nichols, 2005). Grades were examined between high and low-income students and between minority and majority students (Nichols, 2005). After conversion to block scheduling, students were found to take more English/language arts courses, and small increases in grade point average were quantified (Nichols, 2005). Students of low socioeconomic and minority status experienced lower gains when compared to higher income and majority peers (Nichols, 2005).

While some studies have shown increased student achievement, others have found block scheduling to be an ineffective method of increasing student achievement. Lawrence and McPherson (2000) used a causal-comparative research design to ascertain whether end-of-course

test scores in Algebra I, Biology, English I, and U.S. History were different between students on block schedule and on traditional schedule. Data were collected over five semesters, and students on the traditionally schedule consistently had higher test scores (Lawrence & McPherson, 2000). There was no indication of which type of block scheduling was being compared to the traditional school schedule, nor were data disaggregated by student demographic characteristics.

Thomas' (2001) states: "There is great deal of controversy surrounding the use of block scheduling, and many schools are jumping on the block-scheduling bandwagon" (p. 74). Schools and school districts are utilizing school schedule as a technique or as an attempt at school reform to incorporate changes to assist with increasing student achievement. According to Zhang (2001), the qualitative and quantitative research on scheduling types is mixed and does not overwhelmingly support one form of school scheduling over another. Zepeda and Mayers (2006) compiled fifty-eight experimental studies done on high school block scheduling from the years 1985 to 2006. Their analysis of these studies showed similar results and conclusions to what Zhang describes. They found that grade point averages slightly increase and attitudes of teachers, administrators, and students were more positive towards a form of block schedule. On the other hand the results from the analysis of these fifty-eight empirical studies found attendance rates and standardized test scores were mixed in sometimes supporting the use of block schedules, sometimes supporting the use of traditional schedules, and other times not supporting significantly one schedule or another.

Drummond (2001) did a comparative analysis of students' academic achievement to study the impact of secondary schools using traditional scheduling compared to secondary schools using block scheduling. The study was conducted using junior and senior South Carolina high school students, where seven hundred students were instructed under a traditional type of

school schedule and four hundred sixty students were instructed under a form of block schedule. Exit examination scores were used to compare the data between the two types of scheduling. No significant difference was discovered in reading or mathematics exit scores of the block scheduled students and the traditional scheduled students. This was further broken down to compare the data according to race, gender, and socio-economic status, but no significant difference was found in reading or math scores with these variables (Drummond, 2001).

The specific issue is that little research has been conducted to determine whether 4x4 block scheduling is an effective means to improve academic achievement and graduation rates of at-risk students. The 4x4 block-scheduling model has been cited as a better way to educate students at-risk of school failure because teachers have more contact time during the school day (Queen & Isenhour, 1998). However, data derived from this study may provide important information to school districts attempting to improve at-risk student achievement and reduce dropout rates through the implementation of a modified block-scheduling model. According to Zepeda and Mayers (2006), 50% of American high schools have considered or implemented some form of block scheduling.

Historical Background: Looping

Looping is a term that has been used to describe a variety of scheduling strategies, but it has gained continued popularity in recent decades although the concept is based on old practices. Looping is sometimes referred to as “continuous learning” or “multi-year grouping”, and outlines a practice where students and teachers track together from year to year. Although there is debate related to the beginnings of the instructional model in schools, the implementation of looping has been a common practice, in one form or another, in countries such as Germany, Jamaica, Japan, and China (Grant, Richardson, & Forsten, 2000). Simel (1998) states that the

practice of looping is “a movement for which there is no historical precedent.” She suggests that other forms of looping in countries such as Japan and Germany and in the Waldorf Schools should be considered primary influences on the looping movement in the United States. For many, looping represents a monumental shift in pedagogical design reform and has the potential to produce strong results when implemented with fidelity.

The Waldorf Schools

Rudolf Steiner, an Austrian educator and philosopher, living in Germany in the early 1900s, was one of the first formal proponents of multi-year teaching. His Waldorf Schools were founded to educate the children of the Waldorf-Astoria cigarette factory workers of Stuttgart, Germany in the early 1900s.

Steiner outlined his philosophy of education in a lecture series that described the importance of continuity in teacher relationships with students (Steiner, 1996). According to Steiner, a teachers’ knowledge of a child’s development phases was essential to provide the appropriate learning foundation. His belief was formulated on the premise that children grow at different rates, and only teachers who have continuity with students can recognize a lack of development and compensate appropriately the following year.

As a result of his approach, Steiner structured his schools based on the belief that children benefited from a long-term relationship with the teacher (Grant et al., 2000). Teachers in the Waldorf Schools stayed with their students from grades one through eight. McCown and Sherman (2002) speculated that the importation of Waldorf schooling provided the basis for the first looping schools in America. Today, with more than 650 Waldorf Schools throughout the world, these schools are the second largest private school system in the world, highlighting the individual talents and capabilities of the children. (Little & Little, 2001).

More contemporary researchers have echoed the principles established in the Waldorf model suggesting a demanding and challenging commitment by the teacher to long-term relationships with students creates the ideal school culture to ensure student success (Easton, 1997). One Waldorf school teacher who exemplified this philosophy remained with three separate classes of students from Grades 1 through 8 and related his personal experience as: "Waldorf teachers . . . make a commitment to the children they teach . . . they commit themselves and take a chance because the relationship between the students and teacher is central" (Petrash, 2002, p. 120).

Looping Outside the United States

Internationally, looping has been more consistently implemented in several European and East Asian countries. Throughout Denmark, primary and lower elementary classes and teachers remain together for multiple years (Morrill, 2003). Wagner (2003) reported, "The Danish tradition of small schools in which teachers spend as much as 8 years with the same group of students continues to be the norm." Many German elementary schools, group students in Grade 1 and they remain with consistent teachers through Grade 4 (Zahorik & Dichanz, 1994). Homeroom teachers in China remain with the same students for three-year increments in elementary, junior, and senior high schools (Hitz et al., 2007). Liu (1997) described the stark differences between the school structure in China as compared to the United States, where the US places an unnecessary and artificial fragmentation. China's system-wide practice of grouping students into three instructional segments, with teacher continuity throughout each segment, facilitates strong teacher-student bonding and limits the fragmentation associated with a production line approach to education.

Teachers at the elementary school level in Japan remain with classes for two or more years. Japanese middle schools have a similar structure to those in China and are organized by homerooms where teachers teach several subjects to the same group of students (LeTendre, 2000). This cultural emphasis in Japan places an importance on the student-teacher relationships above specialization of teachers in one grade level or one content area (Nichols & Nichols, 2002).

In both Japan and China, teachers recognize the importance of developing strong interpersonal relationships with their students and consequently understand the time necessary to do so in an impactful manner. “Teachers spend much time building relations before covering textbook material, especially in the beginning of the school year” (Sato, 1993). In the United States educators have been searching to innovate in order to find the appropriate school-based organizational structure, Japanese educators have been content with the same model for the past seventy years (LeTendre, 2000).

Looping in the United States

In the United States, the utilization of multi-year teaching began in much more simplistic terms. The rural schools and one-room school houses of the early United States often kept the same group of children together with the same teacher for two or more years based upon necessity and not for pedagogical purposes. Instead, these institutions were structured in this way due to necessity (Simel, 1998). In most cases, the size of the student population or number of available teachers limited the grade levels that could be taught individually.

Prior to the formation of the Federal Department of Education, a 1913 memo from the U.S. Department of the Interior highlighted multi-year teaching as an important issue facing urban schools:

> "Shall teachers in graded schools be advanced from grade to grade with their pupils through a series of two, three, four or more years so that they may come to know the children they teach and be able to build the work of the latter years on that of the earlier years, or shall teachers be required to remain year after year in the same grade while the children, promoted from grade to grade, are taught by a different teacher every year? This I believe to be one of the most important questions of city school administration."

The United States educational system has constantly been reformed in both large and small ways since the issuing of the memo from the Department of the Interior, moving away from the concept of structuring schools into smaller groups. In the 1950s and 60s small schools were consolidated into larger schools and the concept of a new teacher at each grade level became commonplace. By the post-World War II era, most teachers taught at a single grade level for their entire career (Grant et al., 2000).

Deborah Meier, an award-winning New York City educator and the author of The Power of Their Ideas, began using multi-year assignments in her school in 1974. She considered looping an essential part of the instructional model because it allowed teachers and students to build lasting relationships. She wanted students and teachers to get to know each other well, so they stayed with each other for two years (Hanson, 1995). The concepts she implemented have continued to be used as a model in many schools today.

Although not the only example, the Attleboro Public School District in Attleboro, Massachusetts was one of the first U.S. school districts to widely implement the two-year model of looping in the early 1990s. In recent years, other U.S. schools and school districts have followed their looping model and have endeavored to implement looping as an alternative scheduling and teaching method (Grant, Johnson, & Richardson, 1996).

Despite the positive results looping practices are still limited and inconsistent in the United States as compared to foreign school systems. In a 1996 survey of middle schools across the country, George and Alexander (2003) identified "several dozen schools engaged in looping in some way" throughout the United States, in different geographic areas. Neither widespread implementation, nor systematic structuring has occurred and looping tends to be more locally driven. In most cases, looping is initiated as an innovation by individuals who have developed interest in the strategy, through research of current literature or visiting schools with looping programs in place. Elliott and Capp (2003) described the initiation of a looping program in an elementary school: "The impetus for multi-year classes came from a teacher who had researched the design and made a proposal to the principal, who was looking for a way to supercharge curriculum delivery".

Supporting Research: Looping

School leaders have searched for ways to adjust school scheduling in order to improve student achievement. Although this has sometimes produced tepid results, Gough (1990) suggested the focus of schools should be as follows:

> Our goal, as this new decade begins, should be to establish pockets of excellence – school programs that serve students effectively in our own locales. With enough such pockets, we will be able to stitch together a nation-wide system of schooling that effectively serves the needs of young people in the 1990s and beyond (p. 339).

Undoubtedly "pockets of excellence" exist in schools across the United States, but replicating success from one school setting to another is challenging. Introducing change, as well as sustaining it, is a task that most instructional leaders are not equipped to implement. Fullan

(2007) asserted, “We have still not cracked the code of getting beyond the classroom door on a large scale basis.”

Steiner (1996), Noddings (2005), Flinders and Noddings (2001), and Farmer (2002) all speak to the practicality of looping as a strategy to support student growth and development. It represents an uncomplicated strategy to employ, but continues to be layered in difficulty for wide-spread implementation. Looping does not require a monetary investment by the school above that of altering traditional scheduling structures; however, its introduction into American schools has been anything but simple or straightforward.

The literature connected to the topic of looping and research relates the struggle to maintain lasting looping models while developing long-term student-teacher relationships. Although the studies related to looping are not as extensive as other scheduling models, it is important to recognize that the literature related to looping is overwhelmingly supportive. Overwhelmingly, discussions related to looping describe increased promise for students who are part of looping configurations. Instructionally, looping provides the type of continuity Steiner suggested in his model of Waldorf education (Chapman, 1999; Delviscio & Muffs, 2007). The practice of looping also increases the amount of instructional time available to teachers, making it unnecessary to spend time at the beginning of the second year developing consistent classroom management and building student interactions (Bellis, 1999; Chapman, 1999; Simel, 1998).

Foundationally, when instructing students for a period of two or more years, teachers become increasingly familiar with individual student learning needs, and can differentiate activities and assignments to meet varying needs (Bellis, 1999; Hitz et al., 2007). Students exhibit less apprehension in the classroom in the second year of the loop (McCown & Sherman,

2002) and deeper bonds develop not only between students and teachers, but also between teachers and parents (Bellis, 1999; McCown & Sherman, 2002; Simel, 1998).

In a research study, Rodriquez and Arenz (2007) used qualitative and quantitative methods to investigate the value of looping in an elementary school setting. In the study, participants included six teachers who looped with classes during the 2005-2006 school year. The study focused on eighty-seven students, and one parent for each child. The study analyzed questionnaires completed by teachers, students, and parents focusing on the social and emotional benefits of looping following the student's participation in the program. The questionnaire investigated "self-reported perceptions of the impact of looping on the socio-emotional well-being of the students, long-term relationships between stakeholders, classroom discipline, students' attitudes toward school, academic success, and overall satisfaction with the looping experience."

During the research study, a criterion-referenced test (Grade Level Assessment of Students), was administered and compared across groups to look for significant differences between students who participated in the looped classroom settings and students who were in a traditional classroom model. The assessment was administered twice to participating students: first, utilized as a pre-test before the looping process began and later as a post-test following the completion of the looping cycle. The study paired sample t-tests to compare and analyze the treatment and control groups' mean growth in calculated percentage scores on each subtest (Rodriguez & Arenz, 2007). The test assessed students' skills in four areas: (a) writing strategies, (b) vocabulary, (c) reading comprehension, and (d) language conventions.

The data collected from the qualitative and quantitative phases of the study indicated the looping model offered greater opportunities for teachers to develop stronger relationships with

students and parents. Consequently, these improved relationships positively impacted academic success (Rodriguez & Arenz, 2007). The implementation of looping with this group of students also found gains in academic progress in several skill areas. During the study, there were only two instances where progress of non-looped students was superior to progress of looped students. Researchers acknowledged a limitation to the study's findings was the ability to control for positive practices present in the classroom, other than looping, that might have also had an effect on the data used in the evaluation.

Another small-scale study conducted by Lincoln (1997), credited looping as a factor in significantly improved academic performance at his school. He cited the results of comparative analyses of student achievement at the school where he was the principal. Looped students scored higher than non-looped groups in language arts. From the study, the results of the statewide mastery test in writing also showed significant differences in the performance of students in the looping model. The percentage of students in the looped group meeting state goals for writing competence increased from 41% in the sixth grade to 85% in the eighth grade. In mathematics students in the looped groups saw a similar increase in achievement from 64% proficient in sixth grade to 75% proficient in the eighth grade. The positive growth achieved in just two years led Lincoln and his staff to include all students in the two-year looping design.

In a more comprehensive, elementary-level study conducted from 1998 to 2000, Cistone (2004) explored the impact of looping on student achievement in language arts and mathematics classrooms. Students and staff from twenty-six elementary schools in Florida were selected for the study. The study focused on student attendance, student retention rates, and discussed teacher and administrator perceptions of looping as an intervention strategy. In order to determine the influence of looping on academic achievement, students were matched not only on academic

performance, but also on attendance, race, and qualification for free or reduced priced meals. Results of the study demonstrated students in looping configurations, as a group, exhibited higher overall performance in reading comprehension and mathematics applications on the Florida Comprehensive Achievement Test (FCAT) than students in the non-looped sample. Student attendance during the second year of the loop also improved as compared to the attendance within the non-looped group within the same period. Within the qualitative aspects of the study teacher and principal perceptions of looping showed "the majority of participants in both groups had positive attitudes toward looping" (Cistone, 2004).

There were several significant limitations of the study. The qualitative data collected regarding the perceptions of teachers and principals was only conducted in several schools with pockets of looping rather than a larger, school-wide program where all teachers were involved in looping configurations. Additionally, because teachers in this study chose to loop, they likely held positive attitudes about looping prior to the pilot that were merely reinforced through participation. It was noted that the data would be more complete if collected in settings with more diverse groups of teacher participants, including some describing themselves as less committed to the strategy prior to the study (Cistone, 2004).

While most research related to looping is focused at the elementary school level, researchers from the University of Georgia worked with an interdisciplinary middle-school team of teachers, known as the Delta Project, to qualitatively explore the impact of classroom practices and looping on student motivation for three school years between 1990 and 1993. Hart, Mizelle, and Pate (1993) conducted the study as teachers moved with their students through sixth, seventh and eighth grades. Each teacher was tracked as they made use of cooperative learning and student collaboration in a variety of learning activities to help promote a community

of learners. The research from the study showed an increase in student motivation was as a result of the relationships built between students and teachers. Additionally, student interviews revealed that the increased cooperation and interaction that evolved through the looping process led to better self-esteem and improved attitudes toward school. Many students indicated that they enjoyed looping and felt that the teachers understood them better and cared for their needs.

In the study, the researchers documented the impact of looping with student interviews, team planning session transcripts, and classroom observations (Mizelle, 1993). This study, was eventually used as presented as a limitation in findings from Rodriguez and Arenz's (2007) study. The focus of the limitation was based on the failure of the study to evaluate the degree to which other independent variables such as flexible scheduling, interdisciplinary instruction and cooperative learning attributed to the success of the Delta Project, apart from the strategy of looping.

Finally, the Rand study led by Berman (1977) suggested educational innovations are more difficult to implement at the secondary level, than at the elementary level. In the study it was noted that secondary teachers are often characterized as subject-oriented experts in contrast to a child-centered focus attributed to elementary teachers (Berman, 1977). The study also discussed the difficulty associated with implementing reforms that may be viewed as radical or undesirable departures from school norms. This has often been the categorization which has been associated with looping by some teachers and principals. With these two obstacles in mind, it might be suggested that implementing looping at the secondary-level could be one of the more difficult projects that schools or districts could choose to undertake (Berman).

Supporting Research: Math Curriculum and Instruction Issues

A major concern regarding mathematics instruction began to surface in 2001 when the No Child Left Behind (NCLB) Act was signed into law. That report, along with federal research findings, reported the lack of mathematics achievement in the nation. A national push developed as a result of this legislation and a focus on the need for high quality mathematics teachers and appropriate support was identified as a cornerstone to improve education.

In 2004, Schoenfeld's publication *Math Wars,* continued to describe the ongoing debate in mathematics. This debate, which focused on the difference between a formulaic and conceptual approach, also made several suggestions to improve mathematic performance. This primarily focused on the inclusion of opportunities for students to develop theoretical thinking through active involvement in mathematics as a central requirement of mathematics education (Schmittau, 2004).

Over recent years, there has been a general concern about improving student learning in mathematics in all grades of school. The adoption and implementation of Common Core State Standards in Mathematics was promoted as a solution to this problem. During the 2012-2013 implementation, students in all grades were expected to meet new and higher national standards in mathematics and have the skills necessary to apply mathematical concepts at a higher level and to real world situations (Bitter & O'Day, 2010). The curriculum shifted away from the more traditional approach to mathematics instruction and in North Carolina, the implementation of the Common Core State Standards in Mathematics was the first change to curriculum standards in over a decade.

In an effort to address this lack of mathematic focus, many states have pushed for increasing the number of mathematics courses required for high school graduation to improve

achievement (Rasmussen et al., 2011). Also, the Federal Government has pushed to address these concerns with the formulation and subsequent adoption of the Common Core Standards in mathematics throughout most of the United States by creating the expectation of high school graduates having successfully completed higher level mathematics courses (Common Core State Standards, 2014). This surge in focus on mathematics instruction and increased focus on rigorous graduation requirements has helped many states make significant gains and by 2004 only 5 2/10th% of students were graduating high school without taking Algebra I (Rasmussen et al., 2011, p. 205). However, it should be noted that aside from course completion data, achievement standards are still focused on passing required assessments and not necessarily on higher mathematic achievement.

Despite any attention for curriculum improvement focus, mathematics continues to be a culling ground to divide students into those who will have the opportunity to attend college and those who will not attend college (Aughinbaugh, 2012; Buckley, 2010). In my role as a school principal I have personally been part of discussions where students are placed into identified mathematics tracks based on previous performance indicators. Basic arithmetic and remedial math classes have become commonplace in order to meet mathematics requirements established for high school graduation, and courses such as Math 1/Algebra 1 have become the new remedial class for secondary students. This includes placing students identified as "weaker" to be enrolled into year-long courses with additional math support as an elective class. Initially, this emphasis was to be a support for struggling students by providing additional time during the school day to improve student understanding of mathematics while providing improved instruction and practice opportunities. Unfortunately, this focus has not improved college preparatory skills and there is a continued trickle-up effect where more students are now required to take remedial math courses upon admission to college than in previous years.

Common Core Adoption and Improved Student Relationships

During the initial curriculum adoption, forty-three states aligned with the new Common Core State Standards in Mathematics (NGACBP, 2010). Although the adoption was voluntary, there were federal funds withheld from states that did not follow the alignment, and a system of federally mandated curriculum protocols were put in place beyond the previous No Child Left Behind legislation. When the Common Core State Standards were still in their early years of implementation it was promoted as a solution to a decades old problem. Finally, a curriculum would be established where the standards would enhance the depth of instruction, student understanding and higher level thinking that schools had been working to emphasize (Robelen, 2012).

The basic concept of the adoption was for students being taught under the new Common Core State Standards in Mathematics to have a clearer picture of mathematics. Weaker students would be able to catch up using thematic, goal-based units, and the curriculum would be easily adjusted based on what is known about how students' mathematical knowledge, skill, and understanding develop over time (NGACBP, 2010). The standards were a result of behavioral research on learning trajectories and patterns and stressed the conceptual understanding of key ideas and the organizing principles such as place value or the properties of operations to structure those ideas (NGACBP, 2010). As a basic foundation for learning, the curriculum standards were built as a vertical curriculum of sequencing topics and performances based on what is known about how students learn (NGACBP, 2010). The emphasis of the goals of mathematics education based on Common Core guidelines would promote conceptual understanding, strategic competence, adaptive reasoning, productive dispositions, and procedural fluency (Pape & Wang, 2003). This provided the driving force behind the change in curriculum so that the Common

Core Standards in Mathematics stress conceptual understanding of key ideas and allowed teachers the opportunity to continually return students to previous concepts for the organization of principles and structuring those ideas.

The expected result from the new mathematics standards was a higher expectation of student progress each year and improved classroom culture based on improved relationships (Confrey & Maloney, 2011). This focus on relationship building is a central area of concern for many teachers and students. Research clearly shows that improved relationships allows for students at all grade levels to be taught in a way that would allow them to cognitively process information more effectively to apply, retain, and carry it over into settings outside the classroom. To its credit, the Common Core Curriculum Standards were aligned in such a way as to set between those concepts learned in elementary grades, such as number sense and operations, to those concepts needed in the high school years of functions and modeling through trigonometry and statistics (NGACBP, 2010). Since the mathematics curriculum taught under previous standards did not follow this progression of concepts effectively, the new curriculum was designed to allow students and teachers additional time to master concepts and follow a natural progression of topics (McNeil, 2011; Nichols, Glass, & Berliner, 2005).

Mathematics Curriculum and Instructional Shift

The implementation of the new standards shifted many learning outcomes to earlier grade levels and made this progression more rigorous with students being expected to learn more complex topics at an earlier grade level than before. In many ways a pendulum has, in effect, been swinging back and forth between skills and process learning with students and educators caught in the middle during this curriculum transition. This began as a reaction away from the teaching mathematics as a series of skills and facts which can be memorized and used

formalistically to solve problems towards the opposite end of the spectrum to provide open-ended problem-solving approaches (Schoenfeld, 2004). Although both ends of the spectrum have been used to promote teaching and learning in schools, mathematics achievement has not drastically improved under either approach.

Despite the focus on curriculum changes and the impediments associated with instructional pacing based on an EOG/EOC, there is still substantial research to support teachers as the center of the solution. Teaching practices and the process used for instruction are more important than the curriculum used to increase student achievement in mathematics (Aslam & Kingdon, 2011). Additionally, support for teachers on how to engage students in the learning process can assist in improving student achievement in mathematics (Checkley, 2006). The support provided to mathematics teachers, along with the teacher's underlying belief in the capability of students to understand and do mathematics, can have a significant impact on the students' mathematics achievement (Deemer, 2004).

North Carolina Focus on Secondary Mathematics

Districts across North Carolina continue to focus on Math I curriculum, pacing and the limited proficiency of students on the End-Of-Course exam. Although there has been some discussion regarding course structure, the primary focus has been on the curriculum implementation. Because many districts felt that more time was needed for students to gain mastery knowledge of the subject, they have focused heavily on a double-dose scheduling mentality. However, this process of double-dosing as a sole means to improve academic instruction typically leaves many students performing at less than the standard for proficiency. The combination of positive indicators from a year-long course that is then double-dosed with a

looped semester course could potentially improve math proficiency for students that would otherwise have no chance of attaining these math skills.

Supporting Research: On-Track Student Performance and Dropout Rates

In 2001, the federal No Child Left Behind Act increased school accountability standards by requiring state level testing of all students in Grades 3-8 and Grade 11 in mathematics and reading (Klein, 2015). No Child Left Behind also mandated school districts report graduation rates. Schools that failed to meet assessment and graduation targets were identified as deficient in making adequate yearly progress (AYP) as required by the legislation. The law required schools to report disaggregated assessment results by student subgroups including ethnicity, limited English proficiency, special education status, and low socioeconomic status. All of these factors that have been identified as issues that place students at risk of school failure and dropping out (Barton, 2006; Capuzzi & Gross, 2004; Finn & Owings, 2006; Suh et al., 2007; Vanderslice, 2004).

The NCLB legislation was based on the principle that establishing measurable goals with high standards would improve every child's individual outcomes in education (Klein, 2015). Under the NCLB legislation, all states must report specific on-track indicators for students as they work to meet graduation standards. States and educational agencies use a range of methods to calculate retention and dropout numbers. Graduation data reported for federal purposes indicate dropout numbers are considerably lower than the same data found on the state's own databases. In her speech to the America's Promise Alliance Dropout Prevention Campaign Press Conference, in April 2008, U. S. Secretary of Education Margaret Spellings remarked, "One reason that the high school dropout crisis is known as the 'silent epidemic' is that the problem is frequently masked or minimized by inconsistent and opaque data reporting systems...." Spellings

indicated her intent to change data reporting and to use "administrative steps to ensure all states would use the same formula to calculate how many students graduate on time and how many drop out ... so that people nationwide can compare how students of every race, background, and income level are performing."

The NCLB Act, represented a significant step forward for our nation's children in many respects, particularly as it shined a light on where students were making progress and where they needed additional support, regardless of race, income, zip code, disability, home language, or background. The law was scheduled for revision in 2007, and, over time, NCLB's prescriptive requirements became increasingly unworkable for schools and educators. Recognizing this fact, in 2010, the Obama administration joined a call from educators and families to create a better law that focused on the clear goal of fully preparing all students for success in college and careers.

This indicates that to close achievement gaps, students needed not only strong teachers, they also had to show up, behave in class, and try hard to learn. Research shows school actions can positively impact all of these behaviors. This reinforces the point that schools need to pay attention to shaping both learning opportunities and student motivations (Balfanz, 2009, p. 7).

On Track Student Performance - Economic Focus

While the educational reform of NCLB is intended to improve student educational outcomes, the testing and mandated reporting provisions may, in fact, contribute to the decision making process that results in marginally performing students dropping out of school (McNeil, Coppola, Radigan, &Vasquez-Heilig, 2008). In a high school setting, it is not possible to develop a rigorous, top-tier education regarding core academic areas without also addressing student dropouts and limited graduation rates. Echoing Secretary Spelling's comments, upon completing

his “Listening and Learning” tour across the country, Arne Duncan (2013), the U.S. Secretary of Education, stated, “The consensus among policymakers is the number of students not graduating from high school is too high and has an overall negative effect on the country, despite the upward trend in the graduation rate.”

The need for students to maintain a strong high school promotion and graduation rate is of significant concern to stakeholders across the country as only 83% of American students graduated from high school within four years during the 2014-2015 school year (National Center for Education Statistics [NCES], 2017). This means that each year over one million students choose to leave those institutions that are required to report. It is also important to understand the magnitude of this problem and factors associated with dropping out in order to develop effective preventative strategies. Students who fail to obtain a high school diploma face a multitude of unintended consequences that will negatively impact their quality of life, not to mention the consequences for society (Rumberger, 2011).

The Every Student Succeeds Act (ESSA) was signed by President Obama on December 10, 2015, and represents another positive step for our nation’s schools. This bipartisan measure reauthorized the fifty-year-old Elementary and Secondary Education Act (ESEA), the national education law and longstanding commitment to equal opportunity for all students. The new law builds on key areas of progress in recent years, made possible by the efforts of educators, communities, parents, and students across the country.

With such a focus over the last several decades, high school graduation rates are at all-time highs in the United States. Dropout rates are at historic lows and more students are going to college than ever before. Despite the attention and focus on the dropout epidemic, the problem

persists and over one million students (nearly seven thousand students a day) drop out of high school in the United States alone.

Graduation and Employment Opportunities

To focus on the national dropout rate you have to first see that it is not a statistic that functions in isolation. According to the 2016 U.S. Census data, high school graduation is strongly predictive of employment: workers age twenty-five and over without a high school diploma have a 7.4% unemployment rate and the lowest median weekly earnings. Those with a high school diploma saw their unemployment rate lowered to 5.2% and income increase nearly two hundred dollars a week. Although both of these data points require discussion, the lifetime loss in earnings for those who do not have a high school diploma compared to those who have at least a high school diploma is estimated to be approximately six hundred thirty thousand dollars, and roughly one million dollars less than college graduates. “The graduation rate is a barometer of the health of American society and the skill level of its future workforce” (Heckman & LaFontaine, 2007).

Although it’s hard to quantify the full value of an education the wage differences among high school dropouts, high school graduates, and college graduates are significant. The data collected through the 2016 U.S. Census showed the loss of income each year based on the degree level earned. Mean earnings for a high school dropout were twenty-seven thousand, forty dollars, for a high school graduate, thirty-seven, twenty-four dollars, and for a college graduate, nearly sixty-one thousand dollars (U.S. Department of Labor, 2017). There is limited argument against the need for education and the completion of a high school diploma in order to set the foundation for a student’s economic future. The impact on the individual is a loss of income, but the impact on our nation is a stifled economy.

On Track Student Performance and National Economic Impact

The National Center for Education Statistics (2017) reported that in 2014 there were over three million young adults between the ages of sixteen and twenty-four without a high school diploma or its equivalent. In 2012, the White House Council for Community Solutions determined there were nearly seven million young people between the ages of sixteen and twenty-four who were out of school and out of work, at a cost of ninety-three billion dollars in direct and indirect social costs in 2011. Ultimately, what is at stake is the welfare of these young adults, since studies have demonstrated that individuals without a high school diploma are more likely to require government assistance, live in poverty, have lower wage earnings, and experience higher unemployment rates (Neild, Stoner-Eby, & Furstenberg, 2008).

Not long ago a high school graduate was able to find a career, receive a pension and have a productive life. During the past fifty years, that age has all but passed us by and the income gap has increased dramatically over recent years: median earnings of families of high school dropouts were nearly 30% lower in 2004 than they were in 1974 (Achieve, 2006). With the push towards more education and advanced certification, high school dropouts are now three times more likely to be unemployed than college graduates. Systemically, chances are also much higher that they will be living in poverty compared to high school graduates (Bridgeland, Dilulio, & Morison, 2006).

During the previous decade, the more than thirteen million students who dropped out of school were a reported three trillion-dollar loss to the national economy. Looking back over a ten-year period, the dropouts from the Class of 2008 alone could cost the nation more than three hundred billion dollars in lost wages over the course of their lifetimes. Had those students graduated, the nation's economy would have benefitted from nearly three hundred and thirty-five

billion dollars in additional income over the lifetimes of these dropouts. Today, graduation rates are a major component of educational accountability and a strong indicator of school performance for students, parents, policymakers, business owners, and the community as a whole (Rumberger, 2011).

Regardless of the financial burden on the economy, or the individual need to improve one's livelihood, successful entry into the adult world now requires a high school diploma or better. With an increasingly global society, in order for American citizens to have any reasonable opportunity to earn a living, most believe that they must have, at minimum, a high school diploma. Exiting school without earning a high school diploma is viewed as a failure of the student as well as the overall educational system. A high school diploma provides students what is currently considered by most to be the minimal educational preparation and the official educational credential. A diploma provides the individual documentation necessary to directly enter the workforce and, depending on the individual's curricular choices, an adequate foundation for future postsecondary schooling. Even so, approximately 30% of students do not ever complete diploma requirements and others require more than four years to complete diploma requirements.

North Carolina Accountability Data and On Track Student Performance

School systems in North Carolina are required to report dropout data on all dropouts in all grades (K-13) to the Department of Public Instruction (DPI) annually (NCDPI, 2013). Each school maintains a School Leaver Roster (SLR) in order to: (1) establish the total enrollment from the previous year and (2) document the status of students who are no longer in membership on the twentieth school day of the current year. Although it is only one of many data points to follow, maintaining, updating, and checking this record should be an ongoing responsibility at

any school as a matter of accurate record keeping. Accurately following those who leave school can reduce the number of transfers who are incorrectly classified as dropouts (NCDPI, 2018). Each LEA is required to report dropouts by the grade level of their last membership in the reporting year.

> "For example, an eighth grader who fails to return to school in the fall as a ninth grader is reported at the eighth grade level, not the ninth grade. For this reason, all sending and receiving schools should share information on the status of school leavers during the first twenty-day period and for the remainder of the school year" (NCDPI, 2018). North Carolina has a very specific definition for dropouts and a method for calculation. A definition for "dropout" was also established by the North Carolina Department of Public Instruction (NCDPI, 2018).

Supporting Research: Academic Performance and On Track Performance

Students drop out of school for a number of reasons and the decisions are typically not made at the spur of the moment. It is a process that students go through over time that ultimately leads them to making the decision to drop out. One may summarize that the root of the issue for students is a lack of hope. Without hope students lose determination, discipline, dedication, and diligence; this eventually stifles their potential of being successful. The following are some reasons why students drop out of school: chronically late or absent, lack of interest in school and learning, demonstration of poor academic achievement, and non-academic challenges (poverty, health, and pregnancy).

Numerous national and state studies over the past four decades have attempted to provide insight into reasons why students do not complete high school. Researchers concluded the student dropout decision could seldom be attributed to a single event (Finn, 2006; Rumberger,

1987; Rumberger, 2005). They noted the final decision often is the culmination of a long process of student disengagement. Finn (2006) noted the accumulation of events and circumstances combine to either hinder or help a student's opportunities for academic success.

The educational setting and educational policy may influence the student dropout decision. This can be especially true when a student enters high school with one or more at-risk factors. Many students arrive at high school, off track and over age for their current grade, and possessing poor or inadequate skills for high school academic success (M. Bridgeland, John & J. DiIulio, John & Morison, Burke, 2005). Often the high school setting is larger and more interpersonal than middle school. Excessive absenteeism and negative behavior are external symptoms of a lack of student engagement. Eventually, issues with increasingly rigorous academic and behavioral expectations may influence the student's decision to exit school voluntarily. Federal and state accountability measures, which include mandated testing, require teachers to cover specific course curriculum. Student test scores may be used as measures of teacher and overall institutional effectiveness. Institutional rules and procedures may combine to "push out" the student or may compel the student to make the decision to leave the educational setting entirely (Rumberger, 2004).

For ninth graders, the transition into high school can be an extremely intimidating and challenging process. As Reinhard (1997) noted, "Ninth grade is a fragile and confusing time for young people. They come from smaller and more structured middle schools and are thrust into large high schools with a lot of freedom" (Reinhard, 1997, p. 14). Many high schools focus on the dropout rate in upper level classes. However, "Most future dropouts can be identified at the start of high schools, and 80% can be identified by the end of ninth grade" (Gorski, 2008). Combine the dropout rate with high poverty schools, many ninth graders are at an obvious

disadvantage for success. Gorski (2008) also stated, "Regardless of whether a child living in poverty wants to learn, regardless of whether she's determined to make the best life for herself, she must first overcome enormous barriers to life's basic needs" (p. 33). Therefore, high schools, especially urban high schools, must focus on ninth graders and determine what can motivate them to finish high school in four years. The small learning community model may be a solution.

Researchers have found performance indicators that can identify students at risk of dropping out as early as eighth grade with a high degree of certainty. The previously mentioned study of Philadelphia's public schools found each of the following factors measured in eighth graders to predict dropping out: low attendance, poor grades in core courses, and being overage for one's grade (Neild & Balfanz, 2006). An eighth grade student had at least a 75% chance of dropping out if he or she:

A. attended school less than 80% of the time in eighth grade, and

B. failed mathematics and/or English during the eighth grade.

This research categorized ninth grade students as "at risk" if they:

A. attended school less than 70% of the time in ninth grade,

B. earned fewer than two credits during the ninth grade, and

C. were not promoted to the 10th grade on time.

Overall, 80% of eighth and ninth grade students who were categorized as "at risk" eventually dropped out of high school.

Other studies have found similar results. For example, in a study of students in Chicago's public schools, Allensworth (2005) created an indicator variable to designate whether ninth-grade students were "on track" to graduate. Students were classified as not "on track" if they had low numbers on at least two of the following risk factors: attendance, grade point average,

credits earned, and individual grades. This method of classifying the students in Chicago's public school system was 85% accurate in predicting high school graduation (Allensworth, 2005).

Another example comes from an investigation of a small school district in Massachusetts, where students with the largest drop in performance during the transition from elementary school to middle school, and from middle school to high school, were most likely to drop out (Roderick, 1994). This result further reinforces the conclusion of the study of Philadelphia students that students at risk for dropping out can be identified at, or prior to, the beginning of high school.

Rumberger pays particular attention to the concept of engagement in school. Absenteeism, discipline problems and academic difficulties are all strong predictors of dropping out. Subtler indicators of disengagement from school, negative attitude toward school, and minor discipline problems can show up in elementary and middle school. The role of retention is extremely important:

> …students who were retained in grades 1 to 8 were four times more likely to drop out between grades 8 and 10 than students who were not retained, even after controlling for socioeconomic status, eighty grade performance, and a host of other background factors (Rumberger & Thomas, 2000).

In an effort to combat low achievement and high school retention, many school districts across the country have implemented early warning systems to identify students who exhibit behaviors identified by research that place them at risk for dropping out of high school. These early warning systems have the capacity to track a student's academic and behavioral performance as well as school attendance and retention information as early as elementary school to assist educators in effectively identifying students who exhibit as off-track toward graduation (Balfanz & Fox, 2011). Despite the available research on predicative indicators, the

problem continues to persist (Dynarski & Gleason, 2002). Kennelly and Monrad (2007) stated additional research is needed to better understand the variables associated with dropping out so appropriate, individualized intervention programs can be designed that specifically target those variables. Intervention strategies must be comprehensive to include the individual, the family, the school, and the community (Dynarksi & Gleason, 2002). Necessary resources must be made available to develop, implement, and sustain a strategic plan that targets student retention and high academic achievement (Balfanz, Bridgeland, Bruce, & Fox, 2012).

Conclusion and Summary of Remaining Chapters

Chapter 2 provided the theoretical framework and supporting literature addressing the year-long and looped scheduling sequence for students. It presents the perspectives of other researchers and connected studies as they relate to alternative scheduling to provide increased student achievement and on-track student performance. The research related to schedule designs, at-risk student scheduling, dropout dilemma as it relates to other on-track student performance, and long-term student success outlines the potential connection created from the alternative yearlong looping model provided by the problem of practice. Although it is not meant to be a conclusive statement, it is important to note that this literature review provides the necessary theory and data used in the analysis of the problem and the development of a conceptual framework for this study's problem of practice.

CHAPTER 3: METHODOLOGY

The study has been organized into five chapters that focus on various aspects of the research process with Chapter 1 functioning as an introduction and overview of the problem of practice and significant background information related to the study. The initial chapter provides the reader the essential information necessary to understand the purpose of the study, its relevance to the problem, significance, and impact related to the problem, objective of the study, potential shortcomings, conceptual framework, and eventual procedures utilized for the problem of practice study design.

Chapter 2 provided the theoretical framework and supporting literature addressing the year-long and looped scheduling for students. It presents the perspectives of other researchers and connected studies as they relate to alternative scheduling to provide increased student achievement and on-track student performance. The research related to schedule designs, at-risk student scheduling, and long-term student success models outlines the potential connection created from the alternative year-long, looping model provided by the problem of practice. Although it is not meant to be a conclusive statement, it is important to note that it is this literature review that provides the necessary data used in the analysis of the problem and the development of a conceptual framework for this study's problem of practice.

This chapter, Chapter 3, is dedicated to the research design and will provide a description of the study as it relates to need, purpose, setting, participants, and methods for analyzing the data utilized and the innovation of combining the year-long course structure with additional looping support for at-risk students. Research questions to guide the study are included in this chapter to help convey the organization of the scheduling framework

with supporting analysis and data collection parameters. The scheduling framework has also been included to outline the course sequencing for students clearly.

Identifying Areas of Need

School systems have searched for ways to increase student achievement by adjusting curriculum pacing and course alignment, but have continued to find limitations due to time and resources. Many have manipulated school schedules in a variety of ways to increase student achievement and school administrators have used a multitude of schedules to shift the school day to help increase test scores for accountability measures. It is particularly true at the high school level where the 4x4 block schedule and the traditional day are utilized.

The earliest criticism of the traditional school schedule arose from the report A Nation at Risk, published in 1983, which criticized American schools for ineffective use of classroom time. Eleven years later, The National Education Commission on Time and Learning (1994) issued Prisoners of Time, a publication in which commissioners argued the traditional school-scheduling model was flawed. Restructuring the American high school, including the implementation of block scheduling, was promoted to allow for more varied instruction within the school day (Cawelti, 1994).

The traditional school schedule was designed so that students could attend six or seven class sessions per school day lasting approximately fifty minutes for each class. Over the years, many states changed graduation requirements and students have been encouraged to take more classes for additional curriculum exposure (Rettig & Canady, 2003). By the late 1980s, school districts, including those in North Carolina, began to experiment with 4x4 block scheduling to meet the needs of the student and to provide additional flexibility.

The 4x4 block schedule divides the school year into two semesters allowing students to enroll in four courses in the fall semester and four courses in the spring semester. The course alignment of the four courses offered in a ninety-minute setting for ninety days was equivalent to the traditional year courses of fifty minutes for one hundred and eighty days. The 4x4 block schedule is designed for teachers to provide a variety of teaching strategies for the learner and use the extended time in the class setting to differentiate the learning for each student and his/her needs. The 4x4 block schedule also limited transition times between classes and was intended to provide a greater amount of time during the class to expand on curriculum discussions.

Early advocates of block scheduling argued the model would reduce inefficiency and allow more time for active learning (Canady & Rettig, 1995). Used systematically, block scheduling teaching strategies were expected to enhance student achievement by creating a dynamic, integrated, and personally relevant learning environment that encouraged active student participation (Canady & Rettig, 1995). For at-risk students, the 4x4 block schedule was promoted as a better scheduling model because the time structure enables the use of various teaching methodologies, allows for lab work to be completed within one day, allows students to focus only on four courses, and provides structure for more individualized attention (Queen & Isenhour, 1998). However, a major limitation with block scheduling arises when large gaps of time occur between semesters and summer months for courses that require instructional continuity. This lack of continuity occurs when a student takes a math class in the fall of one school year but does not take the following math course until the spring of the next year, creating a significant instructional gap where academic progress has lessened. For at-risk students, this instructional gap can be a significant setback to learning.

Background of the Study

The issues that initially provided the focus for this study were not limited to Franklin County School or North Carolina Public Education. The National Center for Educational Statistics (NCES) is the primary federal organization for collecting and analyzing data related to education. Based on the collected data they have reported that the national trend in mathematics achievement has not significantly changed for the past three decades (NCES, 2014).

According to the North Carolina Department of Public Instruction's release of School Report Card data for the 2015-2016 school year, students taking Math 1 continue to perform at a lower level of proficiency than other End-Of-Course tests. In 2017 only 49% of all students in North Carolina performed at the College Ready level required for federal reporting, while 60 $6/10^{th}$% performed at sufficient levels of mastery (see Table 1). (NCDPI, 2016) These data were initially used for comparison when development of the pilot program was first discussed.

Despite several years of comparative data in North Carolina with the same course and End-Of-Course exam, there has been no significant improvement in student math competency. In fact, student Math 1 performance in North Carolina had noticed no significant gain during the past three years despite a state-wide focus on the Math I curriculum and a recent realignment of instructional standards. Franklin County Schools, in comparison, experienced a decrease (see Table 2) although there had been additional district support related to the implementation of aligned benchmarks, greater data gathering at the local and school level, remediation programs for students considered at-risk, and additional resources for economically disadvantaged populations. Despite all of this effort, there had been no significant improvement.

Table 2

Math 1 Comparison Data between North Carolina and Franklin County Schools

	School Year			
District	2012-2013	2013-2014	2014-2015	2015-2016
North Carolina	36.5	60.0	59.8	60.6
Franklin County	31.5	53.6	56.2	50.0

Note. Adapted from results of district data from the 2012-2013 through the 2015-2016 school year. Performance results are based on the students whose performance on the Math 1 North Carolina End-of-Course attained an achievement level of three or higher (North Carolina Department of Public Instruction, n.d.a.)

During January 2016 the superintendent of Franklin County Schools held a meeting to review district benchmark results and scores in End-of-Course tested subject areas. This discussion specifically focused on Math 1, English 2 and Biology assessment data. A great deal of this conversation centered on the need for additional strategies to support at-risk students and increase the performance on assessments. Ideas presented during the meeting included: double-dosing, remediation, pull out sessions, extended time and flexible scheduling. The meeting's participants consisted of the superintendent, associate superintendent, high school principals, curriculum staff and the district's accountability director. Throughout the meeting, the Math 1 and English 2 courses were a major focus and discussion point. Local educators experienced some level of frustration with these courses and the testing and accountability standards. This frustration included the course sequencing and pacing of the Math 1 course, which led to minimal gains in student performance on local and state assessments.

Under the superintendent's direction, the discussion focused on ways the district could specifically improve student performance in Math 1 and English 2 courses. The Biology End-of-Course data appeared to be progressing well for the district (see Table 3) and those in attendance agreed the focus should be placed on the areas of greatest need. Student performance gains had been noticed in the English 2 course area based on the data presented, but it appeared to have plateaued (see Table 4). This focused data discussion created an opportunity for an open forum related to potential innovations that could lead to improvements related to assessment data and student performance.

District level leadership and principals acknowledged that they could identify students who performed below grade-level in mathematics and English, or were considered at-risk very early in the instructional course using EVAAS data and historical EOG scores. Students

Table 3

Biology Comparison Data between North Carolina and Franklin County Schools

	School Year			
District	2012-2013	2013-2014	2014-2015	2015-2016
North Carolina	45.6	53.9	53.7	55.6
Franklin County	37.4	42.1	39.9	72.9

Note. Adapted from results of district data from the 2012-2013 through the 2015-2016 school year. Performance results are based on the students whose performance on the Biology North Carolina End-of-Course attained an achievement level of three or higher (North Carolina Department of Public Instruction, n.d.a.).

Table 4

English 2 Comparison Data between North Carolina and Franklin County Schools

	School Year			
District	2012-2013	2013-2014	2014-2015	2015-2016
North Carolina	51.2	61.2	59.6	58.8
Franklin County	51.6	60.4	46.9	57.9

Note. Adapted from results of district data from the 2012-2013 through the 2015-2016 school year. Performance results are based on the students whose performance on the English 2 North Carolina End-of-Course attained an achievement level of three or higher (North Carolina Department of Public Instruction, n.d.a.).

identified as being at-risk were also determined to have a limited command of the knowledge and skills contained in the Common Core State Standards (CCSS) for Mathematics assessed at the end of each grade level. This issue was specifically discussed as it related to rising ninth graders as they transitioned into the English and math classes from the middle school. Those students typically needed substantial academic support as they progressed to the Math 1 course sequencing and into more rigorous studies in the content area. For the classroom teacher, this challenge becomes increasingly difficult as these students also need continued academic support and potentially high levels of remediation.

District leadership and curriculum specialists identified a major concern with the level of instruction that students receive and the "double-dosing" exposure that is sometimes required for students to gain mastery of the concepts during the ninety-day course. The Math 1 EOC Assessment contains sixty items, which includes several embedded field test items. In an effort to gain greater focus for struggling students, additional support was provided in areas that have the highest percentage of testing items on the EOC. This structure, unfortunately, did not provide a continuous support system for students, but addressed a "teaching to the test" mentality that all of the interviewed individuals identified as a concern. Most of these issues with content knowledge occur when students try to demonstrate the ability to summarize, represent, and interpret data for both one variable and two variables. They also have difficulty with learning to compute and interpret linear models that represent data precisely. This remedial instruction did not translate to students gaining greater confidence in their mathematics ability but seemed to push the frustration on to the next instructor in the math course sequence.

Throughout the discussions, all individuals commented on the use of remediation within the school to improve mathematics achievement for struggling students (Bahr, 2010). Despite research that student achievement levels before remediation are often identical to those

achievement levels after remediation, the practice was considered a regular part of the Math 1 course and that it was essential to provide the appropriate levels of support for struggling students. During the meeting, there was also a lengthy discussion related to the negative perception of remediation programs for students and their overall performance and understanding of mathematics.

Previous scheduling adjustments had also been made throughout the district and at the pilot school. During the 2014-2015 school year several supplemental mathematics courses were being utilized. Students that had been identified as "at-risk" were scheduled into an Introduction to Mathematics course before taking Foundations of Mathematics. Both courses were required before a student eventually took the Math 1 course. This essentially created a backlog of students that were limited in their math course progression (see Table 5). During the 2015-2016 school year the Introduction to Mathematics course was phased out and the backlog of students began progressing through the course sequencing, however a gap existed to address the needs of students identified as being at-risk. It was during this time that the discussion culminated into the following question: *How can the utilization of year-long courses and looping at the secondary level improve early math and English competency with high at-risk students to impact student academic performance?*

As an employee of Franklin County Schools, under the direction of the superintendent, I began the process of designing a pilot program to be implemented during the 2016-2017 school year to potentially provide a solution to the continued problem of poor student performance in the Math 1 course sequence within the identified at-risk student population. Working with the Director of Accountability, this pilot was initially designed to create a modified block schedule to improve Math 1 success for a selected group of "students" who were identified as high at-risk. This plan included creating hybrid block courses within a traditional block period with enhanced

Table 5

Mathematics Schedule Sequence Comparison Data

	School Year		
	2014-2015	2015-2016	2016-2017
Introduction to Mathematics	47	0	0
Foundations of Mathematics	220	179	131
Year-Long Found. of Mathematics	0	0	40
Math 1	176	276	173

Note. Three-year comparison of students taking course sequence for Mathematics 1. Introduction to Mathematics course phased out in 2014-2015 and Year-Long Foundations of Mathematics course phased in 2016-2017.

looping semesters to complete the Math 1 sequence. To create the appropriate course schedule, the Foundations of Math 1 course was paired with English 1 during the ninth grade year as a way to boost both the Math 1 follow-up course and English 2. By creating this looping structure students would extend their learning throughout the school year and not in a semester block.

For this problem of practice study, the Franklin County Schools superintendent asked this researcher to review and analyze the existing data gathered based on the pilot program implementation to determine if this pilot should be expanded. The primary researcher for this study is a veteran principal in the district, the high school professional learning community lead, and lead for the development, design, and implementation of the modified scheduling.

Defining the Purpose of the Study

The purpose of this descriptive and evaluative study was to determine the degree to which year-long, looped scheduling improves student academic performance in mathematics and English courses while improving on-track student performance for identified at-risk students as compared to their 4x4 block scheduled peers. The primary purpose of the study is to evaluate the model of using a year-long, looped course sequence and its impact on academic performance with at-risk students when compared to at-risk students that were scheduled using a traditional course structure. Data sources for the study included the student achievement records of forty at-risk ninth grade students on a 4x4 block schedule during two cohort years during the 2014-2015 and 2015-2016 school years. Data sources for the study also included the student achievement records of forty at-risk ninth grade students grouped into the year-long, looped mathematics and English courses for the 2016-2017 school year. All students selected within each cohort were in their first year of high school and had recently transitioned from middle school. Students who had previously taken the course were not included in the pilot program.

The main objective of the study is to discover if the modified scheduling block with looping had any measurable impact on at-risk student performance on the End-of-Course assessment for Math 1 and English 2. A secondary purpose of the study is to use the student performance data from the same cohorts to determine if the impact of year-long, looped course structure model had an impact on on-track student performance such as student retention and dropout rates. Finally, it is the intention of this researcher to provide the results of the study to assist other practitioners in the development and implementation of modified scheduling with looping for at-risk students. Some of the specific objectives of this study include the following:

- Describe the steps taken within Franklin County Schools to address Math 1 deficiencies by creating a pilot scheduling program for at-risk students.
- Determine the impact of year-long, looped classes on identified at-risk student performance on Math 1 and English 2 End-of-Course assessments.
- Highlight the existing assessment data within Franklin County Schools and the pilot scheduling program to determine if year-long, looped courses have an impact on student performance.
- Analyze trends from the data gathered to provide practical and effective actions related to alternative scheduling methods for at-risk students that can be implemented by other practitioners.

Two types of research frameworks were selected to evaluate the impact of the year-long, looped course sequence while also determining the potential impact to assist administrators in making informed decisions related to scheduling options:

Descriptive Research: The purpose of this type of descriptive research is to describe a phenomenon and is especially valuable as one of the early stages in a research project.

Descriptive studies report frequencies, averages, and percentages. This type of study does not necessarily draw conclusions related to the overall benefits of the implementation, but to report on the frequencies, averages, and percentages.

Evaluative Research: The purpose of this type of research is to make judgments about the merit or worth of educational programs, products, and organizations. This type of research has been undertaken to assist administrators in making professional decisions. These studies typically provide a focus in either a formative or summative manner. New studies are evaluated using a formative method while they are being developed, while the summative would be employed at the culmination of a study (Glatthorn & Joyner, 2012).

The quantitative data gathered will be used to answer the research questions and draw correlations between cohorts that were tracked with year-long, looped classes and those that were on a traditional block schedule. The gathered data will be reviewed to analyze patterns and trends related to at-risk student completion rates and individual student performance during the research study parameters.

Innovation

Schools have implemented a variety of block-scheduling models to provide extended instructional time and increase the efficiency of the school day (Nichols, 2005; Zepeda & Mayers, 2006). Proponents contend that block-scheduling models increase student achievement (Mattox et al., 2005), but other research regarding the reorganization of the school day contradicts these claims (Zepeda & Mayers, 2006). To date, few studies examined whether block scheduling affects at-risk student achievement, and no studies were found examining yearlong, looped courses at the high school level. (Marchant & Paulson, 2001). Consequently, the results of this study may be useful for educational leaders attempting to determine whether a modified

yearlong course with looping may be an appropriate scheduling model for their schools to positively impact at-risk student performance and improve on-track performance such as dropout and retention rates.

The need for this project arose from accountability results of the Math 1 scores throughout North Carolina and in Franklin County Schools specifically. This researcher contends that secondary schools can significantly impact on-track academic performance for at-risk students by creating an optional course scheduling model as it impacts early mathematics and English instruction. This researcher also contends that improved student performance will be noted on core subject area End-Of-Course exams by combining the positive aspects of a traditional, year-long course schedule with the added benefits of looping in a second-year course.

This model utilizes early identification of at-risk students in math and English courses to implement year-long, ninth grade support courses for Foundations of Math 1 and English 1 on a modified block schedule, with an additional looping course of Math 1 and English 2 during the tenth-grade year (see Figure 2). This model will also utilize student's End-of-Course assessment results and on-track student performance such as grade level promotion, on-time course progression and reduced drop-out rates.

Setting and Participants

Franklin County Schools is a rural, mid-sized LEA in central North Carolina with seventeen schools, serving approximately 8,200 students with sixteen schools; eight elementary, four middle schools, and three traditional high schools. Franklin County is experiencing substantial growth towards its southern borders near Wake County and Wake Forest, however it is still largely considered an economically disadvantaged county with 57% of students classified as Economically Disadvantaged (North Carolina Department of Public Instruction, 2017). The

demographics of the school district are 31% African American, 48% Caucasian, 17% Hispanic, 3% Two or More Races and 1% Other (North Carolina Department of Public Instruction, 2017).

The three traditional high schools in the district all utilize standard 4x4 block scheduling for all Math 1 and English courses. This study focuses on providing descriptive and evaluative research related to a district pilot utilizing a year-long, looped course sequence for at-risk students at one of the district high schools. This pilot study, under the direction of the district superintendent and director of accountability, was initially designed to create a modified block schedule to improve Math 1 and English 2 success for at-risk students. This plan included creating hybrid block courses within a traditional block period with enhanced looping semesters to complete the Math I sequence.

Implementation

To create the pilot program, teachers were asked to review the assessment data for the class of rising ninth graders in the spring of 2016, before their transition to high school. Teachers and curriculum staff looked at specific criteria to identify students who might have issues with foundational math skills. These key indicators included EVAAS predictor scores, sixth, seventh, and eighth EOG assessment scores and classroom grades. From this information, a core group of students was selected that had a limited chance of passing the Math 1 End-Of-Course exam using the EVAAS predictor level.

The second step of the implementation process was to utilize the information gathered to select approximately forty of the lowest performing students of the entering ninth grade cohort to participate in the enhanced-looping model pilot. These students were scheduled to take Math 1-A (Foundations of Math 1) for fifty minutes each day throughout the one hundred and eighty-day calendar of the upcoming school year as opposed to those on the traditional block. These

students then transitioned to lunch during their "split" time and continued the second half of the modified block period in an English I classroom for fifty minutes (see Figure 4). These students followed the same basic instructional calendar and pacing guide throughout the year, with adjustments made for the more traditional schedule and extended year period. This structure varied greatly from the traditional course sequence (see Figure 2) where low-performing at-risk students could potentially re-take the Foundations of Math course twice in the same year and then repeat the class the following fall semester.

Students completing the year-long, hybrid block courses were then looped into a fall semester class as the final step in the initial implementation process. These students were scheduled into Math 1 with the same teacher they had the previous school year in the year-long course. They were also paired with the same English teacher in a fall Composition class and spring English 2 class, which mirrored the traditional students course schedule for Franklin County Schools. The result of the scheduling process combined some of the key elements of the traditional schedule for Math and English courses, while also introducing the concept of looping at the high school level.

Teachers for the pilot model were selected based on personal interest in the year-long course structure and previous performance based on EVAAS data. The English teacher involved with the pilot had previously worked with at-risk students and had additional certifications in reading and differentiated instruction. The math teacher had previously taught at the elementary school level and was familiar with the looping structure. This math teacher was considered one of the strongest Math 1 teachers in the district, with students in their class performing above the district average on benchmark assessments and the End-Of-Course exam.

Data Analysis

All data utilized to answer proposed research questions during the study were gathered through databases housed by Franklin County Schools and the North Carolina Department of Public Instruction. The archived data collected by Franklin County Schools and the North Carolina Department of Public Instruction as it relates to Math 1 End-of-Course performance will be quantitatively analyzed to answer these questions. The data from the 2014-2015, 2015-2016 traditional cohort models and the 2016-2017 pilot cohort will be analyzed and will be presented in data tables to answer each research question. The comprehensive data from the study will assist the district in improving the use of alternative scheduling solutions to improve at-risk student academic performance indicators and on-track progress for the needs of Franklin County Schools and other practitioners. This study is framed with the hypothesis; implementing year-long, looped courses for Math 1 and English courses will improve academic performance and on-track outcomes for at-risk students.

The first area of research is the impact of looping for increased academic performance. Although there is some research that concludes the results of this type of academic schedule have been positive in relationship to improved student achievement in grades K-8, the current research does not provide substantial data for secondary instruction. This is primarily due to the difficulty of scheduling a looped course at this grade level, especially for students that are on a block schedule.

The second area of research is the comparison of yearlong scheduling versus block scheduling as it relates to improved student on-track student performance. This topic has been the subject of considerable research at the secondary level, but only as an independent area of focus. By extrapolating positive attributes from each research area, it is hypothesized that

combining the two scheduling options will result in a greater benefit for at-risk students to improve academic success as compared to their peers on a traditional block schedule.

For the purposes of the study, students with an Individualized Education Plan (IEP) were not identified. All data analyzed within the study focused on individual student academic performance regardless of a student's identified learning disabilities or classroom accommodations.

Research Questions

The study was anchored by four research questions to determine the degree to which year-long, looped scheduling improves student academic performance in mathematics and English courses while improving on-track student performance for identified at-risk students as compared to their peers on a typical block schedule. Quantitative data was used in answering these questions.

1. Did individual student performance on End-of-Course assessments improve for at-risk students in the year-long, looped course sequence compared to students in traditional, block schedule course sequence? Quantitative data from the pre-existing databases will be used to answer the following research questions and compare cohorts that were tracked with year-long looped Math 1 and English 2 classes as compared to those that were on a traditional block schedule. The existing data will be reviewed to analyze patterns and trends related to individual student performance on the End-of-Course exams during the research study parameters, 2014-2015, 2015-2016 and 206-2017.

a. Did individual student performance on the End-of-Course Math 1 assessment improve for at-risk students in the year-long, looped course sequence as compared to students in the traditional, block schedule course sequence?

b. Did individual student performance on the End-of-Course English 2 assessment improve for at-risk students in the year-long, looped course sequence as compared to students in the traditional, block schedule course sequence?

2. Did individual student course completion rate in mathematics and English course sequences improve for at-risk students in year-long, looped course sequence compared to students in traditional, block schedule course sequence? Quantitative data from the pre-existing databases will be used to answer the following research questions and compare cohorts that were tracked with year-long, looped Math 1 and English 2 classes as compared to those that were on a traditional block schedule. The existing data will be reviewed to analyze patterns and trends related to the frequency individual students successfully earned credits in the math and English course progression during the research study parameters, 2014-2015, 2015-2016 and 206-2017.

c. Did individual student course completion rates in mathematics course sequence improve for at-risk students in the year-long, looped course sequence compared to students in the traditional, block schedule course sequence?

d. Did individual student course completion rates in English course sequence improve for at-risk students in the year-long, looped course sequence compared to students in the traditional, block schedule course sequence?

3. Did individual student on-time promotion rates improve for at-risk students in the year-long, looped course sequence compared to students in the traditional, block schedule course sequence? Quantitative data will be used to answer the following research questions and compare cohorts that were tracked with year-long looped Math 1 and English 2 classes as compared to those that were on a traditional block schedule. The existing data will be reviewed to analyze patterns and trends related to the frequency individual students successfully earned on-time credits towards graduation and promotion during the research study parameters, 2014-2015, 2015-2016 and 206-2017.
4. Did individual student drop-out rate improve for at-risk students in year-long, looped course sequence compared to students in traditional, block schedule course sequence? Quantitative data will be used to answer the following research questions and compare cohorts that were tracked with year-long, looped Math 1 and English 2 classes as compared to those that were on a traditional block schedule. The existing data will be reviewed to analyze patterns, and trends related to the frequency individual students maintained enrollment and were not listed as a drop-out during the research study parameters, 2014-2015, 2015-2016 and 206-2017.

Protection of Participants' Rights

During the proposal stage of this study, permission to conduct the study within Franklin County Schools was obtained by submitting a written request to the district's superintendent (see Appendix B). The superintendent approved the request and provided district guidelines to work with the Director of Accountability.

The use of pre-existing NC EOC and EOG assessment data gathered from the North Carolina Department of Public Instruction eliminated the need for informed consent forms. The data received from Franklin County Schools contained no student names and ID numbers to ensure the privacy of the participants. The data is saved on a secure server within Franklin County Schools that is password protected. The data is only accessible to the researcher and the Director of Testing and Accountability. The data will remain on file for five years after the conclusion of the study and will be shredded upon the established termination date.

Conclusion

Chapter 1 provided a brief overview of the issues related to scheduling models at the high school level and the inherent concerns related to at-risk student performance throughout the nation. Chapter 2 provided a review of literature revealing much of the current thinking among scholars, on this issue and the gap of research related to year-long, looped course sequence for at-risk student success. Chapter 3 has introduced the background for the study and the methodology to identify the development of the initial alternative scheduling pilot and the steps taken to analyze data to determine program effectiveness. All data will be collected through pre-existing databases housed with the Franklin County Schools accountability office and through the North Carolina Department of Public Instruction. All results related to individual students will remain anonymous to protect individual student rights and the integrity of this study.

Effective analysis as it relates to the evaluation of this proposed project and the planned data analysis will focus on the impact of this project as it relates to a specific school as a pilot site. To identify the impact, it will be necessary to conclude if there is a significant difference in the end-of-course test grades in Math I among students who completed Math I on a two-semester (4x4) double-dose block schedule, and those who completed Math 1-A on a traditional year-long

schedule with a Math 1-B one-semester block the following year in the fall semester with the same teacher. Additional on-track student performance such as retention rates, course completion rates, and dropout rates will also be analyzed during the study to determine the pilot's success. The data gathered for this study will help Franklin County Schools district level leadership determine if the implementation of year-long, looped course sequencing has a significant impact on the academic success of at-risk students.

Once the data has been collected, it will be analyzed and presented in Chapter 4, where the results of the study are delineated. The final chapter will then take Chapter 4's results and use them to show future implications, as well as determine if modified schedules with year-long, looped course sequence have a significant impact on at-risk student achievement and improve on-track student performance.

CHAPTER 4: RESULTS

The purpose of this descriptive and evaluative study was to determine the degree to which year-long, looped scheduling improves student academic performance in mathematics and English courses while improving on-track performance for identified at-risk students as compared to their 4x4 block scheduled peers. The primary purpose of the study is to use student performance data to test the theory of using a year-long, looped course sequence to see the improved academic performance with at-risk students when compared to at-risk students that were scheduled using a traditional course structure. Data sources included the student achievement records of forty at-risk first-year ninth grade students on a 4x4 block schedule during three cohort years from the 2014-2015 and 2015-2016 cohorts. Data sources also included the student achievement records of forty at-risk first-year ninth grade students grouped into the year-long, looped mathematics and English courses for the 2016-2017 school year.

Research Questions

The study was anchored by four research questions to determine the degree to which year-long, looped scheduling improves student academic performance in mathematics and English courses while improving on-track performance for identified at-risk students as compared to their 4x4 block scheduled peers. Quantitative data were used in answering these questions.

1. Did individual student performance on End-of-Course assessments improve for students in the year-long, looped course sequence as compared to students in previous cohorts using the traditional course sequence?
2. Did individual student course completion rates in mathematics and English course sequences improve for at-risk students in the year-long, looped course sequence compared to students in the traditional, block schedule course sequence?

3. Did individual student, on-time, promotion rates improve for at-risk students in the year-long, looped course sequence compared to students in the traditional, block schedule course sequence?
4. Did individual student drop-out rate improve for at-risk students in the year-long, looped course sequence compared to students in the traditional, block schedule course sequence?

Review of Methodology

Quantitative data were used to answer the research questions and draw correlations between cohorts tracked with year-long, looped classes and those that were on a traditional block schedule. The gathered data were reviewed to analyze patterns and trends related to at-risk student completion rates and individual student performance during the research study parameters. The descriptive and evaluative research methods were utilized to report frequencies, averages, and percentages of the year-long, looped course sequence while also determining the potential impact assisting administrators in making informed decisions related to scheduling options (Glatthorn & Joyner, 2012).

All data utilized to answer proposed research questions during the study were gathered through databases housed by Franklin County Schools and the North Carolina Department of Public Instruction. The archived data collected by Franklin County Schools and the North Carolina Department of Public Instruction, as it relates to Math 1 End-of-Course performance, was quantitatively analyzed to answer these questions. The data from the 2014-2015 and 2015-2016 traditional cohort models, as well as the 2016-2017 pilot cohort, were analyzed and will be presented to answer each research question. Additional data tables are included to provide a specific reference related to each research question. The comprehensive data from the study is

presented to assist school leaders in the use of alternative scheduling solutions to improve at-risk student academic performance indicators and on-track progress. This study was framed with the hypothesis; implementing year-long, looped courses for Math 1 and English courses will improve academic performance and on-track outcomes for at-risk students.

The first area of research was the impact of looping for increased academic performance. Although there is some research that concludes the results of this type of academic schedule have been positive in relationship to improved student achievement in grades K-8, the current research does not provide substantial data for secondary instruction. The lack of research is primarily due to the relative difficulty of scheduling a looped course at this grade level, especially for students that are on a block schedule.

The second area of research is the comparison of year-long scheduling versus block scheduling as it relates to improved student on-track performance. This topic has considerable research at the secondary level, but only as an independent area of focus. By extrapolating positive attributes from each research area, the researcher hypothesizes that combining the two scheduling options will result in a greater benefit for at-risk students to improve academic success as compared to their peers on a traditional block schedule.

Collection of Quantitative Data for Research Cohorts

The study is a retroactive analysis of a pilot scheduling program implemented during the 2016-2017 school year. This cohort was initially created utilizing several key indicators including, sixth, seventh, and eighth EOG assessment scores, EVAAS predictor scores, and classroom grades. From this information, forty of the lowest performing students of the entering ninth grade cohort were selected to participate in the year-long, looped course model pilot. These students were scheduled to take an introductory mathematics course, Foundations of Math 1, for

fifty minutes each day throughout the one hundred and eighty-day calendar as opposed to those on the traditional block. Students in this pilot cohort followed the same basic instructional calendar and pacing guide throughout the year, with adjustments made for the more traditional schedule and extended year period. The researcher collected NCDPI, End-of-Grade assessment results, End-of-Course Math 1 and English 2 data, math and English course sequence completion information, student grade-level retention information, and student dropout data. The data collected for this study included forty students that were selected for the pilot.

Due to the retroactive nature of this study, it was necessary for the researcher to formulate a method to create comparison cohorts from the 2014-2015 and 2015-2016 school year, thus creating two similarly aligned cohorts to the pilot study. The researcher utilized a variation of the selection process for the pilot cohort, by focusing on EVAAS predictor scores, sixth, seventh, and eighth EOG assessment scores, and classroom grades to select forty students considered at-risk from each previous cohort year. A key data point utilized for the selection of all students in each cohort was the limited academic performance on the seventh and eighth-grade End-of-Grade mathematics assessment. Those students included in the study from the 2014-2015 and 2015-2016 cohorts needed to display the same limited Level 1 achievement level for both academic years using the North Carolina Department of Public Instruction scale. The scheduling model implemented during the 2014-2015 school year created an Introduction to Mathematics course for at-risk students. However, this student list was not used to influence the creation of the sample cohort for this study.

All data were collected through the office of the Franklin County Director of Testing and Accountability and available North Carolina Power School information. Student names and other identifiers were removed and replaced with a non-sequential identification number for the

purposes of this study. Each identifying student number includes the last two digits of the student's cohort year, followed by the non-sequential random number generated for the study. The researcher housed all original data on a secured server within Franklin County Schools.

Introducing the Analysis

The quantitative data gathered were used to answer the specific research questions related to student performance and draw correlations between the year-long, looped schedule cohort and the two cohorts on the traditional schedule. Each cohort was tracked based on the research questions with year-long, looped classes and those that were on a traditional block schedule. The gathered data were reviewed to analyze patterns and trends related to at-risk student completion rates and individual student performance during the research study parameters.

The results of this study have been separated into the four research questions developed to analyze the data related to the problem of practice. Quantitative data were used to answer each question as needed, and each research question has been presented with the results from the quantitative data collection. After the findings of each research question have been provided, additional findings will be identified as they relate to the study.

The findings related to the study are presented and supported through data collection. Each data set has been based on the achievement records of forty, at-risk, first-year, ninth grade students on a 4x4 block schedule during the 2014-2015 and 2015-2016 cohort years. Data sources also included the student achievement records of forty, at-risk, first-year ninth grade students grouped into the year-long, looped mathematics and English courses for the 2016-2017 school year.

Research Question #1 Findings

Did individual student performance on End-of-Course assessments improve for at-risk students in the year-long, looped course sequence compared to students in the traditional, block schedule course sequence?

To answer this question, student achievement data were analyzed to identify the number of students in each cohort that increased their proficiency level from their eighth grade End-of-Grade test, to their North Carolina End-of-Course exam in the same content area. This achievement level is indicated using the North Carolina Department of Public Instruction scale. This scale clearly outlines the expectations of Level 1through Level 5 on the End-of-Course assessment, with Level 3 deemed Sufficient command of knowledge and skills, Level 4 deemed Solid command, and Level 5 as Superior command (see Table 6). The data were also analyzed to indicate the overall percentage of students in each cohort whose achievement level improved from eighth grade End-of-Grade test to their high school End-of-Course exam.

Research Question #1a Findings

Did individual student performance on End-of-Course Math 1 assessment improve for at-risk students in the year-long, looped course sequence compared to students in the traditional, block schedule course sequence?

End-of-Course assessment results for students in the year-long, looped course sequence decreased slightly compared to students from the previous traditional course sequence cohorts when based on individual student achievement level increases. Sixteen percent of the thirty-seven students in the 2016-2017 cohort (see Figure 5) saw an increase in their proficiency level on the Math 1 End-of-Course assessment. This proficiency level increase was compared to 21%

Table 6

North Carolina End-Of-Grade Assessment Achievement Level

Achievement Level	Meets On-Grade-Level Proficiency Standard	Meets College-and-Career Readiness Standard
Level 5 denotes Superior Command of knowledge and skills	Yes	Yes
Level 4 denotes Solid Command of knowledge and skills	Yes	Yes
Level 3 denotes Sufficient Command of knowledge and skills	Yes	No
Level 2 denotes Partial Command of knowledge and skills	No	No
Level 1 denotes Limited Command of knowledge and skills	No	No

Note. Adapted from North Carolina Department of Public Instruction Accountability Services academic achievement standards. (North Carolina Department of Public Instruction, n.d.a.).

STUDENT	G6 LVL	G7 LVL	G8 LVL	M1 LVL	CHANGE
S16174567	1	1	1	1	NO CHANGE
S16173975	1	1	1	1	NO CHANGE
S16172345	1	1	1	1	NO CHANGE
S16171128	1	1	1	2	INCREASED +1
S16178856	4	3	1	4	INCREASED +3
S16175539	1	NS	1	1	NO CHANGE
S16177654	1	1	1	1	NO CHANGE
S16172290	1	NS	1	1	NO CHANGE
S16173456	1	1	1	1	NO CHANGE
S16172955	1	1	1	1	NO CHANGE
S16178533	1	1	1	1	NO CHANGE
S16179876	1	1	1	1	NO CHANGE
S16172376	1	1	1	1	NO CHANGE
S16171234	NS	NS	NS	NS	HS 6-8; HMBD
S16175647	1	1	1	1	NO CHANGE
S16172577	NS	1	1	1	NO CHANGE
S16176543	1	2	2	3	INCREASED +1
S16172298	1	1	1	1	NO CHANGE
S16176789	1	1	1	1	NO CHANGE
S16172148	2	1	1	1	NO CHANGE
S16173847	NS	NS	1	1	NO CHANGE
S16171174	NS	NS	2	1	NO CHANGE
S16170987	NS	1	1	4	INCREASED +3
S16173328	1	1	1	1	NO CHANGE
S16172849	1	1	1	1	NO CHANGE
S16175678	1	1	1	1	NO CHANGE
S16172388	1	1	1	1	NO CHANGE
S16178765	1	1	1	1	NO CHANGE
S16170764	2	2	1	2	INCREASED +1
S16174738	NS	1	1	2	INCREASED +1
S16178217	2	NS	1	1	NO CHANGE
S16171029	1	1	1	1	NO CHANGE
S16170784	1	1	1	1	NO CHANGE
S16177459	1	1	1	1	NO CHANGE
S16174321	1	1	1	1	NO CHANGE
S16172614	1	1	1	1	NO CHANGE
S16170231	1	NS	2	1	NO CHANGE
S16179584	1	1	1	1	NO CHANGE
S16171049	1	1	1	NS	DROP OUT
S16172837	1	1	1	NS	TRNS HOME S

Note. Achievement levels based on North Carolina Department of Public Instruction Accountability Services academic achievement standards. (North Carolina Department of Public Instruction, n.d.a.).

Figure 5. 2016-2017 Cohort Data – Math EOG/EOC Achievement Level.

of the thirty-eight students in the 2015-2016 cohort (see Figure 6), and 21% of the thirty-eight students in the 2014-2015 cohort (see Figure 7).

Although the overall achievement level increase was not observed, the total number of students to meet On-Grade-Level Proficiency based on North Carolina standards did increase slightly. Eight percent of the thirty-seven students in the 2016-2017 cohort increased their achievement level to meet On-Grade-Level Proficiency, while only 5% of the thirty-eight of students in the 2014-2015 cohort increased their achievement level to meet On-Grade-Level Proficiency. There were no students in the 2015-2016 cohort saw an achievement level increase to meet On-Grade-Level Proficiency (see Table 7).

The majority of students in each cohort saw no change in their overall End-of-Course achievement level from the previous year. Eighty-four percent of the thirty-seven students saw no change in the 2016-2017 cohort, while 76% of the thirty-eight students in the 2015-2016 cohort saw no change, and 74% of the thirty-eight students in the 2014-2015 cohort remained static related to performance.

Two students in the 2014-2015 cohort saw an achievement level decrease, where the 2015-2016 cohort had only one student. There were no students in the 2016-2017 cohort that experienced an achievement level decrease.

Research Question #1b Findings

Did individual student performance on End-of-Course English 2 assessment improve for at-risk students in the year-long, looped course sequence compared to students in the traditional, block schedule course sequence?

STUDENT	G6 LVL	G7 LVL	G8 LVL	M1 LVL	CHANGE
S15164567	1	1	1	1	NO CHANGE
S15163975	1	1	1	1	NO CHANGE
S15162345	2	1	1	1	NO CHANGE
S15161128	1	1	1	1	NO CHANGE
S15168856	1	1	1	2	INCREASED +1
S15165539	1	1	1	2	INCREASED +1
S15167654	1	1	1	1	NO CHANGE
S15162290	1	1	1	1	NO CHANGE
S15163456	1	1	1	1	NO CHANGE
S15162955	2	1	1	1	NO CHANGE
S15168533	1	1	1	NS	DROPOUT
S15169876	1	1	1	1	NO CHANGE
S15162376	1	1	1	2	INCREASED +1
S15161234	1	1	1	1	NO CHANGE
S15165647	1	1	1	1	NO CHANGE
S15162577	1	1	NS	1	NO CHANGE
S15166543	1	2	1	1	NO CHANGE
S15162298	1	1	1	2	INCREASED +1
S15166789	1	1	1	1	NO CHANGE
S15162148	1	NS	1	1	NO CHANGE
S15163847	2	1	1	2	INCREASED +1
S15161174	2	NS	1	2	INCREASED +1
S15160987	1	2	1	1	NO CHANGE
S15163328	1	1	1	1	NO CHANGE
S15162849	2	1	1	1	NO CHANGE
S15165678	NS	NS	2	1	NO CHANGE
S15162388	1	1	1	1	NO CHANGE
S15168765	1	1	1	1	NO CHANGE
S15160764	1	1	1	1	NO CHANGE
S15164738	1	1	1	1	NO CHANGE
S15168217	1	1	1	1	NO CHANGE
S15161029	1	2	2	2	INCREASED +1
S15160784	1	2	1	1	NO CHANGE
S15167459	1	1	NS	NS	DROPOUT
S15164321	NS	NS	1	1	NO CHANGE
S15162614	2	1	1	2	INCREASED +1
S15160231	1	1	1	1	NO CHANGE
S15169584	1	1	1	1	NO CHANGE
S15161049	1	1	2	1	DECREASE -1
S15162837	1	1	1	1	NO CHANGE

Note. Achievement levels based on North Carolina Department of Public Instruction Accountability Services academic achievement standards. (North Carolina Department of Public Instruction, n.d.a.)

Figure 6. 2015-2016 Cohort Data – Math EOG/EOC Achievement Level.

STUDENT	G6 LVL	G7 LVL	G8 LVL	M1 LVL	CHANGE
S14154567	1	1	1	1	NO CHANGE
S14153975	2	1	1	1	NO CHANGE
S14152345	3	1	1	1	NO CHANGE
S14151128	2	1	1	2	INCREASED +1
S14158856	1	1	1	1	NO CHANGE
S14155539	1	1	1	1	NO CHANGE
S14157654	1	2	1	1	NO CHANGE
S14152290	4	1	1	3	INCREASED +2
S14153456	1	1	1	1	NO CHANGE
S14152955	3	1	1	1	NO CHANGE
S14158533	2	1	1	1	NO CHANGE
S14159876	2	1	1	1	NO CHANGE
S14152376	2	1	1	2	INCREASED +1
S14151234	2	1	1	1	NO CHANGE
S14155647	1	1	1	1	NO CHANGE
S14152577	1	1	1	2	INCREASED +1
S14156543	2	1	2	1	DECREASED -1
S14152298	2	1	1	1	NO CHANGE
S14156789	2	1	1	1	NO CHANGE
S14152148	2	1	2	1	DECREASED -1
S14153847	1	1	1	1	NO CHANGE
S14151174	3	1	1	1	NO CHANGE
S14150987	NS	1	1	2	INCREASED +1
S14153328	NS	NS	1	1	NO CHANGE
S14152849	2	1	1	1	NO CHANGE
S14155678	3	1	1	1	NO CHANGE
S14152388	2	1	1	2	INCREASED +1
S14158765	3	1	1	1	NO CHANGE
S14150764	3	2	1	1	NO CHANGE
S14154738	2	1	1	1	NO CHANGE
S14158217	1	1	1	1	NO CHANGE
S14151029	2	1	1	1	NO CHANGE
S14150784	2	1	1	1	NO CHANGE
S14157459	1	1	1	2	INCREASED +1
S14154321	1	1	1	NS	DROP OUT
S14152614	2	1	1	1	NO CHANGE
S14150231	1	1	1	1	NO CHANGE
S14159584	3	NS	1	1	NO CHANGE
S14151049	1	3	1	NS	DROP OUT
S14152837	1	1	2	3	INCREASED +1

Note. Achievement levels based on North Carolina Department of Public Instruction Accountability Services academic achievement standards. (North Carolina Department of Public Instruction, n.d.a.)

Figure 7. 2014-2015 Cohort Data – Math EOG/EOC Achievement Level.

Table 7

Cohort Comparison of North Carolina Math 1 EOC Achievement Level Results

		Increased		Stayed Same		Decreased	
Cohort	Total Students	#	%	#	%	#	%
2016-2017	37	6	16.2	31	83.7	0	0.0
2015-2016	38	8	21.1	29	76.3	1	2.5
2014-2015	38	8	21.1	28	73.7	2	5.3

Individual student achievement level increases on the English 2 End-of-Course assessment for students in the year-long, looped course sequence saw no discernable increase compared to students from the previous traditional course sequence cohorts. Thirty-three and three-tenths percent of the thirty-six students in the 2016-2017 cohort (see Figure 8) saw an increase in their proficiency level on the English 2 End-of-Course assessment. This was compared to 21 6/10th% of the thirty-seven students in the 2015-2016 cohort (see Figure 9), and 33 3/10th% of the thirty-six students in the 2014-2015 cohort (see Figure 10).

The overall achievement level improvement was also negligible, with the percentage of students to meet On-Grade-Level Proficiency-based on North Carolina standards remaining the same across all cohorts. Eleven percent of the thirty-six students in the 2016-2017 cohort increased their achievement level to meet On-Grade-Level Proficiency. Eight percent of the thirty-seven students in the 2015-2016 cohort increased their achievement level to meet On-Grade-Level Proficiency, while 11% of the thirty-six students in the 2014-2015 cohort saw an achievement level increase to meet On-Grade-Level Proficiency (see Table 8).

As was seen in the Math 1 comparison, the majority of students in each cohort saw no change in their overall End-of-Course achievement level from the previous year. Sixty-seven percent of the thirty-six students saw no change in the 2016-2017 cohort. Sixty-two percent of the of the thirty-seven students in the 2015-2016 cohort saw no change, and 55 ½% of the thirty-six students saw no change in the 2014-2015 cohort (see Table 8).

A larger group in the 2014-2015 cohort saw an achievement level decrease, with 11% of the thirty-six students having a negative gain, where the 2015-2016 cohort had only two students. There were no students in the 2016-2017 cohort that experienced an achievement level decrease.

STUDENT	G6 LVL	G7 LVL	G8 LVL	E2 LVL	CHANGE
S16174567	2	2	1	3	INCREASED +2
S16173975	2	1	1	2	INCREASED +1
S16172345	1	1	1	1	NO CHANGE
S16171128	1	2	1	3	INCREASED +2
S16178856	2	1	1	2	INCREASED +1
S16175539	1	1	1	1	NO CHANGE
S16177654	1	1	1	3	INCREASED +2
S16172290	2	1	1	2	INCREASED +1
S16173456	1	1	1	1	NO CHANGE
S16172955	2	1	1	1	NO CHANGE
S16178533	1	1	1	1	NO CHANGE
S16179876	2	1	1	1	NO CHANGE
S16172376	1	1	1	1	NO CHANGE
S16171234	NS	NS	NS	NS	HS 6-8; HMBD
S16175647	2	2	1	2	INCREASED +1
S16172577	NS	1	1	1	NO CHANGE
S16176543	1	1	1	1	NO CHANGE
S16172298	1	1	1	2	INCREASED +1
S16176789	1	1	1	1	NO CHANGE
S16172148	2	2	1	2	INCREASED +1
S16173847	NS	NS	1	1	NO CHANGE
S16171174	NS	NS	2	2	NO CHANGE
S16170987	NS	NS	1	1	NO CHANGE
S16173328	1	1	1	1	NO CHANGE
S16172849	2	1	2	3	INCREASED +1
S16175678	1	1	1	1	NO CHANGE
S16172388	1	1	1	1	NO CHANGE
S16178765	3	1	1	1	NO CHANGE
S16170764	2	2	1	2	INCREASED +1
S16174738	NS	1	1	1	NO CHANGE
S16178217	2	NS	1	1	NO CHANGE
S16171029	1	2	1	2	INCREASED +1
S16170784	2	1	1	1	NO CHANGE
S16177459	1	1	1	1	NO CHANGE
S16174321	1	1	1	1	NO CHANGE
S16172614	1	1	1	1	NO CHANGE
S16170231	1	1	1	1	NO CHANGE
S16179584	1	1	1	NS	DROP OUT
S16171049	2	2	1	NS	DROP OUT
S16172837	2	2	1	NS	TRNS HOME S

Note. Achievement levels based on North Carolina Department of Public Instruction Accountability Services academic achievement standards. (North Carolina Department of Public Instruction, n.d.a.)

Figure 8. 2016-2017 Cohort Data – ELA/English EOG/EOC Achievement Level.

STUDENT	G6 LVL	G7 LVL	G8 LVL	E2 LVL	CHANGE
S15164567	2	2	1	2	INCREASED +1
S15163975	1	1	1	NS	DROPOUT
S15162345	1	1	1	1	NO CHANGE
S15161128	2	1	2	2	NO CHANGE
S15168856	1	1	1	1	NO CHANGE
S15165539	1	1	1	1	NO CHANGE
S15167654	2	2	2	2	NO CHANGE
S15162290	2	1	2	2	NO CHANGE
S15163456	1	1	1	1	NO CHANGE
S15162955	2	2	1	1	NO CHANGE
S15168533	NS	1	1	1	NO CHANGE
S15169876	2	2	1	1	NO CHANGE
S15162376	1	1	NS	1	NO CHANGE
S15161234	2	2	1	1	NO CHANGE
S15165647	1	1	1	2	INCREASED +1
S15162577	1	NS	1	1	NO CHANGE
S15166543	1	1	1	1	NO CHANGE
S15162298	4	NS	1	4	INCREASED +3
S15166789	1	2	1	1	NO CHANGE
S15162148	1	1	2	1	DECREASE -1
S15163847	NS	NS	2	2	NO CHANGE
S15161174	1	2	1	2	INCREASED +1
S15160987	1	1	2	1	DECREASE -1
S15163328	1	1	1	1	NO CHANGE
S15162849	2	2	1	2	INCREASED +1
S15165678	2	2	2	3	INCREASED +1
S15162388	NS	NS	1	1	NO CHANGE
S15168765	1	2	1	1	NO CHANGE
S15160764	1	1	1	1	NO CHANGE
S15164738	2	2	1	2	INCREASED +1
S15168217	1	2	1	1	NO CHANGE
S15161029	1	1	1	1	NO CHANGE
S15160784	1	1	1	1	NO CHANGE
S15167459	2	1	1	NS	DROPOUT
S15164321	1	1	1	1	NO CHANGE
S15162614	2	2	1	1	NO CHANGE
S15160231	2	2	1	3	INCREASED +2
S15169584	1	1	1	NS	NO CHANGE
S15161049	2	2	2	2	NO CHANGE
S15162837	1	1	NS	OCS	OCS

Note. Achievement levels based on North Carolina Department of Public Instruction Accountability Services academic achievement standards. (North Carolina Department of Public Instruction, n.d.a.)

Figure 9. 2015-2016 Cohort Data – ELA/English EOG/EOC Achievement Level.

STUDENT	G6 LVL	G7 LVL	G8 LVL	E2 LVL	CHANGE
S14154567	1	1	1	1	NO CHANGE
S14153975	1	1	1	1	NO CHANGE
S14152345	3	1	4	4	NO CHANGE
S14151128	2	2	2	2	NO CHANGE
S14158856	3	2	2	2	NO CHANGE
S14155539	1	1	2	1	DECREASED -1
S14157654	2	2	2	4	INCREASED +2
S14152290	4	2	3	4	INCREASED +1
S14153456	1	1	1	1	NO CHANGE
S14152955	3	3	2	4	INCREASED +2
S14158533	3	1	2	TRANS	TRANS. OUT
S14159876	3	2	1	1	NO CHANGE
S14152376	3	2	3	4	INCREASED +1
S14151234	3	2	3	4	INCREASED +1
S14155647	1	1	1	2	INCREASED +1
S14152577	2	1	1	1	NO CHANGE
S14156543	1	1	1	2	INCREASED +1
S14152298	1	1	1	2	INCREASED +1
S14156789	1	1	1	DO	DROP OUT
S14152148	2	1	1	1	NO CHANGE
S14153847	3	3	2	2	NO CHANGE
S14151174	3	2	2	1	DECREASED -1
S14150987	NS	1	1	2	INCREASED +1
S14153328	NS	NS	1	1	NO CHANGE
S14152849	3	1	3	1	DECREASED -2
S14155678	2	2	1	1	NO CHANGE
S14152388	3	3	2	4	INCREASED +2
S14158765	3	3	2	4	INCREASED +2
S14150764	2	2	2	2	NO CHANGE
S14154738	2	1	1	1	NO CHANGE
S14158217	1	2	2	1	DECREASED -1
S14151029	2	2	1	1	NO CHANGE
S14150784	2	2	1	1	NO CHANGE
S14157459	2	1	1	1	NO CHANGE
S14154321	2	1	1	NS	DROP OUT
S14152614	3	1	1	1	NO CHANGE
S14150231	2	2	2	2	NO CHANGE
S14159584	3	NS	1	2	INCREASED +1
S14151049	1	2	1	NS	DROP OUT
S14152837	1	1	2	2	NO CHANGE

Note. Achievement levels based on North Carolina Department of Public Instruction Accountability Services academic achievement standards. (North Carolina Department of Public Instruction, n.d.a.)

Figure 10. 2014-2015 Cohort Data – ELA/English EOG/EOC Achievement Level.

Table 8

Cohort Comparison of North Carolina English 2 EOC Achievement Level Results

		Increased		Stayed Same		Decreased	
Cohort	Total Students	#	%	#	%	#	%
2016-2017	36	12	33.3	24	66.7	0	0.0
2015-2016	37	8	21.6	23	62.1	2	0.5
2014-2015	36	12	33.3	22	55.6	4	11.1

Research Question #2 Findings

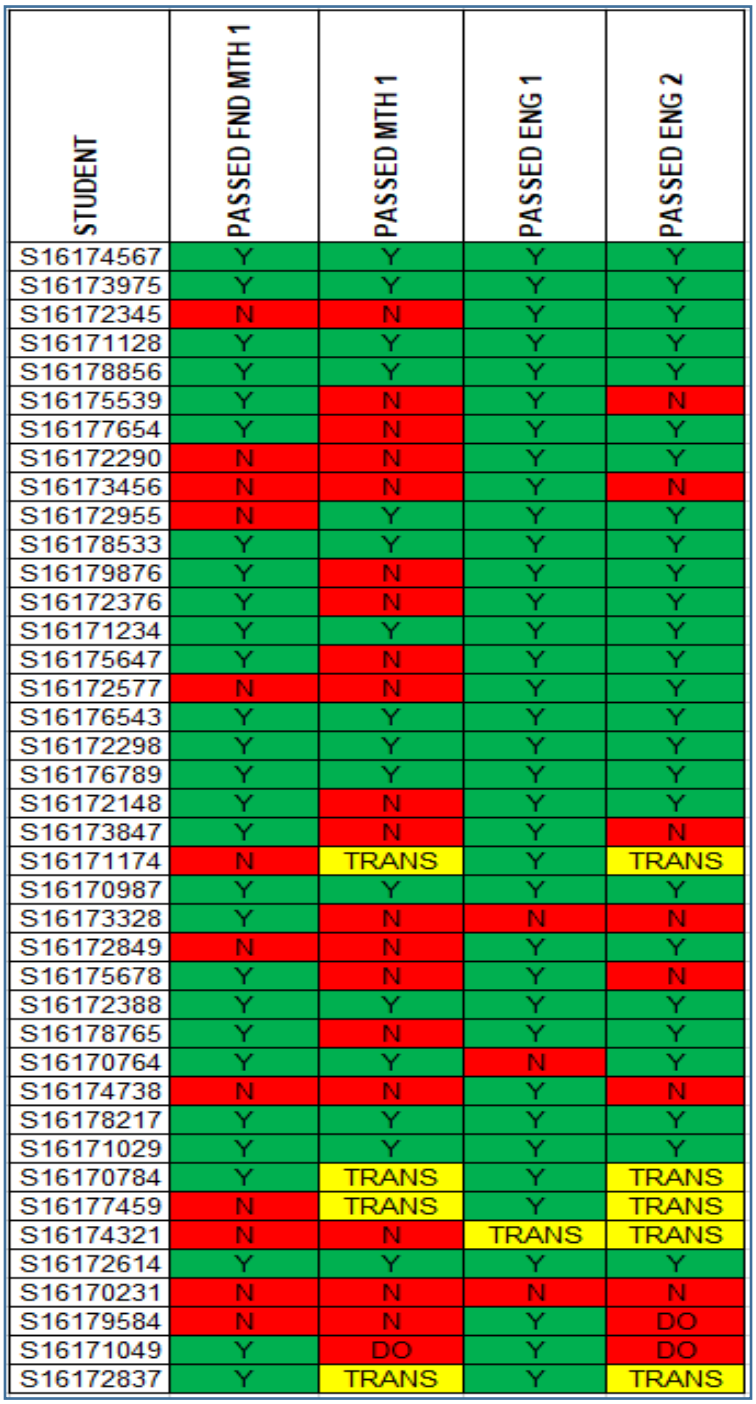
Did individual student course completion rates in mathematics and English course sequences improve for at-risk students in the year-long, looped course sequence compared to students in the traditional, block schedule course sequence?

To answer this question, student achievement data were analyzed to identify the number of students who successfully earned on-time credits towards graduation and on-time promotion during the research study parameters. This data focused on the 2014-2015, 2015-2016 and 2016-2017 target cohorts. On-time credits in mathematics and English were specifically identified, as well as retention data at the end of year-one and year-two in high school. All data gathered related to on-time credit acquisition was based on a student's first-time course attempt in Foundation of Mathematics, Math 1, English 1 and English 2. Data was also gathered on the first-time course attempt of Introductory of Mathematics for the 2014-2015 cohort. No other course data was collected for the study.

Research Question #2a Findings

Did individual student course completion rates in mathematics course sequence improve for at-risk students in the year-long, looped course sequence compared to students in the traditional, block schedule course sequence?

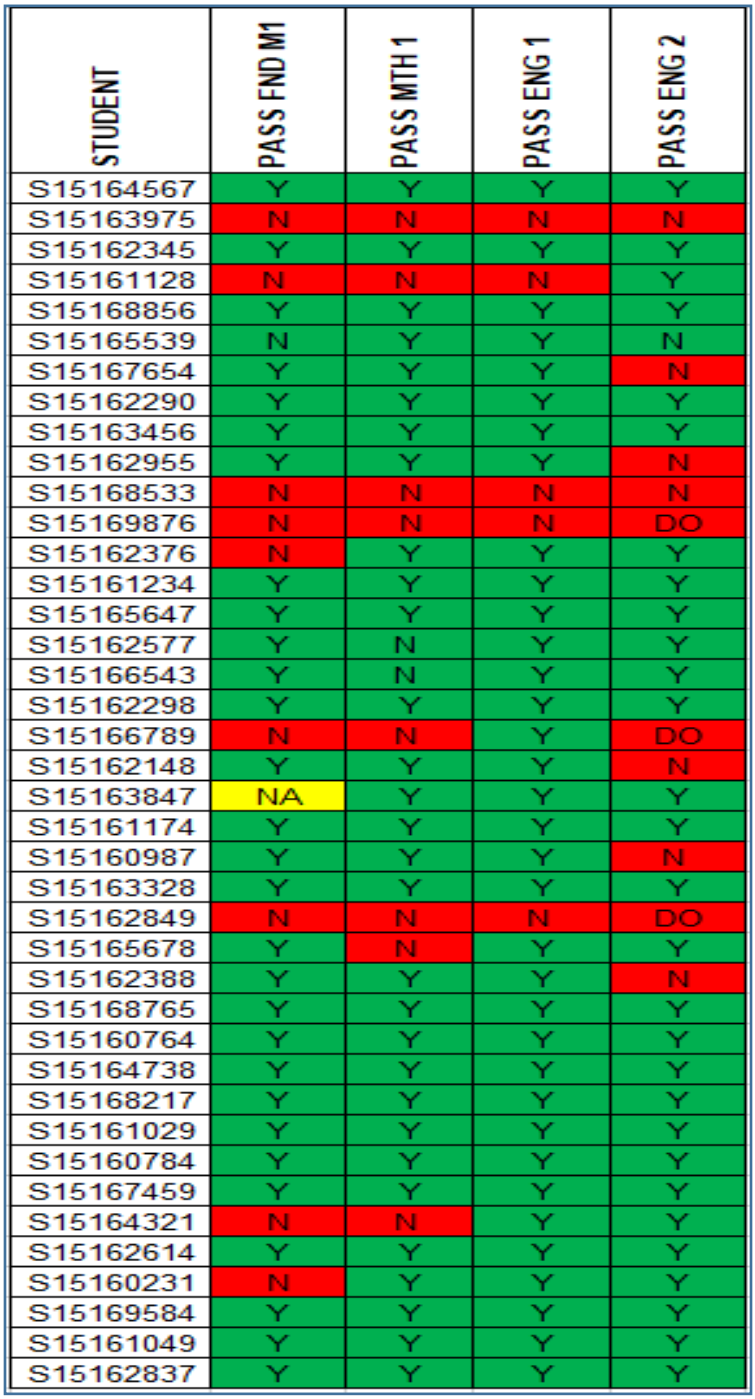
There was considerable variance between the cohorts related to individual student completion rates in mathematics courses based on the data collected related to a student's introductory mathematics course. Thirty percent of the thirty-nine students in the 2016-2017 cohort (see Figure 11) failed their introductory course, Foundation of Mathematics 1, on their first attempt as compared to 58% of the forty students in the 2015-2016 cohort (see Figure 12). The 2014-2015 cohort saw an even greater disparity with 58% of the forty students in the cohort



STUDENT	PASSED FND MTH 1	PASSED MTH 1	PASSED ENG 1	PASSED ENG 2
S16174567	Y	Y	Y	Y
S16173975	Y	Y	Y	Y
S16172345	N	N	Y	Y
S16171128	Y	Y	Y	Y
S16178856	Y	Y	Y	Y
S16175539	Y	N	Y	N
S16177654	Y	N	Y	Y
S16172290	N	N	Y	Y
S16173456	N	N	Y	N
S16172955	N	Y	Y	Y
S16178533	Y	Y	Y	Y
S16179876	Y	N	Y	Y
S16172376	Y	N	Y	Y
S16171234	Y	Y	Y	Y
S16175647	Y	N	Y	Y
S16172577	N	N	Y	Y
S16176543	Y	Y	Y	Y
S16172298	Y	Y	Y	Y
S16176789	Y	Y	Y	Y
S16172148	Y	N	Y	Y
S16173847	Y	N	Y	N
S16171174	N	TRANS	Y	TRANS
S16170987	Y	Y	Y	Y
S16173328	Y	N	N	N
S16172849	N	N	Y	Y
S16175678	Y	N	Y	N
S16172388	Y	Y	Y	Y
S16178765	Y	N	Y	Y
S16170764	Y	Y	N	Y
S16174738	N	N	Y	N
S16178217	Y	Y	Y	Y
S16171029	Y	Y	Y	Y
S16170784	Y	TRANS	Y	TRANS
S16177459	N	TRANS	Y	TRANS
S16174321	N	N	TRANS	TRANS
S16172614	Y	Y	Y	Y
S16170231	N	N	N	N
S16179584	N	N	Y	DO
S16171049	Y	DO	Y	DO
S16172837	Y	TRANS	Y	TRANS

Note. All data based on initial course attempt. Cohort course sequence utilized year-long, looped courses for identified at-risk students.

Figure 11. 2016-2017 Cohort Data – Successful Course Completion Math/English.



STUDENT	PASS FND M1	PASS MTH 1	PASS ENG 1	PASS ENG 2
S15164567	Y	Y	Y	Y
S15163975	N	N	N	N
S15162345	Y	Y	Y	Y
S15161128	N	N	N	Y
S15168856	Y	Y	Y	Y
S15165539	N	Y	Y	N
S15167654	Y	Y	Y	N
S15162290	Y	Y	Y	Y
S15163456	Y	Y	Y	Y
S15162955	Y	Y	Y	N
S15168533	N	N	N	N
S15169876	N	N	N	DO
S15162376	N	Y	Y	Y
S15161234	Y	Y	Y	Y
S15165647	Y	Y	Y	Y
S15162577	Y	N	Y	Y
S15166543	Y	N	Y	Y
S15162298	Y	Y	Y	Y
S15166789	N	N	Y	DO
S15162148	Y	Y	Y	N
S15163847	NA	Y	Y	Y
S15161174	Y	Y	Y	Y
S15160987	Y	Y	Y	N
S15163328	Y	Y	Y	Y
S15162849	N	N	N	DO
S15165678	Y	N	Y	Y
S15162388	Y	Y	Y	N
S15168765	Y	Y	Y	Y
S15160764	Y	Y	Y	Y
S15164738	Y	Y	Y	Y
S15168217	Y	Y	Y	Y
S15161029	Y	Y	Y	Y
S15160784	Y	Y	Y	Y
S15167459	Y	Y	Y	Y
S15164321	N	N	Y	Y
S15162614	Y	Y	Y	Y
S15160231	N	Y	Y	Y
S15169584	Y	Y	Y	Y
S15161049	Y	Y	Y	Y
S15162837	Y	Y	Y	Y

Note. All data based on initial course attempt. Cohort course sequence did not include any remedial mathematics course or alternate placement options.

Figure 12. 2015-2016 Cohort Data – Successful Course Completion Math/English.

failing the Foundations of Mathematics course on their first attempt. Some of the identified "at-risk" students in the 2014-2015 cohort had been required to take an additional Introductory Mathematics course, as part of their course sequence, before Foundations of Mathematics 1. Twenty-four students of the forty in the 2014-2015 cohort (see Figure 13) participated in the Introduction to Mathematics course. Fifty-four percent of the twenty-four participating in the course failed it on their first attempt. Additionally, all thirteen students that failed the Introduction to Mathematics course also failed Foundations of Math 1 on their first attempt.

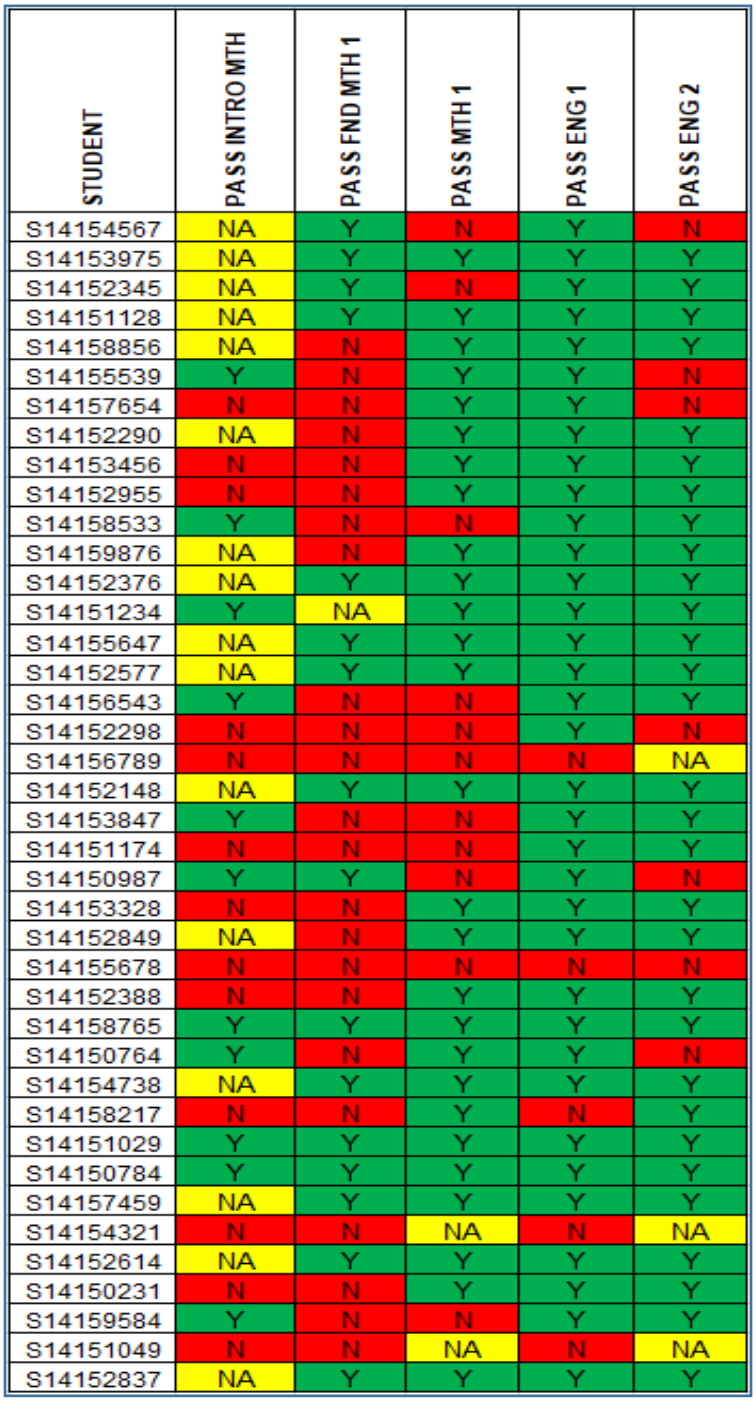
There was more consistency between the cohorts related to individual student completion rates in Math 1 courses based on the data collected. The fifty-four percent of thirty-five students in the 2016-2017 cohort failed Math 1 on their first attempt. This was compared to 23% of the thirty-nine students in the 2015-2016 cohort, and 28% of the forty students in the 2014-2015 cohort (see Table 9).

Additionally, nine students from the 2016-2017 cohort failed both Foundations of Mathematics and Math 1 on their first attempt, as opposed to seven from the 2015-2016 cohort. Thirteen students from the 2014-2015 cohort failed Introduction to Mathematics and Foundations of Math 1. Four of those thirteen also failed Math 1 on their first attempt.

Research Question #2b Findings

Did individual student course completion rates in the English course sequence improve for at-risk students in the year-long, looped course sequence compared to students in the traditional, block schedule course sequence?

Individual student completion rates in the introductory English course saw the greatest level of consistency between the cohorts based on the data collected (see Table 10). Seven percent of the thirty-nine students in the 2016-2017 cohort failed English 1 on their first attempt.



STUDENT	PASS INTRO MTH	PASS FND MTH 1	PASS MTH 1	PASS ENG 1	PASS ENG 2
S14154567	NA	Y	N	Y	N
S14153975	NA	Y	Y	Y	Y
S14152345	NA	Y	N	Y	Y
S14151128	NA	Y	Y	Y	Y
S14158856	NA	N	Y	Y	Y
S14155539	Y	N	Y	Y	N
S14157654	N	N	Y	Y	N
S14152290	NA	N	Y	Y	Y
S14153456	N	N	Y	Y	Y
S14152955	N	N	Y	Y	Y
S14158533	Y	N	N	Y	Y
S14159876	NA	N	Y	Y	Y
S14152376	NA	Y	Y	Y	Y
S14151234	Y	NA	Y	Y	Y
S14155647	NA	Y	Y	Y	Y
S14152577	NA	Y	Y	Y	Y
S14156543	Y	N	N	Y	Y
S14152298	N	N	N	Y	N
S14156789	N	N	N	N	NA
S14152148	NA	Y	Y	Y	Y
S14153847	Y	N	N	Y	Y
S14151174	N	N	N	Y	Y
S14150987	Y	Y	N	Y	N
S14153328	N	N	Y	Y	Y
S14152849	NA	N	Y	Y	Y
S14155678	N	N	N	N	N
S14152388	N	N	Y	Y	Y
S14158765	Y	Y	Y	Y	Y
S14150764	Y	N	Y	Y	N
S14154738	NA	Y	Y	Y	Y
S14158217	N	N	Y	N	Y
S14151029	Y	Y	Y	Y	Y
S14150784	Y	Y	Y	Y	Y
S14157459	NA	Y	Y	Y	Y
S14154321	N	N	NA	N	NA
S14152614	NA	Y	Y	Y	Y
S14150231	N	N	Y	Y	Y
S14159584	Y	N	N	Y	Y
S14151049	N	N	NA	N	NA
S14152837	NA	Y	Y	Y	Y

Note. All data based on initial course attempt. Cohort course sequence included Introduction to Mathematics for some students.

Figure 13. 2014-2015 Cohort Data – Successful Course Completion Math/English.

Table 9

Cohort Comparison of English Course Failure Rate on First Attempt

	English 1			English 2		
Cohort	Total Students	#	%	Total Students	#	%
2016-2017	39	3	0.8	33	7	21.2
2015-2016	40	5	12.5	37	7	18.9
2014-2015	40	5	12.5	37	7	18.9

This was only slightly improved as compared to the 2015-2016 and 2014-2015 cohorts where 13% of forty students failed English 1 on their first attempt.

Individual student completion rates in the introductory English course saw the greatest level of consistency between the cohorts based on the data collected (see Table 10). Seven percent of the thirty-nine students in the 2016-2017 cohort failed English 1 on their first attempt. This was only slightly improved as compared to the 2015-2016 and 2014-2015 cohorts where 13% of forty students failed English 1 on their first attempt.

Data collected on the individual student completion rates in the English 2 course were equally consistent between the cohorts. Nine percent of the thirty-three students in the 2016-2017 cohort failed English 2 on their first attempt. This was only slightly improved as compared to the 2015-2016 and 2014-2015 cohorts where 19% of the thirty-seven students in the cohort failed English 2 on their first attempt.

Research Question #3 Findings

Did individual student on-time promotion rates improve for at-risk students in the year-long, looped course sequence compared to students in the traditional, block schedule course sequence?

There was considerable variance between the cohorts related to individual student on-time promotion rates based on the data collected (see Table 11). A student's on-time promotion was determined based on the successful completion of courses identified as units of earned credit. Students in each cohort were required to earn a minimum of six credits to achieve promotion to the next grade level at the end of their first year of high school. This promotion from ninth to tenth grade occurred at the end of the school year in June if the student was successful. Students would be eligible for promotion again at the end of their second year of high

Table 10

Cohort Comparison of Math Course Failure Rate on First Attempt

	Found. Math 1			Math 1		
Cohort	Total Students	#	%	Total Students	#	%
2016-2017	39	12	30.7	35	19	54.2
2015-2016	39	9	23.7	40	8	20.0
2014-2015	40	23	57.5	40	11	27.5

Table 11

Cohort Comparison of On-Time Promotion Rates

		Retained Year 1			Retained Year 2	
Cohort	Total Students	#	%	Total Students	#	%
2016-2017	39	8	20.0	34	7	20.6
2015-2016	40	6	15.0	35	1	0.3
2014-2015	40	14	35.0	40	5	12.5

school if they had successfully earned twelve credits towards graduation. This promotion from tenth to eleventh grade also occurred at the end of the school year in June if they were successful. For this study, individual student promotion was identified at the end of each year for their first and second year in school.

Based on the data collected, 20% of the thirty-nine students in the 2016-2017 were retained at the end of their first year in high school (see Figure 14). Twenty percent of the thirty-four students in year two of the cohort were retained, with only one student retained during both years. Thirty-eight percent of the cohort was retained at least once during their first two years of high school.

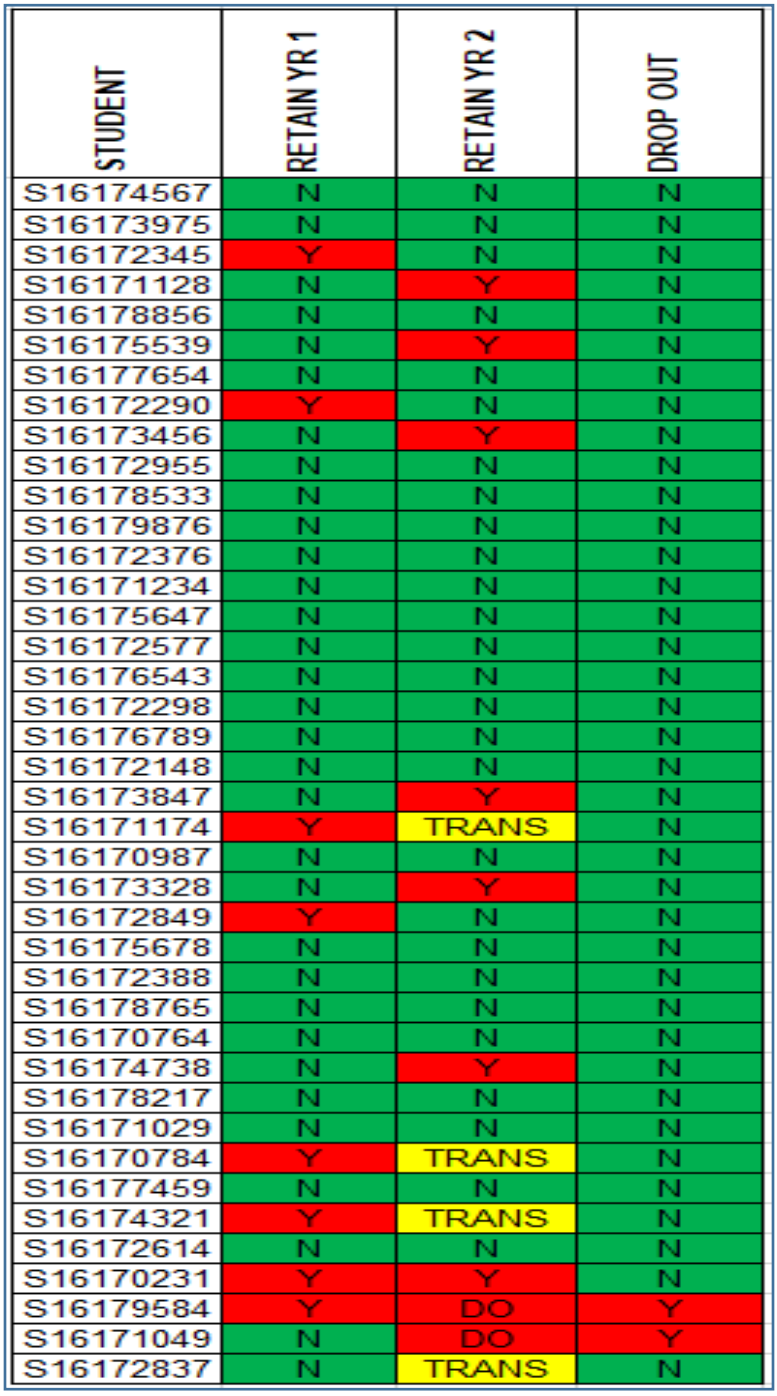
Thirty-five percent of the forty students in the 2014-2015 cohort had been retained at the end of their first year in high school, with five students retained during both years. The remaining students met necessary promotion requirements during year two (see Figure 15).

Fifteen percent of the forty students in the 2015-2016 cohort were retained at the end of their first year in high school with only 3% of the thirty-five students in the cohort retained in year two (see Figure 16). Twenty percent of the cohort was retained at least once during their first two years of high school. The retention rate for this cohort was lower than the 2016-2017 or 2014-2015 cohorts.

Research Question #4 Findings

Did individual student drop-out rate improve for at-risk students in the year-long, looped course sequence compared to students in the traditional, block schedule course sequence?

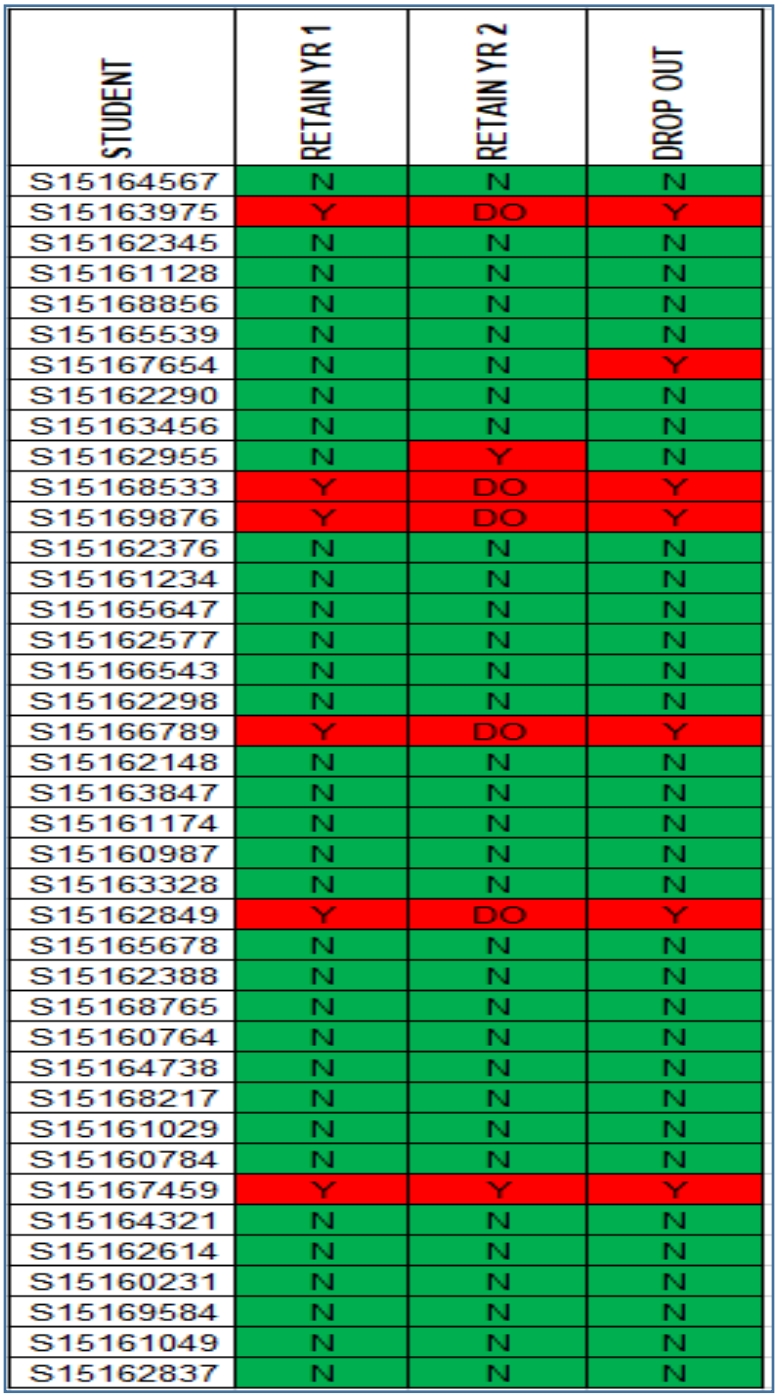
Based on the data collected, the most significant variance between the cohorts related to individual student drop-out rate for at-risk students in the year-long, looped course sequence as compared to students in the traditional, block schedule course sequence. For the purpose of this



STUDENT	RETAIN YR 1	RETAIN YR 2	DROP OUT
S16174567	N	N	N
S16173975	N	N	N
S16172345	Y	N	N
S16171128	N	Y	N
S16178856	N	N	N
S16175539	N	Y	N
S16177654	N	N	N
S16172290	Y	N	N
S16173456	N	Y	N
S16172955	N	N	N
S16178533	N	N	N
S16179876	N	N	N
S16172376	N	N	N
S16171234	N	N	N
S16175647	N	N	N
S16172577	N	N	N
S16176543	N	N	N
S16172298	N	N	N
S16176789	N	N	N
S16172148	N	N	N
S16173847	N	Y	N
S16171174	Y	TRANS	N
S16170987	N	N	N
S16173328	N	Y	N
S16172849	Y	N	N
S16175678	N	N	N
S16172388	N	N	N
S16178765	N	N	N
S16170764	N	N	N
S16174738	N	Y	N
S16178217	N	N	N
S16171029	N	N	N
S16170784	Y	TRANS	N
S16177459	N	N	N
S16174321	Y	TRANS	N
S16172614	N	N	N
S16170231	Y	Y	N
S16179584	Y	DO	Y
S16171049	N	DO	Y
S16172837	N	TRANS	N

Note. All data based on continual student enrollment entering the third year of high school.

Figure 14. 2016-2017 Cohort Data – Retention/Drop Out Information.



STUDENT	RETAIN YR 1	RETAIN YR 2	DROP OUT
S15164567	N	N	N
S15163975	Y	DO	Y
S15162345	N	N	N
S15161128	N	N	N
S15168856	N	N	N
S15165539	N	N	N
S15167654	N	N	Y
S15162290	N	N	N
S15163456	N	N	N
S15162955	N	Y	N
S15168533	Y	DO	Y
S15169876	Y	DO	Y
S15162376	N	N	N
S15161234	N	N	N
S15165647	N	N	N
S15162577	N	N	N
S15166543	N	N	N
S15162298	N	N	N
S15166789	Y	DO	Y
S15162148	N	N	N
S15163847	N	N	N
S15161174	N	N	N
S15160987	N	N	N
S15163328	N	N	N
S15162849	Y	DO	Y
S15165678	N	N	N
S15162388	N	N	N
S15168765	N	N	N
S15160764	N	N	N
S15164738	N	N	N
S15168217	N	N	N
S15161029	N	N	N
S15160784	N	N	N
S15167459	Y	Y	Y
S15164321	N	N	N
S15162614	N	N	N
S15160231	N	N	N
S15169584	N	N	N
S15161049	N	N	N
S15162837	N	N	N

Note. All data based on continual student enrollment entering the third year of high school.

Figure 15. 2015-2016 Cohort Data – Retention/Drop Out Information.

STUDENT	RETAIN YR 1	RETAIN YR 2	DROP OUT
S14154567	N	N	N
S14153975	N	N	N
S14152345	N	N	N
S14151128	N	N	N
S14158856	N	N	N
S14155539	Y	N	N
S14157654	N	N	N
S14152290	N	N	N
S14153456	Y	N	Y
S14152955	Y	N	N
S14158533	N	N	NA
S14159876	Y	N	N
S14152376	N	N	N
S14151234	N	N	N
S14155647	N	N	N
S14152577	N	N	N
S14156543	N	N	N
S14152298	Y	Y	Y
S14156789	Y	Y	Y
S14152148	N	N	N
S14153847	N	N	N
S14151174	Y	N	N
S14150987	Y	N	N
S14153328	N	N	N
S14152849	N	N	N
S14155678	Y	Y	Y
S14152388	Y	N	N
S14158765	N	N	N
S14150764	N	N	N
S14154738	N	N	N
S14158217	Y	N	N
S14151029	N	N	N
S14150784	N	N	N
S14157459	N	N	N
S14154321	Y	Y	Y
S14152614	N	N	N
S14150231	Y	N	N
S14159584	N	N	N
S14151049	Y	Y	Y
S14152837	N	N	Y

Note. All data based on continual student enrollment entering the third year of high school.

Figure 16. 2014-2015 Cohort Data – Retention/Drop Out Information.

study, individual student graduation status was identified for all students in each cohort. Drop-out status was determined based on a student's successful completion of high school course requirements and receiving a high school diploma. Students that transferred out of the school were included in the cohort data using a state-wide student identification number search. Only one student in the 2014-2015 cohort could not be located.

Five percent of the forty students in the 2016-2017 cohort (see Figure 14) were listed as drop-outs. Seventeen and nine-tenths percent of students in the 2015-2016 cohort (see Figure 15) were listed as drop-outs. Seventeen and nine-tenths percent of students in the 2014-2015 cohort (see Figure 16) were also listed as dropouts.

The data also showed a potential connection within the 2015-2016 cohort when comparing retention rates and drop-out rates. Fifteen percent of the forty students in the cohort were retained at the end of their first year in high school. Of this 15% retention rate, five students dropped out during their second year in high school. Only one student dropped out that was not retained in either year one, or year two of high school (see Table 12).

Additional Findings

After reviewing all data collected from the study, there were additional findings. The additional findings focused on the connection highlighted in the study between successful mathematics course completion and dropout rates in the 2014-2015 and 2015-2016 cohorts as compared to the 2016-2017 cohort. Dropout rates for the 2016-2017 cohort were noticeably fewer than the previous two cohorts, based on similar course completion rates, retention rates and time-frame of dropout identification. This finding was first noticed when cross-comparing the academic performance rates for each subject area in the study, and the overall dropout rates for each cohort. The same correlation was not noticed in the English subject area. The potential

Table 12

Cohort Comparison of Retention and Drop-Out Rates

		Retained Once	Retained Twice	Total Dropout	
Cohort	Total Students	#	#	#	%
2016-2017	40	1	0	2	5.0
2015-2016	40	0	6	7	17.9
2014-2015	40	6	5	7	17.9

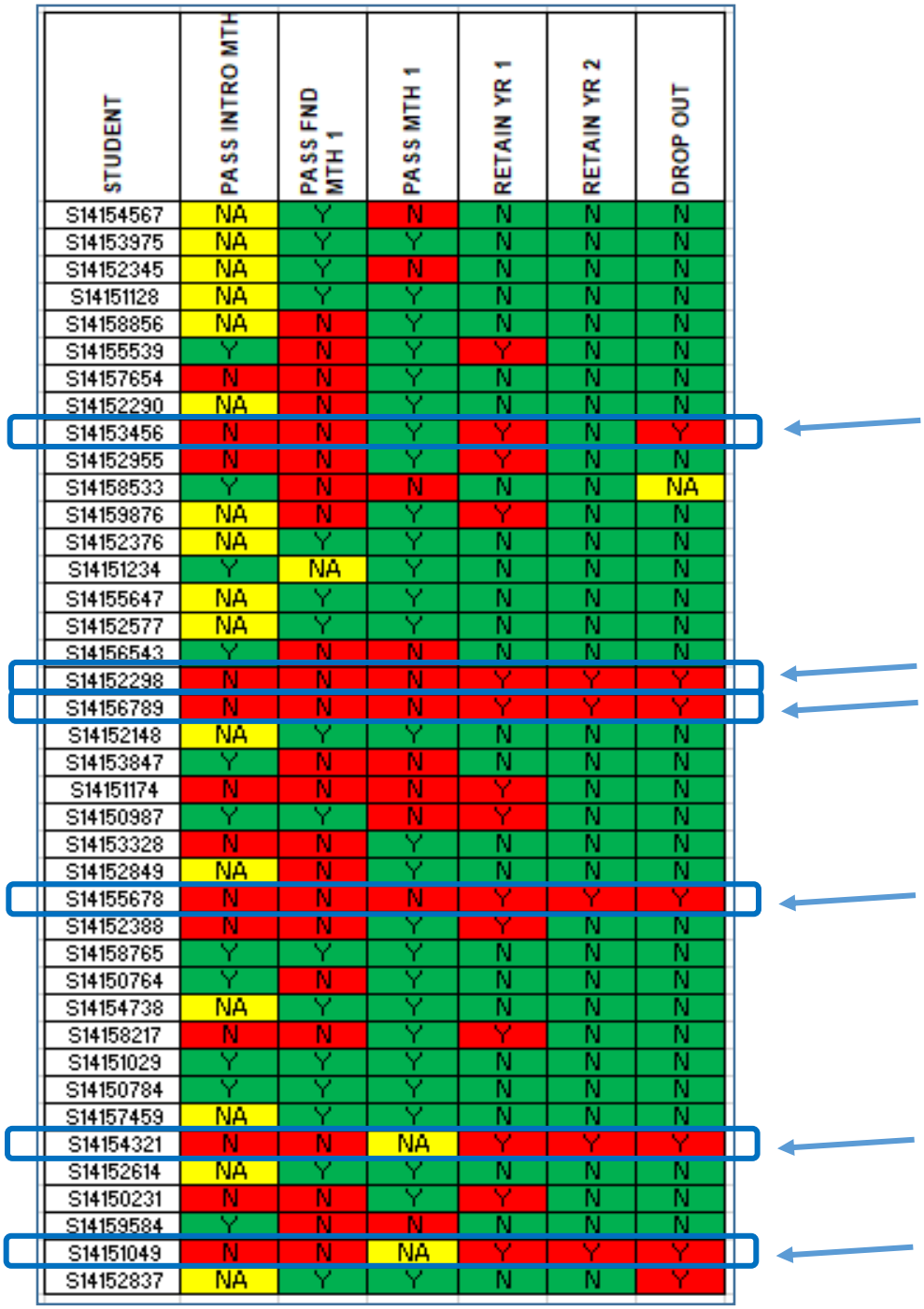
correlation was made by reviewing the comparative data between the mathematics course success rate, student retention rate, and drop out frequency.

Mathematics and Dropout Rate

The 2014-2015 cohort was the only group where an introductory mathematics course was taken before the students were scheduled into Foundations of Math 1 and Math 1, giving them three preparatory courses in the mathematics sequence. During the 2014-2015 cohort analysis, it was noted that twenty-five students failed at least one of the first three courses in their high school mathematics sequence on their first attempt. Sixteen students failed two of the first three courses in their high school mathematics sequence on their first attempt. Four students in the cohort failed all three of their introductory mathematics courses on their first attempt. Two students did not take Math 1 due to dropping out before the Math 1 course had been completed.

During the analysis of the cohort data the researcher noted that of the seven students that dropped out of school from the 2014-2015 cohort, six of them failed at least two of their three introductory mathematics classes (see Figure 17). Five of those students failed all three of their introductory mathematics classes on the first attempt. Students in the 2014-2015 cohort who failed at least two of their mathematics courses had a 35% likelihood of dropping out of school.

The 2015-2016 cohort followed a traditional, block-schedule, course sequence with students taking Foundations of Math 1 and Math 1. This cohort did not utilize the introductory mathematics course found in the 2014-2015 cohort. The data analysis noted a lower course failure rate, with thirteen students failing either Foundations of Math 1 or Math 1 on their first attempt. Only seven students failed both of the introductory courses in their high school mathematics sequence. In this cohort, no students dropped out before the Math 1 course had been completed; however a similar correlation to the 2014-2015 cohort was made by reviewing the



STUDENT	PASS INTRO MTH	PASS FND MTH 1	PASS MTH 1	RETAIN YR 1	RETAIN YR 2	DROP OUT
S14154567	NA	Y	N	N	N	N
S14153975	NA	Y	Y	N	N	N
S14152345	NA	Y	N	N	N	N
S14151128	NA	Y	Y	N	N	N
S14158856	NA	N	Y	N	N	N
S14155539	Y	N	Y	Y	N	N
S14157654	N	N	Y	N	N	N
S14152290	NA	N	Y	N	N	N
S14153456	N	N	Y	Y	N	Y
S14152955	N	N	Y	Y	N	N
S14158533	Y	N	N	N	N	NA
S14159876	NA	N	Y	Y	N	N
S14152376	NA	Y	Y	N	N	N
S14151234	Y	NA	Y	N	N	N
S14155647	NA	Y	Y	N	N	N
S14152577	NA	Y	Y	N	N	N
S14156543	Y	N	N	N	N	N
S14152298	N	N	N	Y	Y	Y
S14156789	N	N	N	Y	Y	Y
S14152148	NA	Y	Y	N	N	N
S14153847	Y	N	N	N	N	N
S14151174	N	N	N	Y	N	N
S14150987	Y	Y	N	Y	N	N
S14153328	N	N	Y	N	N	N
S14152849	NA	N	Y	N	N	N
S14155678	N	N	N	Y	Y	Y
S14152388	N	N	Y	Y	N	N
S14158765	Y	Y	Y	N	N	N
S14150764	Y	N	Y	N	N	N
S14154738	NA	Y	Y	N	N	N
S14158217	N	N	Y	Y	N	N
S14151029	Y	Y	Y	N	N	N
S14150784	Y	Y	Y	N	N	N
S14157459	NA	Y	Y	N	N	N
S14154321	N	N	NA	Y	Y	Y
S14152614	NA	Y	Y	N	N	N
S14150231	N	N	Y	Y	N	N
S14159584	Y	N	N	N	N	N
S14151049	N	N	NA	Y	Y	Y
S14152837	NA	Y	Y	N	N	Y

Note. Arrows show individual students where a potential connection exists between mathematics course failure and dropout.

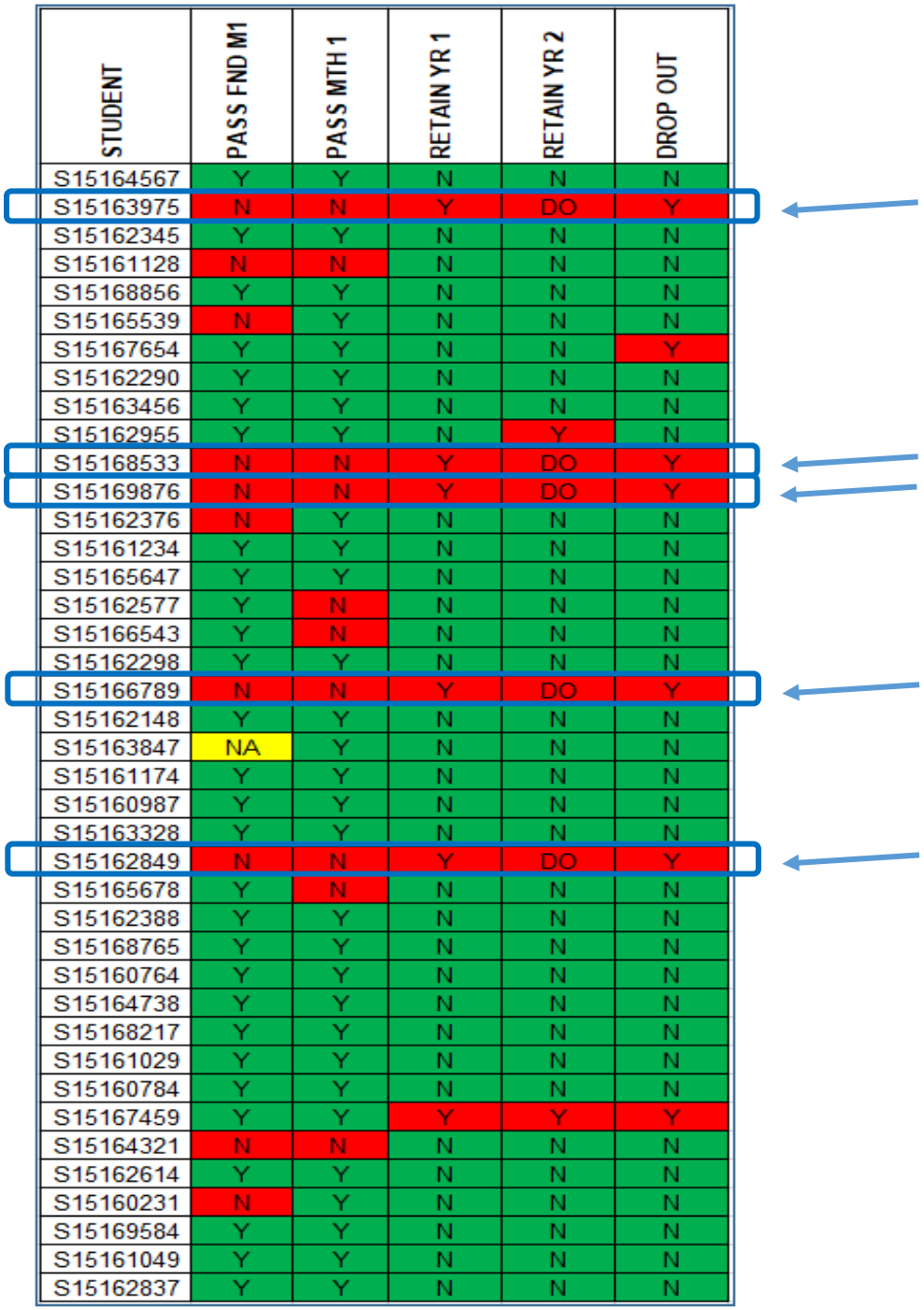
Figure 17. 2014-2015 Cohort Data – Math Course Sequence Success and Dropout Rate.

comparative data between the mathematics course success rate, student retention rate, and drop out frequency. Five of the seven students who dropped out of school from the 2015-2016 cohort failed both of their introductory mathematics classes on their first attempt. Students in the 2015-2016 cohort who failed at least one of their mathematics courses on their first attempt had a 38% likely hood of dropping out of school (see Figure 18).

Based on the data collected, the most significant variance related to the potential connection between mathematics course completion and individual student drop-out rate occurred within the 2016-2017 cohort. This cohort followed the year-long, looped scheduling sequence and did not follow the traditional block schedule. Twenty-two students in this cohort failed either Foundations of Math 1 or Math 1 on their first attempt. Nine students failed both of the introductory courses in their high school mathematics sequence. Although this course failure data was not significantly different as compared to the previous cohorts, it was noted that only one student listed as a dropout in this cohort failed both of their introductory mathematics classes on their first attempt (see Figure 19). This data provided direction to the second additional finding from the study and connected to retention rates for each cohort.

Retention and Dropout Rate

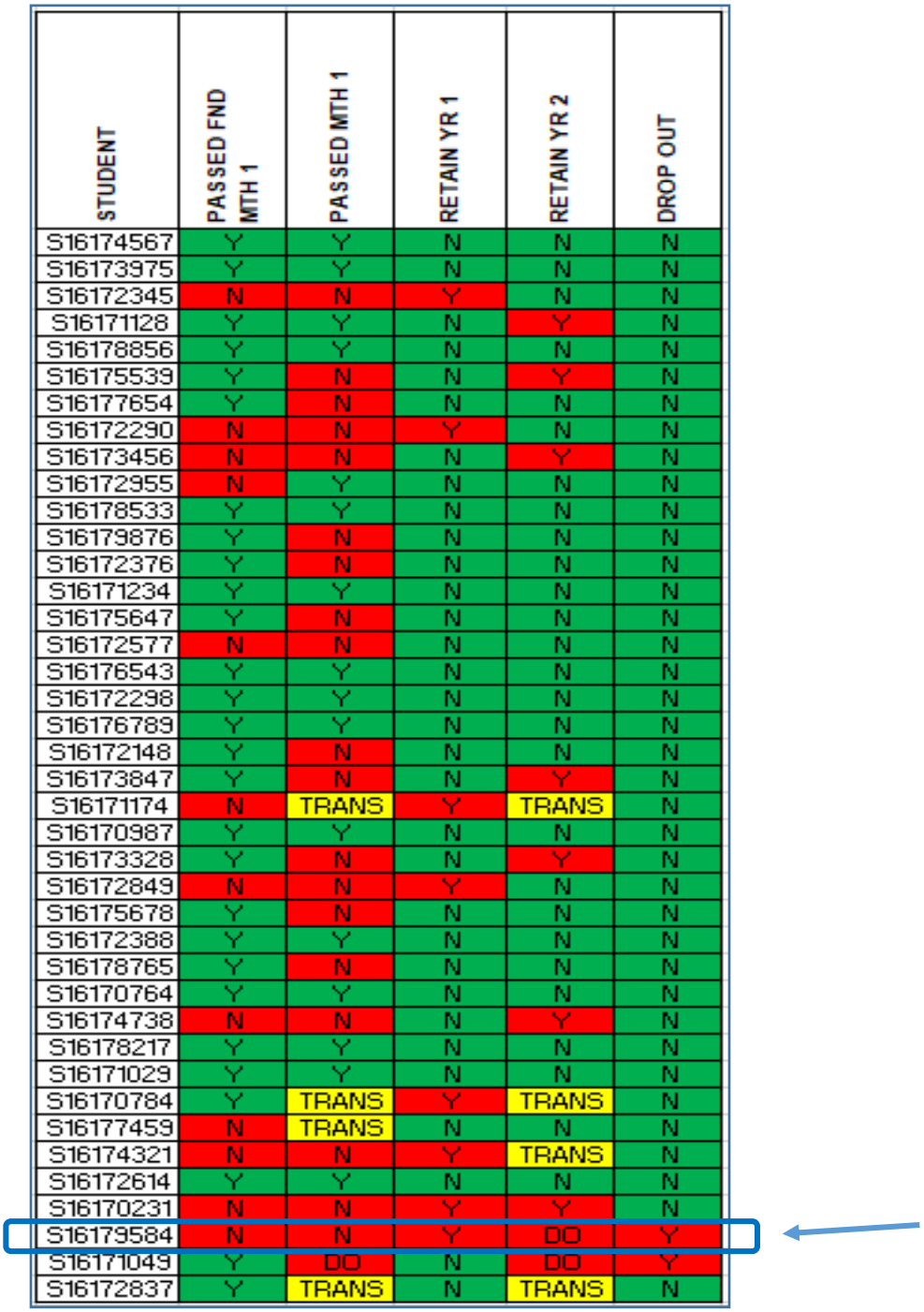
During the study it was noted that a strong connection could be made between retention rates and dropout rates for students in the 2014-2015 and 2015-2016 cohorts. This research was not included in the original study due to the extensive literature related to the connection between student retention and dropout rates. Each of the earlier cohorts follow a relatively consistent progression related to student retention and dropout rates, with the majority of students listed as dropouts also being retained in at least one of their first two years of high school. However, it was noted during the study that the 2016-2017 cohort did not share the same



STUDENT	PASS FND M1	PASS MTH 1	RETAIN YR 1	RETAIN YR 2	DROP OUT
S15164567	Y	Y	N	N	N
S15163975	N	N	Y	DO	Y
S15162345	Y	Y	N	N	N
S15161128	N	N	N	N	N
S15168856	Y	Y	N	N	N
S15165539	N	Y	N	N	N
S15167654	Y	Y	N	N	Y
S15162290	Y	Y	N	N	N
S15163456	Y	Y	N	N	N
S15162955	Y	Y	N	Y	N
S15168533	N	N	Y	DO	Y
S15169876	N	N	Y	DO	Y
S15162376	N	Y	N	N	N
S15161234	Y	Y	N	N	N
S15165647	Y	Y	N	N	N
S15162577	Y	N	N	N	N
S15166543	Y	N	N	N	N
S15162298	Y	Y	N	N	N
S15166789	N	N	Y	DO	Y
S15162148	Y	Y	N	N	N
S15163847	NA	Y	N	N	N
S15161174	Y	Y	N	N	N
S15160987	Y	Y	N	N	N
S15163328	Y	Y	N	N	N
S15162849	N	N	Y	DO	Y
S15165678	Y	N	N	N	N
S15162388	Y	Y	N	N	N
S15168765	Y	Y	N	N	N
S15160764	Y	Y	N	N	N
S15164738	Y	Y	N	N	N
S15168217	Y	Y	N	N	N
S15161029	Y	Y	N	N	N
S15160784	Y	Y	N	N	N
S15167459	Y	Y	Y	Y	Y
S15164321	N	N	N	N	N
S15162614	Y	Y	N	N	N
S15160231	N	Y	N	N	N
S15169584	Y	Y	N	N	N
S15161049	Y	Y	N	N	N
S15162837	Y	Y	N	N	N

Note. Arrows show individual students where a potential connection exists between mathematics course failure and dropout. Students in the 2015-2016 cohort were in their fourth year of high school at the time of the study.

Figure 18. 2015-2016 Cohort Data – Math Course Sequence Success and Dropout Rate.



STUDENT	PASSED FND MTH 1	PASSED MTH 1	RETAIN YR 1	RETAIN YR 2	DROP OUT
S16174567	Y	Y	N	N	N
S16173975	Y	Y	N	N	N
S16172345	N	N	Y	N	N
S16171128	Y	Y	N	Y	N
S16178856	Y	Y	N	N	N
S16175539	Y	N	N	Y	N
S16177654	Y	N	N	N	N
S16172290	N	N	Y	N	N
S16173456	N	N	N	Y	N
S16172955	N	Y	N	N	N
S16178533	Y	Y	N	N	N
S16179876	Y	N	N	N	N
S16172376	Y	N	N	N	N
S16171234	Y	Y	N	N	N
S16175647	Y	N	N	N	N
S16172577	N	N	N	N	N
S16176543	Y	Y	N	N	N
S16172298	Y	Y	N	N	N
S16176789	Y	Y	N	N	N
S16172148	Y	N	N	N	N
S16173847	Y	N	N	Y	N
S16171174	N	TRANS	Y	TRANS	N
S16170987	Y	Y	N	N	N
S16173328	Y	N	N	Y	N
S16172849	N	N	Y	N	N
S16175678	Y	N	N	N	N
S16172388	Y	Y	N	N	N
S16178765	Y	N	N	N	N
S16170764	Y	Y	N	N	N
S16174738	N	N	N	Y	N
S16178217	Y	Y	N	N	N
S16171029	Y	Y	N	N	N
S16170784	Y	TRANS	Y	TRANS	N
S16177459	N	TRANS	N	N	N
S16174321	N	N	Y	TRANS	N
S16172614	Y	Y	N	N	N
S16170231	N	N	Y	Y	N
S16179584	N	N	Y	DO	Y
S16171049	Y	DO	N	DO	Y
S16172837	Y	TRANS	N	TRANS	N

Note. Arrows show individual students where a potential connection exists between mathematics course failure and dropout. Students in the 2016-2017 cohort were in their third year of high school at the time of the study.

Figure 19. 2016-2017 Cohort Data – Math Course Sequence Success and Dropout Rate.

consistency related to retention and dropout rates as the previous two cohorts. Eight of the forty students in the 2016-2017 cohort (see Figure 19) were retained at the end of their first year of high school. Seven were retained at the end of their second year of high school, with only one student being retained for both years. Of the two students who dropped out of school from the 2016-2017 cohort, only one was retained in either their first or second year of school.

Although this additional finding is not definitive, it does provide a potential connection to the second area of research within the study as it compares year-long, looped scheduling sequence versus block scheduling and the improvement of on-track performance for students.

Summary

The quantitative data collected provided mixed results as related to the study questions. Although some positive indicators were noted related to the utilization of year-long, looped scheduling sequence to improve on-track performance for identified at-risk students as compared to their traditional, block scheduled peers, there were no significant gains related to academic performance in mathematics or English. Chapter five will provide conclusions based on the results as it relates to the literature and the original hypothesis. Additional recommendations for future research regarding year-long, looped course models, and on-track performance will be included.

CHAPTER 5: CONCLUSIONS AND RECOMMENDATIONS

Overview

Although districts and schools have searched for ways to increase student achievement by adjusting curriculum pacing and course alignment, they have continually been met with limitations due to time and resources. Many schools have manipulated their schedules in a variety of ways to increase student achievement and school administrators have used a combination of schedules to shift the school day to help increase test scores for accountability measures. This restructuring is particularly true at the high school level where the 4x4 block schedule and the traditional day are primarily utilized.

Schools have implemented block-scheduling models to provide extended instructional time and increase the efficiency of the school day (Nichols, 2005; Zepeda & Mayers, 2006). Proponents contend that block-scheduling models increase student achievement (Mattox et al., 2005), but other research regarding reorganization of the school day contradicts these claims (Zepeda & Mayers, 2006). To date, few studies have examined whether block scheduling has an effect on at-risk student achievement (Marchant & Paulson, 2001). The results of this study may be useful for educational leaders attempting to determine whether a modified yearlong course with looping may be an appropriate scheduling model for their schools to positively impact at-risk student performance and improve on-track performance such as dropout and retention rates.

This model utilized early identification of at-risk students in math and English courses to implement year-long ninth grade support courses for Foundations of Math 1 and English 1 on a modified block schedule, with an additional looping course of Math 1 and English 2 during the tenth grade year (see Figure 2). By making this course sequence change, it was hypothesized by the researcher that it would be possible to see statistically significant gains in End-of-Course

assessment performance and on-track performance such as grade level promotion, on-time course progression and reduced drop-out rates.

Investigation of this type of scheduling model will also assist educational leaders in making informed decisions before initiating specific scheduling adjustments toward or away from a block scheduling model to a modified course structure. This study contributes to the existing body of literature since little research has been conducted on the efficacy of block scheduling (Zepeda & Mayers, 2006), particularly regarding at-risk student achievement (Marchant & Paulson, 2001). Students at-risk of academic failure will benefit when educational leaders possess appropriate information to select a scheduling model that fosters academic success and reduces dropout rates.

As an organizational design, looping has received more attention in the educational community, but little research is available to support its efficacy. There have been few formal studies conducted to compare the academic achievement of students participating in a looping design program with that of their counterparts in traditional one-year classrooms. It was the researcher's goal to utilize this study to provide quantitative information that could be used by the educational community to evaluate and compare the effectiveness of the two program designs. District staff and building level administrators could benefit from the comparisons made in this study to make better decisions regarding the delivery of instruction in school settings.

Introduction

The purpose of this descriptive and evaluative study was to determine the degree to which year-long, looped scheduling improved student academic performance in mathematics and English courses while improving on-track performance for identified at-risk students as compared to their 4x4 block scheduled peers. The primary purpose of the study was to compare

students scheduled using a traditional course structure and those scheduled in a year-long course structure with enhanced looping the following year. Data sources included the student achievement records of forty at-risk ninth grade students on a 4x4 block schedule during two cohort years from the 2014-2015 and 2015-2016 cohorts. Data sources also included the student achievement records of forty at-risk ninth grade students grouped into the year-long, looped mathematics and English courses for the 2016-2017 school year. All students involved were in their first-year of high school and had recently transitioned from one of the feeder middle schools. No students who had previously taken the courses were included into the pilot program.

Problem of Practice Purpose

This study was framed with the hypothesis: implementing year-long, looped courses for Math 1 and English courses would improve academic performance and on-track outcomes for at-risk students. The main objective of the study was to discover if the modified scheduling block with looping had any measureable impact on at-risk student performance on the End-of-Course assessment for Math 1 and/or English 2. A secondary purpose of the study was to use the student performance data from the cohorts to determine if the impact of year-long, looped course sequence model had an impact on on-track performance such as student retention and dropout rates.

The first area of research looked at the impact of looping for increased academic performance. Although there was some research that concludes the results of this type of academic schedule have been positive in relationship to improved student achievement in grades K-8, the current research did not provide substantial data for secondary instruction. This study was framed around this potential positive outcome.

The second area of research compared the year-long scheduling versus block scheduling as it related to on-track student performance improvement. This topic had considerable research at the secondary level, but only as an independent area of focus. This study added to the existing body of research by connecting the two independent innovations for a consolidated modified scheduling option at the secondary level.

Limitations of the Study

As with any research study, there are limitations that should be noted regarding practice and research. There was a clear limitation in the study because there were only two principals and four teachers. Given this limitation, implementing this study with more teachers within the schools would have strengthened the study.

Additional limitations to the study exist. First, the study is a retrospective study limited by the examination of the previously established scheduling implemented to improve mathematics proficiency in at-risk students. The scheduling type for each cohort was preexisting and could not be manipulated. Since the structure of the course sequencing was already established, the sample data to determine the degree to which this impacts academic achievement and on-track performance cannot be adjusted mid-course and any additional supports could not be created.

Second, the scope of the study included one high school in north-central North Carolina. The school was identified because the researcher was involved in the scheduling process at the pilot school and was aware of the previous academic difficulties within the Math 1 course structure and the functionality of scheduling adjustments made. The study consisted of examination of school-based data, cohort predicted EVAAS data, student grades, cohort retention data, and cohort dropout data to determine the at-risk students. While the results of the

study may prove to be beneficial, the school may not be representative of other school populations and more extensive analysis on a larger scale would be necessary to determine the value of the yearlong, looped scheduling sequence. Additionally, for the purposes of the study, students with an Individualized Education Plan (IEP) were not identified. Although some students in the study do have an IEP, all data analyzed focused solely on individual student academic performance regardless of a student's identified learning disabilities or classroom accommodations.

A third limitation of the study was the inability to expand this study beyond the initial cohort of students selected for the year-long, looped course sequence in math and English classes. Two additional cohorts selected using the same criteria as the pilot study are currently in progress using the same course sequence. The second cohort began during the 2017-2018 school year and the third cohort began during the 2018-2019 school year. The data from the second and third cohorts will not be available until after the initial research phase has concluded. Preliminary data may be accessible at a later date to make longitudinal comparisons and to establish the need for additional research on expanded groups by implementing the process throughout the district.

Conclusions and Lessons Learned

The study was anchored by four research questions to determine the degree to which year-long, looped scheduling sequence improves student academic performance in mathematics and English courses while improving on-track performance for identified at-risk students as compared to their 4x4 block scheduled peers. Utilizing quantitative data gathered from the three cohorts, each question was reviewed and data were analyzed to determine the findings for each question. Conclusion statements have been provided for each of the research questions related to the study, and are supported by the data collected.

Conclusion Statement - Research Question #1

The research question posed the following: *Did individual student performance on End-of-Course assessments improve for students in the year-long, looped course sequence as compared to students in previous cohorts using the traditional course sequence?*

Based on the research, there is not enough data to support the use of a year-long, looped course sequence to provide any substantial improvement on End-of-Course assessments for at-risk students. Slight decreases related to Math 1 assessment proficiency were actually noted in the pilot cohort compared to students from the previous traditional course sequence cohorts. There were marginal increases related to On-Grade-Level Proficiency in the pilot cohort; however, the increases were not substantial enough to assert the increase was based on the modified scheduling. The primary data point noticed while researching this portion of the study was the lack of students in the 2016-2017 cohort that experienced an achievement level decrease. It is important to note that this decrease is not necessarily a positive factor for year-long course scheduling due to the fact that most students in the cohort began at a Level 1 based on NCDPI On-Grade-Level proficiency and a decrease could not occur.

During the study, there was no overall achievement level improvement in the English 2 course assessment, with the percentage of students to meet North Carolina On-Grade-Level remaining the same across all cohorts. Similar to the Math 1 comparison, the majority of students in each cohort saw no change in their overall End-of-Course achievement level from the previous year. As with the mathematics course progression, there were no students in the 2016-2017 cohort that experienced an achievement level decrease, the low baseline level of the cohort was the major contributing factor.

Based on the data collected, the study does not provide any direct improvement relationship between the year-long, looped schedule cohort and an increase in student achievement results on Math 1 or English 2 End-of-Course assessment.

Conclusion Statement - Research Question #2

The research question posed the following: *Did individual student course completion rates in mathematics and English course sequences improve for at-risk students in the year-long, looped course sequence compared to students in the traditional, block schedule course sequence?*

Based on the research, there are enough data to support the use of a year-long, looped course sequence to improve completion rates in some mathematics courses for at-risk students. Although there was some inconsistency of failure rates at each course level for each cohort, the data analyzed saw a nearly 20% increase in completion rates for introductory mathematics course with the year-long, looped cohort. The reduced failure rate of this course could be attributed to the fact that students were scheduled to take Foundations of Mathematics 1 throughout the entire school year during a fifty-minute class period. Using this format, students were able to benefit from a nine-thousand-hour course throughout the year, as compared to the eight-thousand-hour course on the traditional block semester. This increase was substantial when compared to the overall academic achievement of each cohort and could provide a potential area for future research. The reduced course failures impact other academic areas and improve additional on-track performance for students.

Based on the research, there is not enough data to support this continued positive impact once the year-long course sequence has ended. Students who were looped into the fall Math 1

course did not have a reduced failure rate as compared to their traditional cohort peers. Conversely, this cohort had the highest Math 1 failure rate of the cohorts analyzed.

An additional area noted during the study was the 2014-2015 cohort's use of an Introductory Mathematics course before Foundations of Mathematics 1. This course was used as a "buffer" course for students considered at-risk in the cohort, but maintained a 50% failure rate. Additionally, all thirteen students in the study that failed the Introduction to Mathematics course also failed Foundations of Math 1 on their first attempt. The use of this additional remedial course did not have any positive impact on the cohort and potentially resulted in the inverse overall effect as it negatively impacted the overall mathematics schedule with no perceived positive impact.

Individual student completion rates in the introductory English course sequences saw the greatest level of consistency between the cohorts based on the data collected, with no discernable difference between the year-long, looped cohort and those on the traditional block schedule.

Based on the data collected, the study does provide a potential correlation between the year-long, looped cohort course completion rates in mathematics or at-risk students compared to students in the traditional, block schedule course sequence.

Conclusion Statement - Research Question #3

The research question posed the following: *Did individual student, on-time, promotion rates improve for at-risk students in the year-long, looped course sequence compared to students in the traditional, block schedule course sequence?*

Based on this study, there is not enough data to support the use of a year-long, looped course sequence to improve on-time promotion rates for at-risk students. No impact was noted between cohorts as it related to the first-time retention during year one of high school, however,

the pilot cohort had a limited number of students retained in both year-one and year-two of the study. Although impactful, the data from this study could not substantially prove any increase in performance was based on the modified scheduling.

Conclusion Statement - Research Question #4

The research question posed the following: *Did individual student drop-out rate improve for at-risk students in the year-long, looped course sequence compared to students in the traditional, block schedule course sequence?*

Based on the research, there are enough data indicators to support the use of a year-long, looped course sequence to improve drop-out rates for at-risk students. Although there are admittedly additional factors that influence a student who drops out of school, a strong relationship was noticed in the data when comparing the three cohorts of the study. There was a small number of students in the 2016-2017 cohort were listed as drop-outs as compared to their traditional, block scheduled peers. The data also showed a connection within several cohorts when comparing grade-level retention rates and drop-out rates, adding to the already existing body of research on the topic.

Study Results in Relation to the Literature

The literature presented within Chapter 2 provided the theoretical framework and supporting research to address the potential benefits of year-long and looped coursework for students. Throughout the literature, the perspectives of other researchers and studies related to alternative scheduling to provide increased student achievement and on-track student performance were found. The research related to schedule designs, at-risk student scheduling, and long-term success models outlines the potential connection created from the alternative yearlong looping model provided by the problem of practice. Although the additional

connections made within this section are not meant to be a conclusive statement, it is important to note that it does provide a relationship between the data collected during the study and the continual development of a more inclusive model for student success.

Looping and Academic Achievement Connection

Although the use of the year-long, looped course model did not provide the anticipated gains related to student achievement on End-of-Course assessments, there were no negative consequences noticed when utilizing the schedule. The additional contact hours, instructional consistency and focused content support did prove beneficial for students identified as at-risk. This finding provided a direct connection to previously reviewed research discussed within Chapter 2. Specifically, the connection between a consistent instructional design for at-risk students can be beneficial for overall student growth and performance. This benefit is primarily due to the teacher and student's relationship with their teacher. Throughout this type of scheduling model, the teacher becomes increasingly familiar with individual student learning needs, and can differentiate activities and assignments to meet varying needs (Bellis, 1999; Hitz et al., 2007).

Retention and Dropout Literature Connection

The researcher distinguished a strong connection between retention rates and dropout rates for students in the 2014-2015 and 2015-2016 cohorts, which is reinforced by the literature also presented in Chapter 2. This relationship was not seen in the 2016-2017 cohort. This research was not included in the original study due to the extensive literature related to the connection between student retention and dropout rates. Each of the earlier cohorts follow a relatively consistent progression related to student retention and dropout rates, with the majority of students listed as dropouts also being retained in at least one of their first two years of high

school. However, it was noted during the study that the 2016-2017 cohort did not share the same consistency related to retention and dropout rates as the previous two cohorts.

Although the findings within this study are not definitive, it does provide a potential connection to the second area of research within the study as it compares year-long, looped scheduling versus block scheduling and the improvement of on-track performance for students. This finding is specifically connected to the reduced retention rates of students in their first and second year of school. As was mentioned in Chapter 2, Reinhard (1997) noted, "Ninth grade is a fragile and confusing time for young people. They come from smaller and more structured middle schools and are thrust into large high schools with a lot of freedom" (Reinhard, 1997, p. 14). Many high schools focus on the dropout rate in upper level classes. However, "Most future dropouts can be identified at the start of high schools, and 80% can be identified by the end of ninth grade" (Gorski, 2008).

Mathematics Success and Literature Connection

After reviewing all data collected from the study, there were additional findings. The additional findings focused on the relationship between successful mathematics course completion and dropout rates in the 2014-2015 and 2015-2016 cohorts as compared to the 2016-2017 cohort. Dropout rates for the 2016-2017 cohort were noticeably fewer than the previous two cohorts, based on similar course completion rates, retention rates and time-frame of dropout identification. This finding was first noticed when cross-comparing the academic performance rates for each subject area in the study, and the overall dropout rates for each cohort. The same relationship was not noticed in the English subject area. The finding was made by reviewing the comparative data between the mathematics course success rate, student retention rate, and drop out frequency.

Previous literature reviewed in Chapter 2 echoed the findings of the study and provides additional support for the need to focus on mathematics courses as indicators of a student's overall high school success. Rettig and Canady (1998) state that successfully completing the first mathematics course (Algebra 1/Math1) is identified as a key factor for future academic accomplishment. If a student does not have a good grasp of a concept learned one day, it is difficult to master the next concept. Students who are in the 4x4 block schedule, must learn multiple concepts each day. Most students are not successful at this pace and need time to absorb material and practice concepts before they can move to additional objectives. The block schedule does not allow time for this process due to the limited eighteen-week timeframe as compared to the thirty-six weeks on a traditional schedule, supporting the need for alternative scheduling options.

Implications for Schools and Recommendations

It is the intention of this researcher to provide the results of the study to assist other practitioners in the development and implementation of modified scheduling with looping for at-risk students. The comprehensive data from the study will assist the district in improving the use of alternative scheduling solutions to improve at-risk student academic performance indicators and on-track progress for the needs of Franklin County Schools and other practitioners.

This study provided additional support to the existing body of research suggesting that modified scheduling can have a positive impact on academic achievement and student success (George & Shewey, 1997; Hampton et al., 1997; Lincoln, 1997; Simel, 1998). The following recommendations are offered to provide superintendent, district leaders, principals, school leaders and teachers additional insight into the potential benefits of participating in innovative scheduling models.

Recommendations for Superintendents and District Leaders

The Rand study led by Berman (1977) suggested educational innovations are more difficult to implement at the secondary level, than at the elementary level. In the study it was noted that secondary teachers are often characterized as subject-oriented experts in contrast to a child-centered focused attributed to elementary teachers (Berman, 1977). The study also discussed the difficulty associated with implementing reforms that may be viewed as radical or undesirable departures from school norms. This challenge has often been the categorization which has been associated with looping by some teachers and principals. With these two obstacles in mind, it might be suggested that implementing looping at the secondary-level could be one of the more difficult projects that schools or districts could choose to undertake (Berman, 1977). Superintendents and district leaders could provide support when principals and school leaders decide to implement innovative scheduling models to improve student outcomes. Although there are difficulties and risks to any creative scheduling model, the need for innovation to benefit students should be encouraged.

Recommendations for Principals and School Leaders

Principals and school leaders are searching for ways to increase student achievement by adjusting curriculum pacing and course alignment, but have continued to find limitations due to time and resources. Manipulation of the school schedule with the hopes of increased student achievement is common, and school administrators have used a multitude of schedules to shift the school day to help increase test scores for increased accountability measures. Although the use of the year-long, looped course model did not produce the anticipated increases in student achievement on achievement assessments, there were no negative consequences noticed when utilizing the schedule and there was no financial burden placed on the school related to the

implementation. The additional contact hours, instructional consistency, and focused content support did prove beneficial for students identified as at-risk by decreasing the dropout potential.

Innovative Scheduling Models

Early advocates of block scheduling argued the model would reduce inefficiency and allow more time for active learning (Canady & Rettig, 1995). Used systematically, block scheduling teaching strategies were expected to enhance student achievement by creating a dynamic, integrated, and personally relevant learning environment that encouraged active student participation (Canady & Rettig, 1995). For at-risk students, the 4x4 block schedule was promoted as a better scheduling model because the time structure enables the use of various teaching methodologies, allows for lab work to be completed within one day, allows students to focus only on four courses, and provides structure for more individualized attention (Queen & Isenhour, 1998). However, a major limitation with block scheduling arises when large gaps of time occur between semesters and summer months for courses that require instructional continuity. This limitation occurs, for example, when a student takes a math class in the fall of one school year, but does not take the following math course until the spring of the next year, creating a significant instructional gap where academic progress is lessened. For at-risk students, this instructional gap can be a significant set-back to learning.

Principals and school leaders should continue to seek innovative methods, such as alternative scheduling and course selection, to address persistent problems within the school environment, supported by research and teacher support. Continually doing things the way they have always been done may not produce the results necessary for improved academic success and school growth.

Student Dashboard Implementation

Due to the retroactive nature of this study, it was necessary for the researcher to formulate a method to create comparison cohorts from the 2014-2015 and 2015-2016 school year, thus creating two similarly aligned cohorts for the pilot study. Once all data were gathered they were placed into a Student Dashboard matrix for easy identification of patterns and trends. These patterns included course failure, retention and classroom academic performance. Utilizing this process provided a much simpler method of extracting trend data to determine student drop out patterns. The researcher could pull data from each column and find potential trends for students who may not have been previously noticed.

It is the researcher's intention to further develop this Student Dashboard into a tool for tracking student progress and an early identification tool for potential drop outs. This tool will allow staff involved in the dropout prevention program to have quick access to students who meet specific criteria for being at-risk of failing a course or ultimately dropping out of school. The researcher believes that this tool could be extremely beneficial for school leaders and districts as an early-warning system for dropout prevention.

One recommended area for improvement would be the addition of expanded data use to make the process more impactful. Although not initially included in the data utilized for the Student Dashboard, use of EVAAS growth data could prove additionally beneficial when identifying trends in student performance.

Conclusion

Although the data from the study did not conclusively demonstrate that the year-long, looped scheduling model improves academic performance in math and English courses for at-risk students, there were no negative effects noted. With the added potential benefits to improve

on-track student performance and limit potential dropouts, the researcher proposes continued analysis to gain additional data.

Initially, the focus on redefining the course sequencing and creating a modified block schedule was directly linked to increasing Math 1 success for historically at-risk students. This idea grew and expanded to a more inclusive scheduling design to impact a greater cross-section of students. It is still this researcher's belief that the combination of positive indicators from a year-long course that has an additional looped semester block course could reduce instructional gaps for at-risk students.

Future investigation of innovative scheduling models may also assist principals and school leaders in making informed decisions before making specific scheduling adjustments for student achievement. This study contributes to the existing body of literature since little research has been conducted on the efficacy of block scheduling (Zepeda & Mayers, 2006), particularly regarding at-risk student achievement (Marchant & Paulson, 2001). Students at-risk of failure will benefit when educational leaders possess appropriate information to select a scheduling model that fosters academic success and reduces dropout rates.

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APPENDIX A: INSTITUTION REVIEW BOARD APPROVAL LETTER

EAST CAROLINA UNIVERSITY
University & Medical Center Institutional Review Board
4N-64 Brody Medical Sciences Building· Mail Stop 682
600 Moye Boulevard · Greenville, NC 27834
Office **252-744-2914** · Fax **252-744-2284** ·
www.ecu.edu/ORIC/irb

Notification of Exempt Certification

From: Social/Behavioral IRB
To: Russell Holloman
CC: Hal Holloman
Date: 1/29/2019
Re: UMCIRB 19-000022
Utilization of modified scheduling with year-long looped courses to improve at-risk student performance

I am pleased to inform you that your research submission has been certified as exempt on 1/29/2019. This study is eligible for Exempt Certification under category #4.

It is your responsibility to ensure that this research is conducted in the manner reported in your application and/or protocol, as well as being consistent with the ethical principles of the Belmont Report and your profession.

This research study does not require any additional interaction with the UMCIRB unless there are proposed changes to this study. Any change, prior to implementing that change, must be submitted to the UMCIRB for review and approval. The UMCIRB will determine if the change impacts the eligibility of the research for exempt status. If more substantive review is required, you will be notified within five business days.

The Chairperson (or designee) does not have a potential for conflict of interest on this study.

APPENDIX B: DISTRICT PERSMISSION TO CONDUCT RESEARCH STUDY

January 8th, 2019

Dr. Rhonda Schuhler
Superintendent, Franklin County Schools
53 W. River Rd., Louisburg, NC 27549

RE: Permission to Conduct Research Study

Dear Dr. Schuhler:
I am writing to request permission to conduct a research study within the Franklin County Schools. I am currently enrolled in the Educational Leadership Program at East Carolina University, under the direction of Dr. Harold Holloman, PhD, and in the process of writing my dissertation. The study is entitled Utilization of Modified Scheduling with Year-Long, Looped Courses to Improve At-Risk Student Performance.

This study focuses on pre-existing data collected from a math and English course structure implemented at Franklinton High School during the 2016-2017 school year, which utilized a year-long, looped course sequence. The study requires access to pre-existing databases housed by Franklin County Schools and the North Carolina Department of Public Instruction. The archived data collected by Franklin County Schools and the North Carolina Department of Public Instruction will be analyzed as it relates to the Math I and English 2 End-of-Course performance of approximately 50 students from the 2014-2015, 2015-2016, 2016-17 school years. The use of pre-existing NC EOC and EOG assessment data gathered from the North Carolina Department of Public Instruction eliminates the need for student consent forms, but I will ensure that the data received from Franklin County Schools contains no student names or [D numbers in order to ensure the anonymity of the data.

The goal of the study is to utilize the comprehensive data collected to assist schools as they look at alternative scheduling solutions to improve academic performance for at-risk students. This study is framed with the hypothesis; implementing year-long, looped courses for Math I and English courses will improve academic performance and on-track outcomes for at-risk students. Specifically, this study will analyze the data related to the use of a year-long, looped course schedule to see if student academic performance improved in mathematics and English courses while also improving on-track indicators, such as promotion and course completion, for identified at-risk students as compared to their 4x4 block scheduled peers.

The research related to this type of scheduling model will also assist educational leaders to make informed decisions regarding specific scheduling adjustments, specifically as it relates to a modified course structure. The study will also contribute to the existing body of literature since there has been limited research conducted on the efficacy of block scheduling as it relates to at risk student achievement. Students at-risk of failure will benefit when educational leaders possess appropriate information to select a scheduling model that fosters academic success and improves on-track indicators.

Your approval to conduct this study will be greatly appreciated. I will follow up with a conversation later next week and would be happy to answer any questions or concerns that you may have at that time. You may contact me at my email address:hollomanr00@students.ecu.edu.

If you agree, kindly sign below and I will pick up the letter from your office when it is ready.

Sincerely,

Russell Holloman

East Carolina University

Approved by:

Dr. Rhonda C. Schuhler Superintendent

Name (Print) Position Title

Dr. Rhonda C. Schuhler 1/14/19

Signature Date

APPENDIX C: NORTH CAROLINA END-OF-COURSE MATH 1 ACHIEVEMENT

LEVEL DESCRIPTORS AND SCALE SCORE CUT OFFS

North Carolina End-of-Course Assessment of NC Math 1

In October 2013, the State Board of Education (SBE) adopted college-and-career readiness Academic Achievement Standards and Academic Achievement Descriptors for the End-of-Grade (EOG) and End-of-Course (EOC) tests and their alternate assessments. After considering much input on the importance of having more definitive discrimination for student achievement reporting, the SBE adopted at its March 2014 meeting a methodology to add a new achievement level. The addition of the new Achievement Level 3 will identify students who are prepared for the next grade, but do not meet the college-and-career readiness standard. An additional level will also enable more accurate identification of students who need additional instruction and assistance.

In June 2016, the SBE adopted the revised content standards for NC Math 1. The end-of-course assessment of Math I was revised to align to the adopted content standards for NC Math 1. As a result, the achievement level descriptors were revised and approved by the SBE in September 2016. Revisions included (1) specifying the content standards are the NC *Standard Course of Study*, (2) changing the course name to NC Math 1, (3) adding "multi-standard" to the achievement level descriptors, and (4) removing "justify or extend relationships of rational exponents" and the word "precise." The achievement level ranges (cut scores) remain the same as adopted by the State Board of Education in 2013–14.

Effective with the 2013-14 school year, the State will report five levels as follows:

Achievement Level*	Meets On-Grade-Level Proficiency Standard	Meets College-and- Career Readiness Standard
Level 5 denotes Superior Command of knowledge and skills	Yes	Yes
Level 4 denotes Solid Command of knowledge and skills	Yes	Yes
Level 3 denotes Sufficient Command of knowledge and skills	Yes	No
Level 2 denotes Partial Command of knowledge and skills	No	No
Level 1 denotes Limited Command of knowledge and skills	No	No

*Detailed achievement level descriptors are available on the following pages.

NC Math 1 EOC Achievement Level Ranges (Cut Scores)

Subject	Level 1	Level 2	Level 3	Level 4	Level 5
NC Math 1 (Starting with 2013–14 school year)	≤ 243	244-249	250-252	253-263	≥ 264

NC Math 1 EOC Achievement Level Descriptors

Achievement Level 1:
Students performing at this level have a **limited command** of the knowledge and skills contained in the NC *Standard Course of Study* for Mathematics assessed at the end of NC Math 1 and will need academic support to engage successfully in more rigorous studies in this content area. They will also need continued academic support to become prepared to engage successfully in creditbearing, first-year Mathematics courses without the need for remediation.

Level 1 students are seldom successful when attempting to develop and use appropriate units, quantities, and scale to solve multi-step and/or multi-standard problems. These students are rarely able to develop expressions, equations, and inequalities from context or use them to solve multi-step problems. Level 1 students seldom use reasoning to model, interpret, explain, and apply key features of linear, exponential, and quadratic functions. In geometry, they are usually unable to apply and implement definitions and formulas to algebraically prove geometric theorems in the coordinate plane. Students rarely demonstrate the ability to summarize, represent, and interpret data for both one variable and two variables or precisely compute and interpret linear models that represent data.

Achievement Level 2:
Students performing at this level have a **partial command** of the knowledge and skills contained in the NC *Standard Course of Study* for Mathematics assessed at the end of NC Math 1 and will likely need academic support to engage successfully in more rigorous studies in this content area. They will also likely need continued academic support to become prepared to engage successfully in credit-bearing, first-year Mathematics courses without the need for remediation.

Level 2 students are sometimes successful when developing and using appropriate units, quantities, and scale to solve multi-step problems. These students are sometimes able to develop expressions, equations, and inequalities from context and use them to correctly solve multi-step and/or multi-standard problems. Level 2 students show limited evidence that they are able to use reasoning to model, interpret, explain, and apply key features of linear, exponential, and quadratic functions. In geometry, they can sometimes apply and implement definitions and formulas to algebraically prove geometric theorems in the coordinate plane. Students have

limited ability to summarize, represent, and interpret data for both one variable and two variables or to precisely compute and interpret linear models that represent data.

Achievement Level 3:
Students performing at this level have a **sufficient command** of knowledge and skills contained in the NC *Standard Course of Study* for Mathematics assessed at the end of NC Math 1 but may need academic support to engage successfully in more rigorous studies in this content area. They are prepared for further studies in this content area but are not yet on track for college-and-career readiness without additional academic support.

Achievement Level 4:
Students performing at this level have **solid command** of the knowledge and skills contained in the NC *Standard Course of Study* for Mathematics assessed at the end of NC Math 1 and are academically prepared to engage successfully in more rigorous studies in this content area. They are also on track to become academically prepared to engage successfully in credit-bearing, firstyear Mathematics courses without the need for remediation.

Level 4 students are usually successful when developing and using appropriate units, quantities, and scale to solve multi-step problems and/or multi-standard problems. These students are typically able to develop expressions, equations, and inequalities from context and use them to correctly solve multi-step problems. Level 4 students are usually able to use complex reasoning to model, interpret, explain, and apply key features of linear, exponential, and quadratic functions. In geometry, they can apply and implement definitions and formulas to algebraically prove geometric theorems in the coordinate plane. Students are typically able to summarize, represent, and interpret data for both one variable and two variables and precisely compute and interpret linear models that represent data.

Achievement Level 5:
Students performing at this level have a **superior command** of the knowledge and skills contained in the NC *Standard Course of Study* for Mathematics assessed at the end of NC Math 1 and are academically well-prepared to engage successfully in more rigorous studies in this content area. They are also on-track to become academically prepared to engage successfully in credit-bearing, first-year Mathematics courses without the need for remediation.

Level 5 students have a high level of success when developing and using appropriate units, quantities, and scale to solve multi-step problems. These students have a strong ability to develop expressions, equations, and inequalities from context and use them to correctly solve multi-step and/or multi-standard problems. Level 5 students consistently use complex reasoning to model, interpret, explain, and apply key features of linear, exponential, and quadratic functions. In geometry, they have a high level of success when applying and implementing definitions and formulas to algebraically prove geometric theorems in the coordinate plane. Students are consistently able to summarize, represent, and interpret data for both one variable and two variables and precisely compute and interpret linear models that represent data.

APPENDIX D: NORTH CAROLINA END-OF-COURSE ENGLISH 2 ACHIEVEMENT

LEVEL DESCRIPTORS AND SCALE SCORE CUT OFFS

North Carolina End-of-Course English II Test

In October 2013, the State Board of Education (SBE) adopted college-and-career readiness Academic Achievement Standards and Academic Achievement Descriptors for the End-of-Grade (EOG) and End-of-Course (EOC) tests and their alternate assessments. After considering much input on the importance of having more definitive discrimination for student achievement reporting, the SBE adopted at its March 2014 meeting a methodology to add a new achievement level. The addition of the new Achievement Level 3 will identify students who are prepared for the next grade, but do not meet the college-and-career readiness standard. An additional level will also enable more accurate identification of students who need additional instruction and assistance.

In June 2016, the State Board of Education approved a technical correction to specify the content standards are the NC *Standard Course of Study*. The achievement level ranges and achievement level descriptors remain the same as adopted by the State Board of Education in 2013–14.

Effective with the 2013–14 school year, the State will report five levels as follows:

Achievement Level*	Meets On-Grade-Level Proficiency Standard	Meets College-and- Career Readiness Standard
Level 5 denotes Superior Command of knowledge and skills	Yes	Yes
Level 4 denotes Solid Command of knowledge and skills	Yes	Yes
Level 3 denotes Sufficient Command of knowledge and skills	Yes	No
Level 2 denotes Partial Command of knowledge and skills	No	No
Level 1 denotes Limited Command of knowledge and skills	No	No

*Detailed achievement level descriptors are available on the following pages.

English II EOC Achievement Level Ranges (Cut Scores)

Subject	Level 1	Level 2	Level 3	Level 4	Level 5
English II (Starting with 2013-14 school year)	≤140	141-147	148-150	151-164	≥165

English II EOC Achievement Level Descriptors

Achievement Level 1:
Students performing at this level have **limited command** of the knowledge and skills contained in the NC *Standard Course of Study* of Reading Standards for Literature as assessed by supporting analysis of the text with textual evidence; determining and analyzing the development and refinement of a theme or idea throughout a text; summarizing a text objectively; analyzing the development, interaction, and contribution of characters in a text; determining meanings of words or phrases in a text; analyzing the impact of word choice on meaning and tone; analyzing how authors' choices create literary effects, such as tension; analyzing point of view and cultural experiences in literature from outside the US, drawing on world literature. They will need academic support to engage successfully in this content area.

Students have limited command of informational text, showing inconsistency in supporting analysis of the text with textual evidence; determining a theme or idea and how it's revealed and refined throughout a text; summarizing a text objectively; analyzing the order and manner a key element is introduced and explored in a text; determining figurative, connotative, and technical meanings of words or phrases in a text; analyzing the placement and contribution of particular sections of text, including larger portions of texts; determining an author's point of view/purpose and its presentation.

Students demonstrate limited command of language when determining and clarifying the meaning of words by using the context, identifying word changes that alter meaning, consulting reference materials, and/or verifying initial thought of word meaning; demonstrating an understanding of figures of speech, analyzing their contribution to the text, and analyzing subtle variation between similar terms. They rarely demonstrate the use of grade-appropriate vocabulary and will need academic support to engage successfully in this content area.

Achievement Level 2:
Students performing at this level have **partial command** of the knowledge and skills contained in the NC *Standard Course of Study* of Reading Standards for Literature as assessed by supporting analysis of the text with textual evidence; determining and analyzing the development and refinement of a theme or idea throughout a text; summarizing a text objectively; analyzing the development, interaction, and contribution of characters in a text; determining meanings of words or phrases in a text; analyzing the impact of word choice on meaning and tone; analyzing how authors' choices create literary effects, such as tension; analyzing point of view and cultural experiences in literature from outside the US, drawing on world literature. They will likely need academic support to engage successfully in this content area.

Students have partial command of informational text, showing inconsistency in supporting analysis of the text with textual evidence; determining a theme or idea and how it's revealed and refined throughout a text; summarizing a text objectively; analyzing the order and manner a key element is introduced and explored in a text; determining figurative, connotative, and technical meanings of words or phrases in a text; analyzing the placement and contribution of particular sections of text, including larger portions of texts; determining an author's point of view/purpose and its presentation.
Students demonstrate partial command of language when determining and clarifying the meaning of words by using the context, identifying word changes that alter meaning, consulting reference materials, and/or verifying initial thought of word meaning; demonstrating an understanding of figures of speech, analyzing their contribution to the text, and analyzing subtle variation between similar terms. They demonstrate knowledge of standard English conventions:
grammar, usage, capitalization, punctuation, and/or spelling. However, they demonstrate inconsistent use of grade-appropriate vocabulary and will likely need academic support to engage successfully in this content area.

Achievement Level 3:
Students performing at this level have a **sufficient command** of knowledge and skills contained in the NC *Standard Course of Study* of Reading Standards for Literature but may need academic support to engage successfully in more rigorous studies in this content area. They are prepared for further studies in this content area but are not yet on track for college-and-career readiness without additional academic support.

Achievement Level 4:
Students performing at this level have **solid command** of the knowledge and skills contained in the NC *Standard Course of Study* of Reading Standards for Literature as assessed by supporting analysis of the text with textual evidence; determining and analyzing the development and refinement of a theme or idea throughout a text; summarizing a text objectively; analyzing the development, interaction, and contribution of characters in a text; determining meanings of words or phrases in a text; analyzing the impact of word choice on meaning and tone; analyzing how authors' choices create literary effects, such as tension; analyzing point of view and cultural experiences in literature from outside the US, drawing on world literature. They are academically prepared to engage successfully in this content area.

Students have solid command of informational text, showing consistency in supporting analysis of the text with textual evidence; determining a theme or idea and how it's revealed and refined throughout a text; summarizing a text objectively; analyzing the order and manner a key element is introduced and explored in a text; determining figurative, connotative, and technical meanings of words or phrases in a text; analyzing the placement and contribution of particular sections of text, including larger portions of texts; determining an author's point of view/purpose and its presentation.

Students demonstrate solid command of language when determining and clarifying the meaning of words by using the context, identifying word changes that alter meaning, consulting reference materials, and/or verifying initial thought of word meaning; demonstrating an understanding of figures of speech, analyzing their contribution to the text, and analyzing subtle variation between similar terms. They demonstrate command of standard English conventions: grammar, usage, capitalization, punctuation, and spelling. They demonstrate consistent use of grade-appropriate vocabulary and are academically prepared to engage successfully in this content area.

Achievement Level 5:
Students performing at this level have **superior command** of the knowledge and skills contained in the NC *Standard Course of Study* of Reading Standards for Literature as assessed by supporting analysis of the text with textual evidence; determining and analyzing the development and refinement of a theme or idea throughout a text; summarizing a text objectively; analyzing the development, interaction, and contribution of characters in a text; determining meanings of words or phrases in a text; analyzing the impact of word choice on meaning and tone; analyzing how authors' choices create literary effects, such as tension; analyzing point of view and cultural experiences in literature from outside the US, drawing on world literature. They are academically well-prepared to engage successfully in this content area.

Students have superior command of informational text, showing consistency in supporting analysis of the text with textual evidence; determining a theme or idea and how it's revealed and refined throughout a text; summarizing a text objectively; analyzing the order and manner a key element is introduced and explored in a text; determining figurative, connotative, and technical meanings of words or phrases in a text; analyzing the placement and contribution of particular sections of text, including larger portions of texts; determining an author's point of view/purpose and its presentation.

Students demonstrate superior command of language when determining and clarifying the meaning of words by using the context, identifying word changes that alter meaning, consulting reference materials, and/or verifying initial thought of word meaning; demonstrating an understanding of figures of speech, analyzing their contribution to the text, and analyzing subtle variation between similar terms. They demonstrate purposeful use of standard English conventions, including grammar, usage, capitalization, punctuation, and spelling. They demonstrate exemplary use of grade-appropriate vocabulary and are academically well-prepared to engage successfully in this content area.