

ABSTRACT

Derrick Anthony Jackson, INTERIM ASSESSMENT AS A PREDICTIVE TOOL AND DRIVER OF FORMATIVE ASSESSMENT PRACTICES TO IMPROVE STUDENT PERFORMANCE ON STATE ASSESSMENTS (Under the direction of Dr. R. Martin Reardon). Department of Educational Leadership, July 2019.

The problem of practice on which this study focused was the establishment of interim assessments as a predictive tool and driver of formative assessment practices to improve student performance. The initial phase of the study involved equipping educators with tools to understand each student's ability to be proficient on the EOG Assessment based on the previous year's EOG data. The next phase of the study used the predictive capacity of the i-Ready Adaptive Diagnostic Assessment (Curriculum Associates, n.d.) to help identify how formative assessment practices could be used to help students achieve that predicted score—which was, in turn, anticipated to facilitate more students being proficient on the EOG Assessments at the end of the school year. An additional focus of the study was to use the predictive value of the i-Ready Adaptive Diagnostic Assessment to reduce the number of students who lost their proficiency rating from one year to the next. Phase One of the action research adopted here was focused on identifying what formative assessment practices School F used the past three years. The purpose of identifying those practices was so that they had the potential to be used in School B. Part of this was to highlight the importance of understanding at what level of proficiency students commenced the school year, and the development of a plan to ensure they either stayed proficient or grew from being non-proficient to proficient. The aim of the action research phase was to empower the teachers in School B to determine whether students made progress after each administration of the i-Ready Adaptive Diagnostic Assessment. Related professional development sessions equipped the teachers with an understanding of the predicted scores and what interventions they had to implement to ensure students improved between each

administration of the i-Ready Adaptive Diagnostic Assessment—thereby ensuring students had the greatest chance of being proficient on the EOG Assessment at the end of the school year.

INTERIM ASSESSMENT AS A PREDICTIVE TOOL AND DRIVER OF FORMATIVE
ASSESSMENT PRACTICES TO IMPROVE STUDENT PERFORMANCE ON STATE
ASSESSMENTS

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by

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ASSESSMENT PRACTICES TO IMPROVE STUDENT PERFORMANCE ON STATE
ASSESSMENTS

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DEDICATION

I dedicate my dissertation work to my mother who has nudged and encouraged me throughout this journey of life. She instilled in me, from my early childhood years, the importance of a quality education. One of the things which keeps me going from one achievement to the next is to never let her down. You are appreciated.

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CHAPTER 1: INTRODUCTION

Problem of Practice

During the 2013-2014 school year, Gasper County Schools (GCS, a pseudonym) hired a new superintendent. As part of his introduction to the school system, the new superintendent went on a listening tour, conducting what he called “Community Talks.” The major focus of the listening tour was to gather input from district stakeholders to develop the GCS’s strategic plan for the years 2015-2019. Of the many areas that were discussed, the stakeholders decided the main priority for GCS’s next five years should be improving End-of- Grade (EOG) Assessment Proficiency Rates for each school and the school district as a whole.

The “Community Talks” took place during the second year of the new Common Core State Standards (CCSS) assessments. The North Carolina Department of Public Instruction, during the 2013-2014 school year, increased the number of achievement levels from four to five to determine if students were proficient on the CCSS end-of-grade (EOG) assessment. The addition of the fifth achievement level led to more students being classified as proficient due to their now being able to achieve a proficiency rating by earning a level three, four, or five, instead of only a level three or four. However, when test results were released during the 2014-2015 school year—the first year that a comparison could be made between the new and the previous achievement levels—the improvement curve of achievement levels of the students in Gasper County Schools remained essentially flat with a less-than-one percent increase in proficiency.

During the 2015-2016 school year, the superintendent added to the original “Community Talks” by establishing focus groups to continue to gather feedback from stakeholders. The stakeholders were concerned about the stagnant district CCSS EOG results. The focus groups specifically inquired about middle school scores being much lower than elementary school scores. As a follow-up to the focus group meetings, the superintendent asked the Gasper County

Schools' Accountability Department to conduct an analysis to see why scores had not improved, and what the district could do to help schools improve their proficiency ratings going forward. During the analysis conducted by the Gasper County Schools' Accountability Department, it became clear that Grade 8 math scores were much lower than the math scores for any other tested grade. The lower scores clearly were not cohort-specific, which suggested that the teaching and learning environment may have played a role. I will highlight previous standards adoptions to help illustrate how the current recovery following the introduction of CCSS is not in line with previous recoveries. The state of North Carolina has had three previous math standards adoptions during the 2001-2002 and 2005-2006 before the change in 2012-2013.

To illustrate this anomaly, Table 1 displays the math proficiency rates (overall % proficient) the year before adoption, the first year of adoption, and four years after the 2005-06 adoption of the previous math content standards in North Carolina across the individual schools in Gasper County. Comparable data are provided also for math proficiency rates the year prior to the CCSS (2011-12), the year CCSS became operational (2012-2013), and four years after CCSS became operational (2016-2017). "School B" is in parentheses as it is the school that will be the focus of the intervention I plan to implement, and this row is shaded in Table 1. As a basis for comparison, "School F" is also in parentheses as it is the school that I am taking as a benchmark against which to measure the outcome of my intervention, and this row is outlined in Table 1. As is clear from Table 1, math proficiency suffered a notable drop when the 2005-2006 math content standards were implemented, but four years later, the proficiency scores were approaching the pre-implementation levels. By contrast, overall proficiency rates following the implementation of CCSS exhibited a precipitous drop and are in a protracted recovery phase.

To make the magnitude of this problem clearer, the current main concern for Gasper County in this era of CCSS assessments is the proficiency rate four years after the initial CCSS

Table 1

Comparison of Percent Proficiency Rates of Gasper County Middle School Students on State Tests of Math (GCS Overall, and by School)

	Fast Recovery After Change			Slow Recovery After Change		
	2004-05	2005-06	2009-10	2011-12	2012-13	2016-17
GCS overall	88.0	61.7	80.2	80.1	36.5	45.4
School A	94.1	70.2	87.3	86.7	44.2	61.4
<i>(School B)</i>	<i>83.6</i>	<i>50.6</i>	<i>65.0</i>	<i>65.6</i>	<i>21.3</i>	<i>29.3</i>
School C	93.2	72.0	89.6	92.0	55.6	68.0
School D	88.7	62.2	82.7	83.8	41.0	49.9
School E	90.7	60.0	86.5	79.2	33.2	42.5
<i>(School F)</i>	<i>82.8</i>	<i>59.9</i>	<i>72.0</i>	<i>67.0</i>	<i>21.3</i>	<i>40.9</i>
School G	90.6	61.3	85.6	86.1	44.1	47.6
School H	80.2	46.1	69.1	74.0	28.2	33.5
School I	86.0	62.0	82.9	88.6	34.0	43.7
School J	82.2	51.7	81.6	79.7	23.7	45.1
School K	75.4	43.5	72.7	71.9	14.4	20.7

assessment in 2012-13. As Table 1 shows, there was a 26% decrease in proficiency overall (from 88.0% to 61.7%) after the 2005-06 content standards adoption, but by the end of the 2009-10 school year, four years after those standards were adopted, proficiency rates had rebounded to 80.2%, only eight percent lower than they were before those content standards were adopted. By comparison, the first year the CCSS assessments were given there was a 43% decrease in the district proficiency rate (from 80.1% to 36.5%). Far from experiencing a robust recovery, however, in 2016-17, four years after the CCSS assessments, the district's proficiency rate is still 35% lower than it was when CCSS assessments began—a district reality that mirrors the reality confronting all the individual schools.

A visual comparative scan down the 2004-05 and 2009-10 columns in Table 1 reveals that, by 2009-10, GCS overall and most middle schools in GCS, except for School B (the focus of my study), School F (my benchmark school), and School H, had almost completely rebounded to their proficiency rates before the implementation occurred. However, a visual scan down the 2011-12 and 2016-17 columns reveals a very different scenario. Every single school without exception is well below the proficiency level that its students exhibited before the change to CCSS—in the case of School B, 36% below. Figure 1 translates these comparative percentages into a series of bar graphs. The series of bars in blue relate to the 2005-06 “before CCSS” curriculum implementation, and the series of bars in red relate to the 2012-13 “after CCSS” curriculum implementation. (I chose School F as my benchmark school because the proficiency percentages are quite comparable to School B except for the 2016-17 percentage—which is just over 10% points higher. This close comparison—apart from the final discrepancy—leads me to believe that some element of the learning environment in School F may promise a similar improvement for School B.)

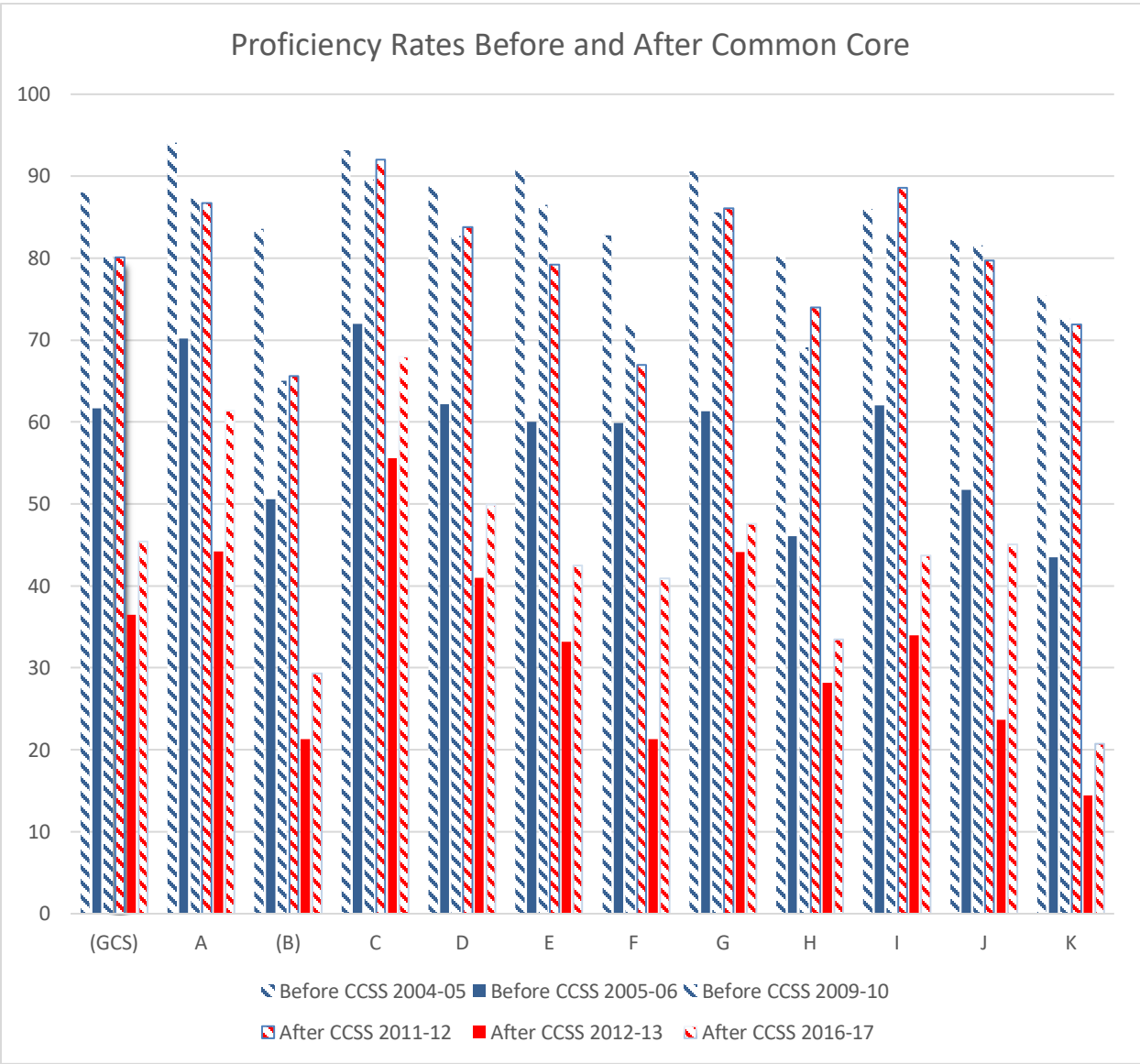


Figure 1. Comparison of Gasper County middle schools’ overall math proficiency scores, showing the negative impact of changing standards and the recovery trajectory of proficiency.

Clearly, this is a problem of practice of major proportions. I indicated above that the crux of the problem is related to the Grade 8 math students. This was a carefully researched conclusion. Rather than attempting to tackle too much and to pinpoint an area for improvement, the Gasper County Schools (GCS) Accountability Department analyzed the middle school EOG proficiency rates in math from the 2004-05 through the 2016-17 school year, disaggregated by grade level, to determine what grade level had the largest drop in proficiency from the previous assessment to the current CCSS assessment. Table 2 represents the proficiency rate for Grade 6, 7, and 8 students for the last year of the prior standards (2011-12) and four years after CCSS implementation (2016-17). While there was considerable variability from school to school, the GCS overall proficiency rates for students in Grade 8 during the 2011-12 school year were two to three points higher than the GCS overall score for the Grade 6 and Grade 7 students. Again, School B will be the focus of my project. School F is one of the anomalies, with the Grade 6 students showing higher proficiency than the Grade 8 students.

In stark contrast, however, as is shown in Table 3, during the 2016-17 school year under the CCSS assessment, GCS overall Grade 8 proficiency rates were eight to ten points lower than the Grade 6 and Grade 7 students. This is a major change from the results under the previous standards change.

Finally, Figure 2 is a graphical comparison of the change in proficiency from the 2011-2012 and 2016-2017 school years for the data represented in Tables 2 and 3. This radar plot serves to reinforce the magnitude of the relative difference across Grades 6, 7, and 8 between the proficiency in mathematics exhibited by the students in each grade level before and after CCSS. Note that the Grade 8 proficiency discrepancy varies from school to school, with School K being in a particularly problematic situation (the Grade 7 students showing less of a decrease in proficiency than either the Grade 6 or Grade 8 students), as is School I, in which all the grades

Table 2

Proficiency Rates on State Tests in Mathematics before Common Core (2011-2012) by GCS

Middle School Grade Level

	Grade 6	Grade7	Grade 8
(GCS overall)	79.0	78.3	81.2
School A	90.7	81.8	87.1
(School B)	56.5	68.3	72.5
School C	91.7	92.3	92.0
School D	79.4	88.1	83.8
School E	82.0	82.4	71.9
(School F)	71.1	64.1	65.8
School G	80.8	85.1	92.4
School H	75.8	67.7	78.3
School I	89.0	89.6	87.1
School J	80.7	74.4	84.1
School K	62.6	67.5	85.4

Table 3

Proficiency Rates on State Tests in Mathematics after Common Core (2016-17) by GCS Middle School Grade Level

	Grade 6	Grade 7	Grade 8
(GCS overall)	47.7	49.6	39.4
School A	62.4	65.9	56.8
<i>(School B)</i>	<i>34.7</i>	<i>31.6</i>	<i>21.2</i>
School C	71.5	75.8	57.3
School D	49.4	61.4	39.4
School E	52.4	41.3	35.5
<i>(School F)</i>	<i>42.3</i>	<i>44.0</i>	<i>36.6</i>
School G	51.1	44.8	46.9
School H	41.3	35.0	23.6
School I	43.1	44.3	43.6
School J	46.4	52.6	36.6
School K	8.6	33.3	21.9

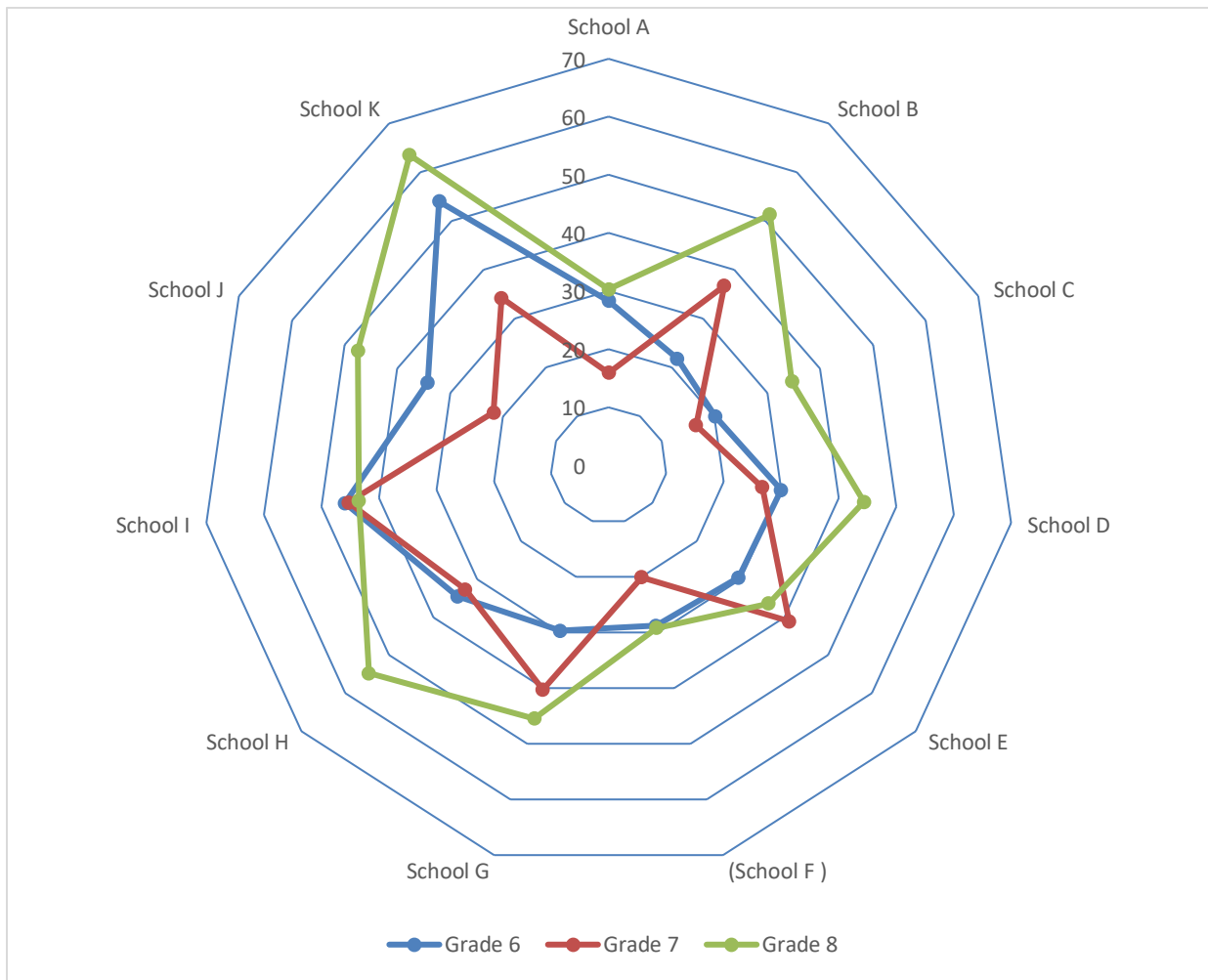


Figure 2. Radar plot of the magnitude of the *decrease* in mathematics proficiency from 2011-12 to 2016-17, based on the data in Tables 2 and 3.

show a comparable decrease in proficiency. This is encouraging in terms of my project because it reinforces my belief that refining the teaching and learning environment has the potential to make a difference. Students in School B show a relatively consistent decrease in proficiency from Grade 6 to Grade 7, whereas, in School F, Grade 6 and Grade 8 students experience the same decrease in proficiency and Grade 7 students a smaller decrease in proficiency.

Of course, Figure 2 is a comparison of snapshot data at two points in time (2011-12 & 2016-17) that do not involve the same children in each of the snapshots, but, from the perspective of those who expect continual improvement, the apparent degradation of students' proficiency across the middle school years in GCS from 2011-12 to 2016-17 is a cause of great concern and demands immediate attention.

Problem Statement

As Table 1 illustrated, GCS witnessed a large decline in the EOG proficiency scores of middle school students in mathematics upon the introduction of the CCSS assessments in 2012-13, but has not experienced a rebound in proficiency scores in the ensuing years comparable to the rebound that accompanied the prior change in standards. In the past, test scores have improved by 20% to 25% during the second to fourth year of administering new state-wide high-stakes accountability EOG assessments (Mims & Sims, 2013). By contrast, GCS has not experienced a large increase in math EOG scores the past four years under the CCSS assessments. In fact, EOG scores have only marginally increased during the second through fourth year of the CCSS assessments.

Purpose of Study

The above discussion substantiates that GCS confronts a major problem of practice in the apparent inability of GCS students to exhibit proficiency on the CCSS assessment. In particular, Grade 8 students have failed to demonstrate proficiency on the CCSS mathematics assessment in

comparison to the students in Grade 6 and Grade 7. The focus of my research, then, is to delve into the cause of this problem in order to collaborate effectively with the Grade 8 mathematics teachers to address it.

The purpose of my study, then, is to set the stage for a return of GCS students' proficiency rates in math, as measured by the Common Core State Standards (CCSS) assessments, to the levels prior to the implementation of the CCSS. My study involves three phases: (1) a historical research phase, (2) an investigative and planning phase which will consist of gathering what teachers in School F understand about formative assessments practices (how the practices were used), and (3) my action research, in collaboration with the teachers in School B, into how the results of interim assessments, professional development, and formative assessment practices are implemented, thereby facilitating their positive impact on improving student achievement. I will discuss the three phases further when I focus on my study plan in Chapter 3. Table 4 is a high-level logic model that provides an overview of my project. I will revisit and considerably expand on this logic model in Chapter 3.

Definition of Terms

Area Under the Curve (AUC) - AUC is an overall indication of the diagnostic accuracy of a Receiver Operating Characteristic (ROC) curve (see subsequent definition). AUC values closer to 1 indicate the screening measure reliably distinguishes between students with satisfactory and unsatisfactory performance, whereas values at .50 indicate the predictor is no better than chance.

Common Core State Standards - The Common Core State Standards Initiative is an educational initiative in the United States that details what K–12 students should know in English language arts and mathematics at the end of each grade. The initiative is sponsored by the National Governors Association (NGA) and the Council of Chief State School

Table 4

Logic Model of Intervention to Raise Grade 8 Mathematics Achievement Scores in GCS

Resources	Activities	Outputs	Short- and Long-Term Outcomes/Impact
GCS math achievement scores	Disaggregate data to verify that Grade 8 math is the leverage point for improvement	Detailed list of effective instructional approaches in Grade 8 math (developed from School F)	Reduction in the magnitude of the gap between the pre-CCSS and post-CCSS Grade 8 math proficiency scores in School B
Access to Curriculum Associates state-level math achievement data	Research instructional approaches employed by Grade 8 math teachers at benchmark middle school (School F)	Evidence of effectiveness of the adoption of effective approaches in School B	A larger number of students who are appropriately equipped for math at the high school level
Access to Grade 8 math teachers at benchmark middle school (School F)	Collaborate with Grade 8 math teachers at School B to encourage adoption of effective approaches		More college- and career-ready high school graduates measured by an increase in the number of students improving their proficiency rate on the i-Ready Diagnostic Assessment during the BOY, MOY, and EOY window
Access to Grade 8 math teachers at intervention middle school (School B)	Analyze the impact of the project		

Officers (CCSSO) and seeks to establish consistent educational standards across the states, as well as ensure that students graduating from high school are prepared to enter credit-bearing courses at two- or four-year college programs or to enter the workforce.

End of Grade Assessment (EOG) - The North Carolina EOG Tests are designed to measure student performance on the goals, objectives, and grade-level competencies specified in the North Carolina Standard Course of Study.

EVAAS (Education Value-Added Assessment System) - Is a customized software system available to all North Carolina school districts. EVAAS provides North Carolina's educators with tools to improve student learning and to reflect and improve on their own effectiveness. Along with other sources of data, EVAAS plays a valuable role in the success of North Carolina's schools and students.

EVAAS examines the impact of teachers, schools, and districts on the learning of their students in specific courses, grades, and subjects. Users can access colorful, easy-to-understand charts and graphs via the Web, as well as produce customized reports that predict student success, show the effects of schooling at particular schools, or reveal patterns in subgroup performance.

The North Carolina State Board of Education has selected EVAAS as the statewide model for measuring student growth when common assessments are administered (for example, the End of Course and End of Grade assessments).

Formative Assessment Practices - Formative assessment practices (short assessments before or after instruction has taken place, questioning to determine progress, students setting and measuring learning goals, and continuous feedback to students on learning progress (closing gaps) can assist teachers on a daily basis to solicit input and provide feedback to students. These

practices can be used to adjust instruction in a timely fashion in order to meet best the needs of students in a classroom.

Interim Assessment - Normed Interim assessments are administered at different intervals (hence the name) between instruction. The data from interim assessments can be used for several purposes—all of them intended to deliver instructionally useful information to teachers, students, principals, district administrators and parents. At the core, interim assessments help teachers understand better what a student knows and the concepts on which teachers must focus to ensure grade-level performance.

i-Ready Assessment - Adaptive assessments, like the *i-Ready Diagnostic Assessment*, leverage advanced technology to provide a deep, customized evaluation of every student, and to track student growth and performance consistently and continuously over a student's entire K–12 career. By dynamically adapting—based on student response patterns—adaptive assessments derive large amounts of information from a limited number of test items. This allows the assessments to more accurately and more efficiently pinpoint students' needs as compared to traditional fixed-form tests.

Linking Study - A linking study relates scores on different tests measuring similar but distinct constructs. The results are typically derived from statistical linking procedures provide a direct link between scores on different tests and serve various purposes. Aside from describing how a score on one test relates to performance on another test, linking studies can also be used to identify benchmark scores on one test corresponding to performance categories on another test, or to maintain continuity of scores on a test after the test is redesigned or changed.

Professional Learning Community (PLC) - A PLC is a method to foster collaborative learning among colleagues within a particular work environment or field. It is often used in schools to organize teachers into working groups of practice-based professional learning.

Race to the Top(RttT) - RttT (sometimes abbreviated R2T, RTTT or RTT), is a \$4.35 billion United States Department of Education competitive grant created to spur and reward innovation and reforms in state and local district K-12 education. It is funded by the ED Recovery Act as part of the American Recovery and Reinvestment Act of 2009, and was announced by President Barack Obama and Secretary of Education Arne Duncan on July 25, 2009.

READY (Framework for Change) Accountability Model - North Carolina has been a pioneer in school accountability since 1996, which was the first year of the state's initial school accountability model called the *ABCs of Public Education* (North Carolina Public Schools, 2012). This model measured student academic growth and the performance of schools statewide. Since those early days of school-based accountability, North Carolina educators and leaders have learned a great deal about how to measure and improve student and school performance. Fueled by this knowledge, the State Board of Education in 2008 adopted a hallmark document, *A Framework for Change: The Next Generation of Assessments and Accountability*. This document directed the Department of Public Instruction to undertake a comprehensive overhaul of the state's *Standard Course of Study*, the student assessment program and the school accountability model. North Carolina was one of the first states to tackle such an ambitious reform agenda.

Receiver Operating Characteristic (ROC) Curve - A ROC curve is a generalization of the set of potential combinations of sensitivity and specificity possible for predictors. A ROC curve is a plot of the true positive rate (sensitivity) against the false positive rate (1-specificity) for the different possible cut-points of a diagnostic test.

CHAPTER 2: LITERATURE REVIEW

Context of North Carolina's Accountability Models and Review of Literature

I open this chapter by providing an overview of the events that preceded the situation currently being faced by GCS, beginning with a discussion of the evolution of North Carolina's educational standards that includes a consideration of the impact of the federal *No Child Left Behind* legislation and the *Race to the Top* initiative that played a major role in accelerating curriculum change. Before implementing the READY Accountability Model and CCSS, North Carolina had two changes in math standards (2001-2002 and 2005-2006 school years). I then consider the role of the CCSS, and how all of this contributed to the current situation in North Carolina in general and in GCS in particular. Finally, I discuss how the literature relates to my project—a discussion which leads to my consideration of my improvement goal for my project.

Background to North Carolina Educational Standards

From 1890 to 1977 the state of North Carolina did not ensure students were educated to the same extent as did the other southern states in the region. North Carolina had an illiteracy rate far above the national average for much of the first half of twentieth century (Christensen, 2008). Under the leadership of Governor Hunt (1977 – 1985; 1993 - 2001), the state of North Carolina made a major commitment to improving education (Christensen, 2008). To ensure the improvement could be measured, the North Carolina Department of Public Education (NCDPI) established an accountability model called “The ABCs of Public Education” (North Carolina Public Schools, 2012).

The State Board of Education implemented the ABCs of Public Education commencing during month of May 1995, laying out a framework for a dramatic restructuring of the accountability for public schools in North Carolina. The “ABCs” in the title refer to “**A**ccountability, teaching the **B**asics with an emphasis on high educational standards, and

maximum local Control”. During the 1995-96 school year, ten school districts participated in the pilot of the ABCs of Public Education Accountability Model. After the pilot program was completed, the General Assembly approved the State Board of Education’s plan and passed into law the “School-Based Management and Accountability Model” (ABC Program Information, 2013), which established the ABCs of Public Education Accountability Model.

During the 1996-97 school year, the ABCs of Public Education Accountability Model (North Carolina Public Schools, 2012) was implemented for grades K-8 only. During the 1997-98 school year, the high school portion of the ABCs of Public Education Accountability Model was added. NCDPI decided to implement the K-8 portion of the ABCs of Public Education Accountability Model first and then add the high school grades one year later. The ABCs of Public Schools Accountability Model was a work in progress that was refined over the next four years before becoming fully implemented.

No Child Left Behind

During the 2001-2002 school year, the federal government reauthorized the Elementary and Secondary Act (ESEA) with the new name of *No Child Left Behind* (NCLB, 2002). NCLB authorized several federal education programs that were administered by the states. Under NCLB, states were required to test students in reading and math in grades 3–8 and once in high school (Elementary and Secondary Education Act of 1965, 2017). All students were expected to meet or exceed state standards in reading and math by 2014 (Elementary and Secondary Education Act of 1965, 2017). The major focus of NCLB was to close student achievement gaps by providing all children with a fair, equal, and significant opportunity to obtain a high-quality education. The United States Department of Education emphasized four pillars within NCLB:

- **Accountability:** To ensure those students who are disadvantaged, achieve academic proficiency.

- Flexibility: To allow school districts flexibility in how they use federal education funds to improve student achievement.
- Research-based education: To emphasize educational programs and practices that have been proven effective through scientific research.
- Parent options: To increase the choices available to the parents of students attending Title I schools.

NCLB required each state to establish state academic standards and a state testing system that met federal requirements (Elementary and Secondary Education Act of 1965, 2017). This accountability requirement was intended to ensure that students attained what was called Adequate Yearly Progress (AYP). It was easy for the state of North Carolina to comply with NCLB, because North Carolina's ABCs of Public Education Accountability Model had been measuring what NCLB was now requiring of every state, starting with the 2002-2003 school year (North Carolina Public Schools, 2012).

Transition from NCLB and Race to the Top

ESEA was scheduled for renewal during 2007, but failed to pass congress because of political difference and change in leadership at the presidential level. With the lack of support for reauthorizing ESEA, the Obama Administration developed a framework for providing waivers to the requirements of NCLB called *Race to the Top*. The requirement allowed states to adopt rigorous standards for students in exchange for funding from the federal government to develop the rigorous standards and a framework for change. States that agreed to adopt rigorous standards and assessments to measure student progress were awarded additional federal funding. After six years of the *Race to the Top* initiative, President Obama signed the ESEA reauthorization on December 10, 2015.

Race to the Top

During the 2008-2009 school year, the federal government passed the American Recovery and Reinvestment Act (ARRA). As part of the ARRA, *Race to the Top* (RttT) grants were created by the United States Department of Education to spur and reward innovation and reforms in state and local district K-12 education (Race to the Top, 2010). North Carolina received one of only 12 federal RttT competitive grants in 2010, bringing nearly \$400 million to the state's public school system. This funding enabled North Carolina to remodel the state educational accountability system as part of an ambitious plan to increase student achievement, close achievement gaps, and continue to increase the number of career- and college-ready graduates by making sure every student had an excellent teacher (Race to the Top, 2010).

Common Core State Standards

During the 2012-2013 school year, the state of North Carolina—along with forty-five other states—implemented the Common Core State Standards (CCSS) in math and reading (North Carolina READY Initiative, 2012). With the establishment of the new standards, new state assessments were designed. This was the first time the state of North Carolina had implemented new instructional standards and new state assessments in both reading and math at the same time (North Carolina READY Initiative, 2012).

During previous changes in instructional standards, the state of North Carolina had phased in reading and math assessments during different school years (e.g., implemented math one year and reading two years later). In the past, even though the reading and math implementation was phased in, initial results showed a ten to twenty percent reduction in the numbers of students passing state assessments (Dillon, 2013).

By contrast with established practice, students and staff members started learning and teaching both CCSS-aligned reading and math courses on August 27, 2012. When students took

the first CCSS-aligned End-of -Grade (EOG) assessments during the months of May and June of 2013, the state informed the school districts that scores would not be released until October 2013. However, when the results of the first Common Core State EOGs were eventually released in November 2013, the state and many schools saw an average reduction in their performance composite score of from 30% to 45% from the assessments conducted under the previous state standards. The performance composite is calculated by dividing the number of students that achieved at levels three, four, or five in the school/district by the total number of students that took the EOG assessment in that school/district. The sharp drop in student proficiency during the 2012-2013 school year, the first year of the CCSS, was unprecedented in the history of high-stakes accountability assessments in the state of North Carolina (Dillon, 2013).

In an effort to answer the question of why reading and math achievement scores under the READY Accountability Model plummeted (and have not recovered at the same rate as previous standards adoptions), it is instructive to look at how the READY Accountability Model was implemented in comparison to how the ABCs of Public Education Accountability Model (North Carolina Public Schools, 2012) was implemented.

At the time the READY Accountability Model was being developed, the state was suffering—along with the rest of the country—from one of the worst economic recession the country had seen since the great depression. The state of North Carolina needed the money provided by the RttT grant to help fund education in the state. It seems that the pressure of meeting the deadlines associated with the RttT grant may have prompted the state of North Carolina to move at a fast pace, potentially too fast to maintain quality in the READY Accountability Model. For example, it took the state from 1996 to 2000—four years—to fully implement the ABCs of Public Schools Accountability Model (North Carolina Public Schools, 2012). During the 2012-13 school year, the state implemented the READY Accountability

Model in one year. The political and practical imperative of being able to adequately fund education was met by developing an accountability system in one year. Arguably, it may have been better if the accountability model had been piloted for a year or two and phased in over a four-year period like the ABCs of Public School Accountability Model (North Carolina Public Schools, 2012).

The Current Situation

The North Carolina Department of Public Instruction (NCDPI) recently provided schools with information on the achievement level (levels 1-5, and a scale score) that students attained on the EOG and end-of-course (EOC) assessments, and how students performed on the major content standards and domains the past two years (since the 2015-2016 school year). The standards results were provided in the form of sub-score reports that identified how students performed on the content standards and the domains tested. These reports are customarily provided at the end of the year, but their usefulness for guiding instruction is limited because at the end of the year students move on to a new grade and teacher. Even though the reports help teachers understand how well they taught the standards the previous year, the reports do not provide them with information on how their incoming students will perform on the state assessment at the end of the forthcoming school year. Consequently, to improve student achievement results under the new Common Core State Standards, school and district leaders are looking for normed interim assessments that can be used during the school year to predict student success on state assessments at the end of the school year (Marshall, 2008).

In addition to predicting the achievement levels, schools and school leaders are looking for predictions on how students will perform on the standards that will be assessed on the state assessments (Delisio, 2007). Leaders are hoping the results of normed interim assessments will provide the data needed for teachers to adjust instruction during the school year—in anticipation

that this will, in turn, result in students mastering standards and content domains to help improve proficiency rates on EOG assessments at the end of the school year (Goertz, Olah, & Riggan, 2009).

Unfortunately, once district and school leaders and teachers have the results of the normed interim assessments, teachers have been slow to change the structure of the classroom to improve the daily learning environment, and to clearly present what the students must learn to improve their performance on the next normed interim assessment and, potentially, the summative assessment at the end of the school year (McMillian, 2003). However, research conducted over the past two decades has surfaced a proven method that ensures students can master concepts presented each day and are on track to be successful on summative assessments: having teachers integrate formative assessment practices into the everyday life of their classroom (Heritage, 2010). Implementing formative assessment practices in the classroom will require some change in how the business of teaching and learning is conducted (Heritage, 2007).

There is little research into the practice of combining the predictive capacity of interim assessments oriented to projecting how students will perform on summative assessments at the end of the school year with using formative assessment practices to ensure that (a) students are mastering state standards, and (b) teachers are improving instruction during the school year (Pon, 2013). An assessment that predicts success on state assessments would give teachers and school leaders the opportunity to work consistently with students during the school year to ensure they are prepared for summative assessments at the end of the school year (Keller, Elliott, & Kurz, 2014). Implementing formative assessment practices in conjunction with a normed interim assessment that correlates with outcomes on EOG exams would help ensure students are on track to do well on summative assessments at the end of the school year (Pon, 2013).

Literature Review

Figure 3 is a literature map that displays the literature I used to establish the research questions for this study.

With an increased focus on educators' using state assessments as a measure of a student's readiness to be successful in college and a career when they graduate from high school, educators are continually looking for ways to improve state assessment proficiency rates, which are considered indicators of college- and career-readiness in the state of North Carolina. A key factor in helping educators improve proficiency rates is educating teachers on how to combine normed interim assessment results with formative assessments practices to help their students understand when they have not mastered the learning targets established by the state standards and what students need to do to meet the standards (Wren, 2017).

Teachers must be willing to confront numerous obstacles when changing to a system of true formative assessment practices (Heritage, 2007). First, some teachers may have to alter their beliefs about learning and the learning potential of their students (Brookhart, 2008). They must be willing to reject the transmission model, which asserts that when knowledge is conveyed effectively, student understanding will follow (Wren, 2017). There is an abundance of evidence that the transmission model does not work, whereas formative assessment concepts do make a difference (Wren, 2017). Most teachers accept that good teaching involves interaction, which is a prerequisite for the successful implementation of formative assessment practices in the classroom (Rickabaugh, 2016). Another belief that obstructs achievement through formative assessment practices is when teachers make the assumption that each student has a fixed—rather than an untapped—potential for learning (Fisher & Ford, 1998).

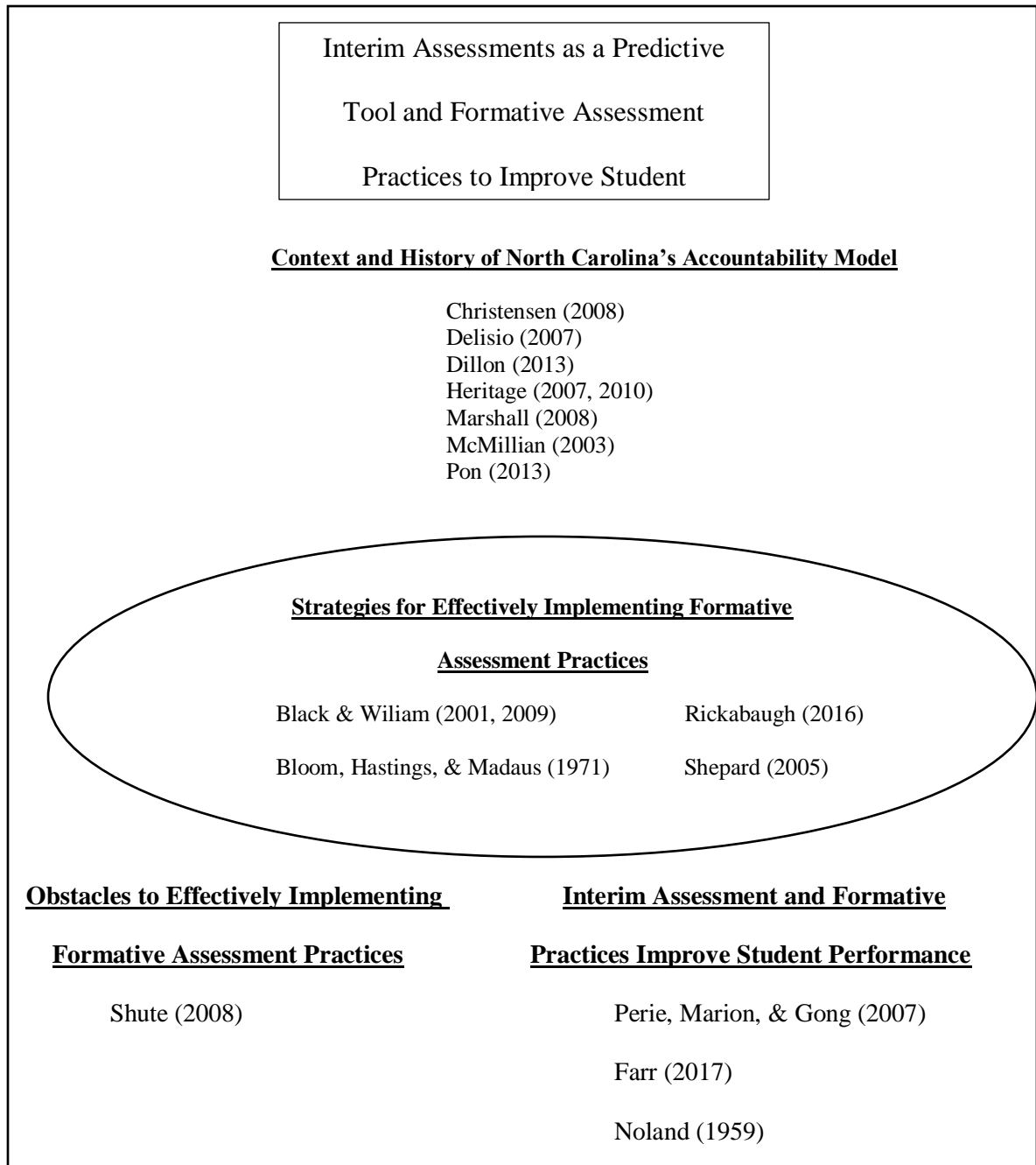


Figure 3. Map of pertinent literature.

Strategies for Effectively Implementing Formative Assessment Practices

Research studies on how to effectively implement formative assessment practices have proliferated over the past three decades. Black and Wiliam's research on formative assessment practices during the 1990s focused on how to embed formative assessment practices in the classroom and is frequently a point of reference for those conducting research on formative assessment practices. According to Black and Wiliam (2001), there are four key concepts that underpin a good understanding of how to effectively implement formative assessment practices in classrooms. First, students must have a clear understanding of what learning should take place and how mastery of the learning will be measured. Second, teachers must be able to engineer effective classroom discussion activities, and learning activities that provide evidence that learning has taken place each class period. Third, teachers must develop a system that provides students with constructive feedback and which can be used to help identify the learning targets not mastered and what the student has to do to master those learning targets. Last, teachers must find creative ways to help students take ownership for their learning.

As research on formative assessment practices has increased over the past two decades, practices have been refined regarding how to effectively implement formative assessment practices in the classroom. Formative assessment practices have two fundamental purposes: first, to provide information on student current level of achievement, and, second, to inform the future steps that teachers need to take to ensure that students make progress toward the desired outcome and learning goals (Heritage, 2007).

Formative assessment practices work most effectively when teachers communicate the purpose and learning targets to students at the beginning of the learning cycle in language that students understand (Shepard, 2005). Another key to effectively implementing formative assessment practices is developing a classroom culture that is built on continuous improvement

and not competition. In order for all students to realize their capacity for doing well, assessment results must be conveyed in an appropriate manner so that students understand what they got wrong and what they have to do to get it right (Wren, 2017).

According to Bloom's *Mastery Learning Model* (Bloom et al., 1971), for students to be able to master concepts, formative assessment practices must be linked to classroom instruction and curriculum instructional units to make the instructional units important to the students and to hold the students accountable for their learning. Formative assessment practices are defined by their purpose which is to help show a student has mastered concepts during the learning process and to provide feedback regarding the teaching and learning process (Shepard, 2005). Feedback is the linchpin that links the components (see Formative Assessment definition) of the formative assessment process (Brookhart, 2008).

Obstacles to Effectively Implementing Formative Assessment Practices

When implementing formative assessment concepts in the classroom, teachers must have a good understanding of what formative assessment practices are (Heritage, 2010). Teachers must also be provided with appropriate professional development on a continuous basis regarding how to implement formative practices in order for all students to see significant gains in academic achievement (Rickabaugh, 2016).

A key part of implementing any program or concept is providing personnel with specific professional development on how to implement the concept or program. In my review of the research literature, I found little research on the importance of professional development with using formative assessment practices effectively. Shute (2008) concluded that, when looking at formative assessment (feedback) over the past fifty years, there have been some conflicting findings that prevent educators from implementing the concepts with fidelity. Shute asserted that good feedback can significantly improve the learning process and learning outcomes if delivered

correctly. For instance, Shute observed, a struggling student may require greater support and structure from formative feedback than a proficient student. Often students are given the same feedback when teachers are not trained on how to use formative assessment practices effectively in the classroom.

Another reason formative assessment practices are not implemented effectively is the inability of leaders at all levels to align goals at the state and local levels with classroom expectations (Bloom et al., 1971). Bloom et al. (1971) asserted that to convince teachers that formative assessment practices are a key component of a balanced and coherent assessment system, leaders have to establish time for teachers and students to review data, and to verify that students are mastering objectives and goals the teacher and students have set. Sometimes, formative assessment practices are not successful when teachers set goals too high for students, and, when goals become unattainable, the learner will likely experience failure and become discouraged. On the other hand, goals cannot be set low either, or students' progress may suffer from their being insufficiently challenged (Fisher & Ford, 1998).

Interim Assessments and Formative Assessment Practices Improve Student Performance

Few studies exist on how to combine the effective use of the predictive value of normed interim assessments with formative assessment practices to improve student outcomes on EOG assessments. North Carolina has been administering summative assessments to measure student outcomes at the end of each school year using EOG assessments since the end of the 1996-1997 school year (North Carolina Public Schools, 2012). With the implementation of the CCSS assessments during the 2012-2013 school year, district leaders are looking for commercially generated normed interim assessments that will allow them to make decisions on what interventions need to be implemented after each administration of the normed interim assessment to ensure students are on track to be successful on the EOG assessment at the end of the school

year. Now that we have assessment companies working to ensure normed interim assessments can reliably predict student success on the EOG assessments specific to North Carolina, district leaders are also looking for ways to combine the effective use of normed interim assessments with appropriate interventions to ensure students are ready for EOG assessments at the end of the school year.

The Aspen Institute along with the National Center for the Improvement of Educational Assessment Policy Brief working with Perie et al. (2007) developed a policy brief on the role of interim assessments. Their work produced three findings schools and districts could highlight when looking to use interim assessments. First, interim assessments are used to evaluate students' knowledge and skills relative to a specific set of academic goals, typically within a limited timeframe. Second, the results of the assessment are used to inform decisions at not just the classroom level but beyond the classroom level. Third, interim assessments may serve a variety of purposes with a growing area focused on the ability to predict students' ability to succeed on large-scale summative assessments.

Of the three findings the policy brief identified about interim assessment, being able to use the assessment to predict proficiency is growing in popularity. Interim assessments can be used as predictive assessments to identify students who are not on track to succeed on the end-of-year assessment. Once those students are identified, they can be given further formative assessments to determine areas of weakness and provided with remedial instruction, extra support, and/or tutoring. This scenario is an example of how interim and formative assessments work together to help improve student performance on summative assessments. It also highlights the importance of having formative, interim, and summative assessments aligned in a comprehensive assessment system. However, it is important to track the performance of students predicted to succeed on the summative test. That is, it should not be considered a strike against

the predictive test if a student predicted to fail the summative test actually passes it, but questions should be raised if too many students predicted to pass the summative test actually fail it.

The Right “FIT” When Selecting Formative Assessment Systems

Since the beginning of the accountability movement when NCLB was introduced in 2001, school systems have worked tirelessly searching for assessment platforms that would allow school system personnel to have a good understanding of whether students are on track to be proficient on EOG assessments and allow teachers to adjust instruction in a timely manner. School systems are looking for in-year information about student performance “just-right information (Heffernan & Militello, 2009). School systems are also looking for a system that will give them accurate data of growth between state level assessments and is able to predict what students will be proficient on the EOG Assessment at the end of the school year (Heffernan & Militello, 2009). The formative assessment system must also be able to shape learning by being aligned to classroom practices and be able to translate data into instructional knowledge.

Selecting the i-Ready Diagnostic Assessment and Instructional platform for the Gasper County School System was an effort to find the “just right” formative assessment platform for grades K-8. Over a four year period the school district tried using two platforms from the Renaissance Learning STAR Assessment and Compass Learning Instructional Platform. The platforms proved not to be a “fit” for the school system because the platforms were not a good predictor of student success on the EOG Assessment or did not provided timely information teachers could use to adjust instruction. Because school leaders are uniquely positioned to access (e.g. purchase), access (e.g. monitor and evaluate), and support and resources (e.g., train and develop) assessment data in schools, the Goldilocks Dilemma explains why the just-right fit is important when selecting a formative assessment system for a school or school district (Heffernan & Militello, 2009). The Goldilocks Dilemma describes four areas a district should

consider when selecting a formative assessment system. What something has to offer vs what it is intended to be used for is important when selecting a formative assessment system. The Goldlocks's metric for fit included the temperature of porridge, size of chair, and comfort of bed (Heffernan & Militello, 2009). Metrics should be used when selecting a formative assessment system the purpose of the system of the system (e.g., properties of the assessment including validity) and the intended uses by school educators (e.g. lesson planning) (Militello, Sireci, & Schweid, 2010).

It is important to establish criterias when selecting an assessment system for a school district. Educational assessments come in many shapes and sizes. Large-scale assessments can either criterion reference (e.g. NCLB state-level assessments) or norm-reference (e.g., TIMSS, NAEP, SATG, ACT). An assessment of curriculum is formative if it shapes the development of curriculum. An assessment of a student is formative if it shapes that student's learning. System leaders should use the guidelines below when selecting a formative assessment system.

- Assessments that are linked to a curriculum that is aligned with the district scope and sequence and state curricular benchmarks
- Assessments that provide timely, student diagnostic-level data
- Ability to disaggregate data with other datasets (e.g, other student achievement data, perceptual data, etc.) and to easily access and communicate reports with a variety of audience, and
- Availability of on-going professional development and immediate on-site assistance to translate data into instructional knowledge.

The importance of finding a formative assessment system that is a good “fit for a school system is important to ensure students have the best chance to learn and master content standards during the school year. Early district efforts were characterized by schools aligning (re-

aligning) their curriculum to match what was taught on state assessment. However, alignment is only one step toward improving student achievement. The other is being able to identify a formative assessment system teachers can use to guide and improve teaching during the school year. Formative assessment systems when they are a good fit offer “just-in-time feedback for teachers and administrators (Popham, 2004, 2008).

Theoretical Framework

To help develop the focus of my study and develop its research questions, and help develop its themes, the theory of formative assessment (Black & Wiliam, 2009) made the strongest impact on my thinking. There are three important concepts involved in the learning and teaching process which Black and Wiliam (2009) used in developing the guidelines for formative assessment theory: (a) establishing where the learners are in their learning, (b) establishing where they are going, and (c) establishing what needs to be done to get learners where they need to be. Teachers must have a clear understanding of these three key concepts to implement formative assessment practices effectively in their classroom on a daily basis and to have a chance to improve the academic achievement for all students. A critical feature of the theory is providing quality interactive feedback to students to help them meet their learning targets.

Traditionally, the teacher has been regarded as responsible for each of the concepts of formative assessment practices, but it is also necessary to take into account the role that the learners themselves and their peers play in implementing formative assessment concepts (Black & Wiliam, 2009). The theory of formative assessment practices focuses on student and teacher interaction. A large portion of Black and Wiliam’s (2001) study focused on the interaction among teachers, students, and their peers, and showed how important that interaction was to students’ meeting their individual learning goals.

Improvement Goal

The State of North Carolina had three major implementations of math content standards since the ABC Accountability model (“A Review of the ABCs Standards Under HB 1414”, 2005) was introduced during the 1996-1997 school year that required the state to develop new EOG assessments. The three major adoption years for math standards in North Carolina were the 2000-2001, 2005-2006, and 2012-2013 school years. Each time new assessments were introduced, test scores in math dropped dramatically. After three to four years following each of the first two adoptions, proficiency rates rebounded to where they were before those adoptions. However, under the Common Core State Standards adoption, proficiency rates have not recovered after four years.

In October 2013, the State Board of Education (SBE) adopted college-and-career readiness Academic Achievement Standards and Achievement Descriptors for the EOG assessment. With this adoption, a fifth achievement level was added, level 5. Achievement Level 3 now identifies students who are prepared for the next grade, but do not meet the college-and-career readiness standard (“Understanding the Five Achievement Levels”, 2014). The addition of the fifth achievement level during the 2013-2014 school year also helped to improve proficiency rating by allowing students that would have been considered non-proficient during the 2012-13 school year to be considered proficient. With the above discussion as background, there are two improvement goals for my study.

Improvement Goal 1

My first improvement goal, using the predictive value of the iReady Adaptive Diagnostic Assessment, is to work with teachers to use the results of the assessment to help improve student results on the next iReady Adaptive Diagnostic Assessment taken by students. By improving teachers’ effective use of the iReady Adaptive Diagnostic Assessment in the day-to-day

operations of the classroom, eventually, the goal of GCS Leadership will be to return proficiency rates in math among Grade 8 students in all GCS schools to where they would have been four years after the introduction of CCSS if the rebounding of those rates had followed the trajectory of rebounds after previous math standards adoptions. After the previous adoption in the 2005-2006 school year, scores recovered to within about 8 to 10 percentage points of the rates the year prior to the adoption by the end of the 2009-2010 school year (4 years after the 2005-2006 standards adaption).

In order for Grade 8 proficiency to recover at a comparable rate in this instance, School F (my benchmark school) would experience an increase of 19.2%, and School B (my intervention school) an increase of 41.3% in their Grade 8 math proficiency rates. These percentage increases are highly improbable over the course of my study. Thus, Improvement Goal 1 for my study is to work with teachers to use the results of the assessment to help improve student results on the next iReady Adaptive Diagnostic Assessment taken by students.

To put the situation in GCS in perspective, Figure 4 provides a clear visual of how Grade 8 math EOG proficiency rates had almost recovered during the 2009 -2010 school year, four years after the standards adoption, to the rates they were during the 2004-2005 school year. Figure 4 also provides a clear picture of how far student math proficiency fell with the adoption of the CCSS and four years later how student math proficiency still lags the proficiency ratings that were recorded during the 2011-12 school year.

Table 5 displays the proficiency rates the years before the past two state standard adoptions and four years after the adoptions for GCS and Schools B (my intervention school) and F (my benchmark school). The numbers in Table 5 also provide insight into the struggles the school district in general, and Schools F and B in particular have, encountered in improving math EOG scores in Grade 8 under CCSS. In the two earlier statewide standards adoption instances,

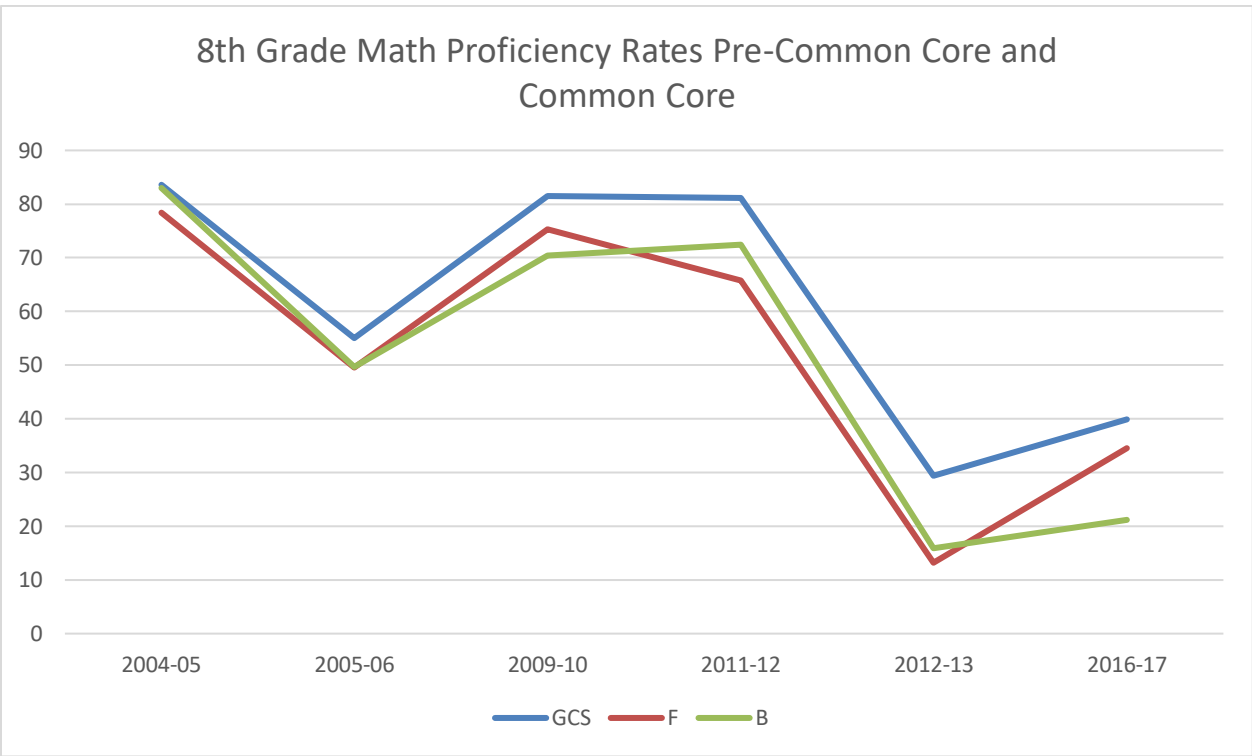


Figure 4. The reduction and recovery of Grade 8 mathematics proficiency rates from the past two standards adoption events in 2005-06 and 2012-13 for GCS overall and for Schools B and F.

Table 5

Proficiency Rates on State Tests of Proficiency on Mathematics (Grade 8)

Context	Fast Recovery After Change			Slow Recovery After Change		
	2004-05	2005-06	2009-10	2011-12	2012-13	2016-2017
Math GCS	83.6	55.0	81.5	81.2	29.4	39.9
Math (School F)	78.4	49.6	75.3	65.8	13.2	34.5
Math (School B)	83.0	49.7	70.4	72.5	15.9	21.2

four years afterwards, scores had rebounded to near their former levels. However, in the current situation, North Carolina adopted new CCSS standards in math and reading during the same year, whereas, in the past, the state has adopted new reading standards and two years later has adopted new math standards, arguably contributing to the slow recovery illustrated in Table 5.

There are two changes to the READY Accountability Model that took effect during the 2017-18 school year which will affect the progress in achieving the improvement goals for my study. During the 2017-18 school year the state of North Carolina submitted and received partial approval of its Every Student Succeed Act (ESSA) proposal from the U.S. Department of Education. Previously, students in Grade 8 who were enrolled in Math I (a high school course) had to take both the Math I assessment and Grade 8 EOG assessment at the end of each school year. This change to the accountability model is important because more advanced students will no longer be required to take the Grade 8 math EOG, and this has ramifications for the Grade 8 math proficiency percentages. For these more advanced students who take Math I, their proficiency rate in the Grade 8 math EOG is often above 95%. Because these more advanced and high-achieving students will no longer be in the Grade 8 EOG pool, this change may result in a reduction in proficiency for each school that houses such students. The state of North Carolina is currently revising the math standards scheduled to be taught for the first time during the 2018-2019 school year. Along with revising the math standards, a new EOG assessment will be given during the 2018 – 2019 school year. This will add to the challenge of improving EOG assessment proficiency scores over the course of my study.

Improvement Goal 2

The second goal of my study is to reduce the number of students losing their proficiency rating from year to year. The i-Ready Adaptive Diagnostic Assessment will be used to measure progress during the school year. Historically, there have been a number of students who were

proficient in Grade 7 but emerged as not proficient in Grade 8 (referred to as “losses” in Table 6; those who were not proficient in Grade 7 but who emerged as proficient in Grade 8 are referred to as “gains” in Table 6).

The data show School B (my intervention school) did a better job of keeping students proficient than GCS overall. Table 6 displays how GCS, School F (my benchmark school), and School B (my intervention school) gained and lost students to and from proficiency from the 2015-16 school year on the Grade 7 math EOG to the 2016-2017 school year on the Grade 8 math EOG.

Table 6 also displays how many students maintained their achievement level from the previous year. Students maintaining their achievement level would normally be a focus, but, since Grade 8 student proficiency rates are the lowest of the three middle school grades, the group of non-proficient students that are maintaining a non-proficient achievement status from year to year will be the focus of the interventions during the study for improvement goal two. Table 7 displays how School B (my intervention school) has a large number of students that are maintaining a level 1 and 2 from Grade 7 to Grade 8. School B will have to focus on not just maintaining the students that were a level 3, 4, or 5 but to find a way to move level 2 students to a level 3, 4, or 5. There are many students who are at the achievement level 1 and 2 that continue to maintain their achievement level, and this has to improve to meet the improvement goal.

Table 6

Transition Table for Grade 8 Math Students for the 2015-16 and 2016-2017 School Year

From Grade 7 to Grade 8	Gained Proficiency (Was Level 1 or 2 in 2015-16)	Maintained Proficiency Levels	Lost Proficiency (Was Level 3 – 5 in 2015-16)	Difference
GCS	364	1255	527	-163
School B	26	106	23	+3
School F	37	101	45	-8

Table 7

Transition Table Showing the Number of Students Maintaining Achievement Levels from Grade 7 to Grade 8 Math

	Achievement Levels				
	1	2	3	4	5
GCS 7 th to 8 th Grade	525	244	21	282	183
School B 7 th to 8 th Grade	62	24	1	14	5
School F 7 th to 8 th Grade	42	25	0	26	8

CHAPTER 3: METHODOLOGY

Key Questions and Tasks

The CCSS initiative has been controversial since the CCSS standards were introduced in the State of North Carolina during the 2012-2013 school year. Educators have complained about the poor quality of the preparation they received from the North Carolina Department of Public Instruction (NCDPI) and Local Education Agencies (LEA) to help them refine their teaching to align with the standards. Political leaders have complained about the lack of state control to decide what should be taught in the state of North Carolina. If nothing else, one thing the CCSS has prompted the state of North Carolina to understand is the imperative to focus on ensuring every student has mastered the content standards as required under the CCSS (Sanchez, 2015).

The CCSS are designed to ensure students are mastering content standards at all four levels of the Webb, Alt, Ely, and Vesperman (2005) “Depth of Knowledge Framework.” This is a change from what the previous standards required. The previous standards required students to master the standards on the first two levels of the Webb et al. (2005) “Depth of Knowledge Framework” (DoKF). To ensure GCS is preparing our students to perform well on the CCSS EOG Assessments and ensure our teachers are teaching the standards to all four levels of the Webb et al. (2015) DoKF, GCS has decided to utilize technology-based normed interim assessments to help measure students’ readiness for the CCSS EOG Assessment. The GCS leadership team understood that there are many types of normed interim assessments to choose from, but it focused on normed interim assessments. i-Ready Adaptive Diagnostic Assessment developed by Curriculum Associates, was chosen because it is technology-based and can provide students timely feedback and help teachers adjust their instructional practices as closely as possible to the time when the instruction was first introduced to the students (Ray, 2016). Using the approach that will be established in the methodology section, I will first establish the

potential for the i-Ready Adaptive Diagnostic Assessment instrument to predict student success on the EOG Assessment.

Research Questions

The questions guiding my study were developed after conducting a review of the formative assessment practice theory developed by Black and Wiliam (2001, 2009) that provides a framework for how teachers could use formative assessment practices in their classroom to improve student learning outcomes. The research questions are listed below.

Research Question 1

Research Question 1 asked to what extent would teachers' knowing the previous academic performance of the students in School B impact their approach to teaching the students.

The assumption underlying this question is that, once teachers had a reliable indicator of their students' end-of-year performance, they would recalibrate their teaching accordingly, and individualize the instructional environment to more appropriately address the needs of all the children in the class. The often-replicated findings of the original Hawthorne effect studies (Noland, 1959) encourages me to suggest that teachers' motivation to utilize the interim assessment data in an optimal fashion would be enhanced by my continual research presence.

Research Question 2

Research Question 2 addressed how formative assessment practices would help students master content standards and improve learning outcomes between the administration of each i-Ready Adaptive Diagnostic Assessment.

Underlying this question are the multiple studies that have found that students learn more effectively when teachers implement formative assessment practices which involves teachers making adjustments to their instruction based on evidence collected, and providing students with

feedback that helps them advance their learning (Hattie & Timperely, 2007). Heritage (2010) argued that to use formative assessment correctly, teachers will need to optimize their knowledge in their domain area, pedagogical content, assessment knowledge, and knowledge of students' previous learning. These skills border on mastery-level teaching, but in many ways these are expectations of quality formative assessment practices. It is well-supported by research evidence that, when effectively implemented, formative assessment as a process assists students in achieving intended instructional outcomes (Wren, 2017).

Methodology

My study capitalized on the ability of the i-Ready Adaptive Diagnostic Assessment (Farr, 2017) being able to be used as an interim assessment that predicts the success students could have on the EOG Assessments at the end of the year. The i-Ready Adaptive Diagnostic Assessment, developed by Curriculum Associates, adapts to each student, providing easier or harder questions depending on the student's answers to previous questions. By adapting across grades K–12, i-Ready Adaptive Diagnostic Assessment helps teachers understand the root causes behind student challenges. This is especially beneficial for providing differentiated instruction and for identifying gaps spanning back multiple years, or for determining where students are ready for further challenge. i-Ready Adaptive Diagnostic Assessment assesses student performance across the key domains in reading and mathematics for grades K–12, providing a valid and reliable measure of student growth with detailed diagnostic results and individualized next steps for instruction.

The first phase of my research was an historical research phase to verify the predictive ability of i-Ready Adaptive Diagnostic Assessment in the GCS context. Once the predictive ability of the assessment was established using the approach that will be described shortly, I collaborated with the teachers in School B (my intervention school) to determine how the

previous academic achievement of each student should be taken into account in planning for the coming year. I collaborated with the teachers to implement formative assessment practices based on the results of the i-Ready Adaptive Diagnostic Assessment to measure growth between each assessment (given three times a year, beginning, middle, and end of year). Ultimately, the goal was determining if formative assessment practices combined with the predictive ability of the i-Ready Adaptive Diagnostic Assessment was a factor in improving student achievement on the EOG Assessment at the end of the school year.

The focus of my study after the historical research phase was on two areas. The first area was gathering and understanding what formative assessment practices School F (my benchmark school) used over the past three years to achieve steady improvement in student performance. Once the analysis was completed, the second area was implementing the strategies in School B to see if similar improvement could be made. The second area consisted of working with teachers in School B so they would understand student learning potential based on the previous year EOG Assessment. To help teachers in School B use the formative assessment practices effectively and personalize instruction for students, I provided support during their existing Professional Learning Community (PLC) meetings. Another focus of the PLC meeting was developing resources parents can use at home to help students improve in areas identified as weaknesses.

To help teachers at School B further understand student potential based on the previous year's EOG assessment, a PLC session was scheduled at the beginning of the school year to provide teachers with a list of their current students who were proficient the previous year (level 3, 4, or 5). The purpose of this opening session was to ensure teachers knew who those students are, and that they develop a plan early in the school year to ensure the students remain proficient during the current school year. During the PLC sessions at School B, the students were discussed

to see if they are on track to stay proficient—based on the i-Ready Adaptive Diagnostic Assessment results.

School Contexts

School F (my benchmark school) is an inner city middle school in Western North Carolina. The school has an enrollment of 671 students (Black: 314, White: 147, Hispanic: 150, Two or More Races: 51, Asian: 6, Native American: 3). School F has a 60.84% free and reduced lunch (FRD) rate and a teacher turnover rate of about 25% each year, well in excess of the state of North Carolina’s overall teacher turnover rate of 14%.

School B (my intervention school) is a rural middle school in Western North Carolina. The school has an enrollment of 558 students (Black: 151, White: 304, Hispanic: 79, Two or More Races: 22, Asian: 1, Native American: 1). School B has a 60.89% free and reduced lunch (FRD) rate and a teacher turnover rate of about 16% each year, much closer to the state of North Carolina’s teacher turnover rate of 14%.

Both schools are Title I middle schools within GCS. Both schools have exceeded growth the past three school years. The major difference is students in School F have increased their proficiency each year and the proficiency of students in School B has remained flat. By focusing on the formative assessment practices School F implemented the past three years, I am hoping, implementing the same strategies in School B we will see an increase in proficiency consistent with Improvement Goal 1.

An understanding of the School Performance Grade calculation process helped to illuminate further the comparison between School B and School F. Beginning with the 2013-14 school year, School Performance Grades (SPG; letter grades from A through F) were assigned to schools based on students’ EOG/EOC Assessments scores and Growth data using Education Value Added Assessment System (North Carolina READY Initiative, 2012) measures. The SPG

is calculated based on both student achievement (contributing 80% to the composite) and growth (contributing 20% to the composite). Student achievement at the middle school level is calculated using the students' proficiency rate on EOG Assessments in math Grades 6-8, reading Grades 6-8, and science Grade 8. Schools can earn one of three EVAAS Growth Status indicators: Met, Not Met, and Exceed Growth. Table 8 displays the ranges that determine how letter grades are assigned for the SPG based on a 15-point scale. The state of North Carolina categorizes schools as low performing when they have a letter grade of a D or F, and do not exceed growth.

The school I selected as the benchmark school (School F), with a high FRD and a teacher turnover rate near the state average), has never been a low performing school and has increased its SPG each of the last three school years with the SPG for the 2016-17 school year of a 60-C. The teachers' teaching experience at School F ranges from three to fifteen years among the total of 55 teachers. Again, the benchmark school was selected because it has had a large amount of growth under the current principal and has established a track record of improving the proficiency and growth rate of their students each school year and the school rebounded after CCSS.

In comparison, the school I selected as the intervention school (School B), also with a high FRD and a teacher turnover rate near the state average, has exceeded growth each of the last three school years with the SPG for the 2016-17 school year of a 44-D. The main difference is School B has not increased its proficiency rates at the same rate as School F. The teachers' teaching experience at School B ranges from three to ten years among the total of 60 teachers. Again, the intervention school was selected because its proficiency rate has not recovered under CCSS.

Table 8

School Performance Grade Ranges and Assigned Letter Grades to Schools

Grade	Range
A	85-100
B	70-84
C	55-69
D	40-54
F	39 or Less

Study Plan

My study was conducted using an action research approach that focused on two middle schools (School F and School B) in GCS in an effort to improve student achievement in School B for Grade 8 math students. Both schools are Title One schools with comparable percentages of students that qualify for free and reduced lunch. Although School B is a rural school and School F is an urban school, for the purposes of my study, I believe that the other similarities outweigh the contextual differences. School F has demonstrated steady growth in student proficiency the past three years, while School B's growth in student proficiency has remained flat.

Description of Study Phases

As discussed above, Phase One (historical research) involved comparing past EOG results to interim assessment results in order to establish the predictive capacity of the i-Ready Adaptive Diagnostic Assessment (Farr, 2017) interim assessments already in place in GCS. This preparatory study was necessary because it should not be taken for granted that what is true of the state overall (Farr, 2017) is also true in GCS. As part of the responsibilities of my position within the GCS administration, I have recently completed this Phase One segment of my study at the request of my supervisor, and presented the outcome of this study to validate my proposed use of the i-Ready Adaptive Diagnostic Assessment in my research study.

As phase two of the overall concept and the opening segment of my research study, following my receipt of IRB approval, I administered a survey to gain an understanding of how the teachers and the administrative team in School F achieved their steady growth. The survey focused on what formative assessment practices were implemented, and how the practices were used in conjunction with interim assessment results. The survey results were used to help me develop professional development for School B teachers. The purpose of the professional

development was to help teachers in School B develop strategies for formative assessment practices that use the results of interim assessment to improve student achievement.

Phase Three consisted of the implementation of my action research interventions—based on what I learn from School F—in School B. At the conclusion of my research study, if my action research intervention results in noteworthy gains in student performance in School B, I intend to offer the same action research interventions for the other middle schools in GCS.

Phase One: Historical Research

As highlighted above, it was essential for me to establish the credibility of i-Ready Adaptive Diagnostic Assessment as a predictive tool prior to embarking on my research study. Thus, phase one consisted of an investigation that used de-identified historical data to explore, at the district level, the association between EOG scores and the i-Ready Adaptive Diagnostic Assessment (Farr, 2017) developed by Curriculum Associates. I had the approval of the appropriate authorities at GCS to conduct this exploration of the historical data as part of my responsibilities within the GCS administration.

The use of interim assessments and their ability to identify whether students are on track to become proficient was an important part of establishing interventions early during the school year. With limited resources available at the district and school level, if i-Ready Adaptive Diagnostic Assessment proves to be a reliable predictor of EOG scores, it could be an important tool to assist district leadership in focusing resources during the school year where the resources can improve student outcomes.

Curriculum Associates (Farr, 2017) conducted a linking study, after the 2015-16 school year, comparing Curriculum Associates' i-Ready Adaptive Diagnostic Assessment Scale Scores to the EOG Assessment Scale Scores. The study revealed that i-Ready Adaptive Diagnostic Assessment Scale Score matched the EOG Assessment Scale Score, thereby identifying students

on track to achieve a level 1-5 had the students been taking the EOG Assessments the day they took the i-Ready Adaptive Diagnostic Assessment. In terms of the technical specifications, the Center on Response to Intervention defines that when the Area Under the Curve (AUC) from Receiver Operating Characteristic (ROC) Curve analysis is greater than .85, the evidence is convincing that an assessment can accurately predict the binary categorical outcome (e.g., “proficient” or “not proficient”) on another assessment. Table 9 shows the AUC values for predicting whether or not students are classified as proficient on the EOG Assessment in Mathematics using the i-Ready Adaptive Diagnostic Assessment Scale Score. The higher than .85 AUC ratings indicate that the i-Ready Adaptive Diagnostic Assessment Scale Scores of 1-5 correspond closely with levels 1-5 on the EOG assessment. This means the scale score on the i-Ready Adaptive Diagnostic Assessment closely maps to the scale score on the EOG, and is a good predictor of success on the EOG Assessment at the end of the school year at the state-wide level. The high AUC values suggest that the selection of the i-Ready Adaptive Diagnostic Assessment as a means of being able to predict eventual EOG proficiency is appropriate.

The goal of Phase One was to see how accurately the i-Ready Adaptive Diagnostic Assessment scale score established by Curriculum Associates predicts performance at the school and district level. Depending on the accuracy of prediction of the i-Ready Adaptive Diagnostic Assessment, I devised a projected math proficiency rate for School F i-Ready Adaptive Diagnostic Assessment, which is the number of students likely to receive a score at the proficient level (scoring at levels 3, 4, or 5) on the EOG CCSS math assessment. This prediction gave me a point of reference for my collaborative discussions with the teachers about how to enrich the learning environment.

Table 9

Curriculum Associates AUC Values Indicate Predictive Potential of the i-Ready Adaptive

Diagnostic Assessment

Grade	AUC Values
3	.91
4	.92
5	.91
6	.93
7	.93
8	.92

Investigative Approach at School and District Level

The Educational Research Institute of America conducted a research study evaluating the relationship between i-Ready Adaptive Diagnostic Assessment and the 2016 North Carolina EOG Tests. The results of the research showed a high correlation between the i-Ready Adaptive Diagnostic Assessment and North Carolina EOG Tests, indicating that i-Ready effectively predicted end-of-year proficiency rates. The results of the research also showed a strong correlation between the spring i-Ready Adaptive Diagnostic Assessment and the 2016 North Carolina EOG Tests—with overall correlations of .82 for Mathematics for all students across grades 3–8—exceeded the Center on Response to Intervention's recommended .70 threshold for correlations. Table 10 displays the i-Ready Adaptive Diagnostic Assessment Scale Scores for Grades 3-8 Math.

During the school year, the instructional department in GCS requires schools to administer the i-Ready Adaptive Diagnostic Assessment three times to each student. Based on the scale scores in Table 10, Grade 8 students who earned a scale score of 528 or higher on the Curriculum Associates i-Ready Adaptive Diagnostic Assessment have a great chance of earning a proficient level (level 3, 4, or 5) on the EOG Assessment at the end of the school year. Following up on the linking study conducted by Curriculum Associates, I conducted a linking study that examined how effective the i-Ready Adaptive Diagnostic Assessment was at predicting EOG success for GCS students, given that Curriculum Associates established a scale score of 528 or greater as a good predictor of success (achieving EOG Math Levels 3-5) on the Grade 8 EOG. The linking study was used to establish a predicted proficiency rate for School B Grade 8 Math.

To establish the credibility of the i-Ready Adaptive Diagnostic Assessment scale scores as indicators of eventual EOG scores and achievement levels, I correlated the scores of the math

Table 10

Curriculum Associates i-Ready Adaptive Diagnostic Assessment Math Score Equivalents for Each NC EOG Achievement Level Scale Score

i-Ready Adaptive Diagnostic Assessment Score Ranges per Proficiency Level					
Grade	EOG Level 1	EOG Level 2	EOG Level 3	EOG Level 4	EOG Level 5
3	100-426	427-449	450-458	459-482	483-800
4	100-426	453-475	476-481	482-508	509-800
5	100-461	462-485	486-491	492-518	519-800
6	100-482	483-504	505-510	511-534	535-800
7	100-490	491-513	514-520	521-544	545-800
8	100-500	501-527	528-533	534-561	562-800

students in School B on the i-Ready Adaptive Diagnostic Assessment scale scores on each of the three administrations in 2016-17 with their eventual EOG scale scores and EOG proficiency levels.

Table 11 and Table 12 display the comparison between the i-Ready Adaptive Diagnostic Assessment achievement levels and the EOG Assessment Achievement levels for School B (see Table 11) and School F (see Table 12). I focused on Grade 8 math students to determine how closely the i-Ready Adaptive Diagnostic Assessment predictions align with the actual EOG (Levels 1 – 5). The shaded cells show where both assessments agreed. School B did not have any students that achieved a level 5 on the EOG Assessment. School B had 12 of 46 students the i-Ready Adaptive Diagnostic Assessment predicted would be proficient on the EOG Assessment who did not achieve proficiency.

School F had 8 of 76 students that the i-Ready Adaptive Diagnostic Assessment predicted would be proficient on the EOG Assessment who did not achieve proficiency on the EOG Assessment. For the students where the achievement levels did not agree, most were in the range of Levels 2-4. When NCDPI introduced the level 5 achievement level in 2013-14, Level 3 was established based on two scale scores. The highest Level 2 scale score is 451 and lowest Level 4 scale score is 454. The range for Level 3 scale scores is 452 and 453. Thus, the margin for the end and beginning levels of a Level 2 and Level 4 is narrow and a student that is a low Level 4 could easily be a high Level 2, based on answering three to four questions correctly or incorrectly.

Based on the above discussion, I believe the i-Ready Adaptive Diagnostic Assessment can be used to help School B identify what students could possibly be proficient and non-proficient on the EOG Assessment at the end of the school year. Also, the i-Ready Math Assessment can be used to develop next steps for instruction for students not on-track to be

Table 11

*School B 2017-18 i-Ready Adaptive Diagnostic Assessment and EOG Assessment Results**Comparison*

Actual EOG Achievement Levels	i-Ready Adaptive Diagnostic Assessment Predicted EOG Achievement Levels				
	1	2	3	4	5
1	98	24	0	0	0
2	14	42	8	0	4
3	0	8	4	0	2
4	0	6	10	0	18
5	0	0	0	0	0

Table 12

*School F 2017-18 i-Ready Adaptive Diagnostic Assessment and EOG Assessment Results**Comparison*

Actual EOG Achievement Levels	i-Ready Adaptive Diagnostic Assessment Predicted EOG Achievement Levels				
	1	2	3	4	5
1	148	6	0	0	0
2	38	48	4	4	0
3	2	10	10	4	0
4	0	28	10	46	0
5	0	0	2	0	4

proficient and students on-track to be proficient. The i-Ready Adaptive Diagnostic Assessment can be used to drive the formative assessment practices that was used to help teachers in School B improve the learning environment for students.

Phase Two: Investigative and Information Gathering Phase

In a partnership with the administrative team and teachers in School F, after I received IRB approval for my study, a structured professional development plan was developed for implementation in School B. The professional development plan focused on helping staff members in School B understand (a) the predictive value of normed interim assessments, (b) the use of formative assessment practices, and (c) how to implement systematic interventions to help students improve between interim assessments and give students a better chance of scoring a Level 3, 4, or 5 on the state EOG Assessment.

After I received IRB approval for my study, the first step of professional development focused on reviewing the 2017-18 data with teachers in School B. Since the focus of the study was on the middle school, we looked at the achievement scores for students in School B when they were in Grade 7 during the 2016-17 school year to see if their proficiency level moved from a Level 3, 4, or 5 (proficient) to a Level 1 or 2 (not proficient; losses) during the 2017-18 school year. Conversely, we also looked to see if individual students' achievement level moved from a Level 1 or 2 (not proficient) to a Level 3, 4, or 5 (proficient; gains). The point of looking at how students transition from Grade 7 to Grade 8 when it comes to achievement levels was to develop appropriate instructional strategies during PLC data support sessions to maximize the gains and minimize the losses. The results of the transition data analysis was used to identify a starting point to track the student progress during the school year in the expectation that they will be proficient on the EOG Assessment at the end of the school year.

For reference, Table 13 shows how School B gained and lost Grade 8 students to and from proficiency from the 2016-17 to the 2017-2018 school year on the math EOG.

The second step of Phase Two of my study, once the survey results from School F were analyzed, was to establish key areas for professional development sessions that was offered during staff meetings to help teachers and staff members support students at risk of not being proficient. This second step of my study began during the month of September and extend throughout the school year.

I developed parent support sessions that focused on resources available to them to support their child's improvement between Interim Assessments. I also developed a one-page document that was used to inform parents of the benefits of administering the Interim Assessments, and how parents could help their child improve his or her score on the Interim Assessments by working at home on the development of skills not already mastered.

Professional development sessions was also conducted during Professional Learning Community (PLC) Math Teams meetings during the school year. The support provided to teachers focused on using the Interim Assessment results to help teachers adjust instructional strategies, identify what each student needed to focus on to improve, and what parents could work on at home with students.

Phase Three: Action Research

Phase Three of my study focused on the effective use of formative assessment practices and interim assessment results, and will build on what I learned during the investigative and historical research phases of my study as it relates to School B. Phase Three will begin during the month of September and will be part of ongoing support throughout the year for Grade 8 teachers in School B. We focused on establishing systematic interventions based on how students perform on the Interim Assessments conducted during the school year. The formative assessment

Table 13

School B Transition Table for the 2016-17 and 2017-2018 School Year

Math	Gain Was Level 1 or 2 2016-17	Loss Was Level 3,4,5 2016-17	Difference
Grade 7 to Grade 8	10	7	+3

practices that was the focus of Phase Three was what I learned from the survey administered to the administrative team and teachers at School F in addition to what I learned during PLC meetings.

As mentioned above, to help identify effective practices School F used and implemented during the periods between each interim assessment, a survey was administered to Math Teachers in Grade 8. Once the practices were identified, teachers in School B will receive professional development on (a) the formative assessment practices identified from school F, (b) identifying the potential proficiency of students, and (c) the effective use of Interim Assessment results. The professional development took place during PLC meetings and staff meetings. Table 14 shows the overall plan for my study in the form of a logic model.

To summarize, the initial focus of my study was getting School B to understand each student's ability to be proficient on the EOG Assessment. Next, the focus of my study was to use the predictive value of the i-Ready Adaptive Diagnostic Assessment to help identify how formative assessment practices could be used to help students achieve that predicted score—which, in turn, would lead to their being proficient on the EOG Assessments at the end of the school year. The secondary focus of my study was to using the predictive value of the i-Ready Adaptive Diagnostic Assessment to reduce the number of students that lose proficiency from one year to the next.

The historical research phase of the study focused on establishing the credibility of the i-Ready Adaptive Diagnostic Assessment as an indicator of whether students were on track to become proficient on the EOG Assessment at the end of the school year. I was focused particularly on how accurate the i-Ready Adaptive Diagnostic Assessment was in predicting the success of Grade 8 students at School B, in anticipation that this tool would allow School B to focus on what students to target during the school year in order to improve student outcomes on

Table 14

Logic Model of Plan to Improve Student Achievement

Planned Implementation of Action Research			Intended Results	
Resources	Activities	Outputs	Outcomes	Impact
Each student’s previous year EOG result (proficiency rating).	Professional Development on establishing potential proficiency for each student. The focus will be on knowing each student’s ability to be proficient on the EOG Assessment.	Teachers and administrators will know what students were proficient the previous year. The goal will be to keep the student proficient for the current school year. Teachers will also know the students that were three scales scores away from being proficient. The students who were proficient the previous year and the students three scale scores away will be used to establish a potential proficiency rate for Grade 8.	Teachers will know how to work with each student to ensure he or she remains proficient if he or she was at Level 3, 4, or 5. Teachers will also know how to work with students who were at Level 1 or 2 the previous year to enable them to move to a Level 3, 4, or 5.	Increased individualized support for each student.
i-Ready Adaptive Diagnostic Assessment results and the cut score table.	Professional Development on the predictive value of Interim Assessments.	Teachers and administrators will understand how accurate the i-Ready Adaptive Diagnostic Assessment is in predicting students’ potential success on the EOG Assessment. The predictions will be used to see if Grade 8 students are on track to meet their proficiency rating after the administration of each Interim Assessment.	Teachers and administrators will understand what score on the Interim Assessment is equivalent to a Level 3, 4, or 5 on the EOG Assessment.	Teachers and administration will be able to develop interventions for students not on track to be proficient after each assessment.

Table 14 (continued)

Planned Implementation of Action Research			Intended Results	
Resources	Activities	Outputs	Outcomes	Impact
Survey Data	Administer survey to Teachers at School F.	Questions will identify specific formative assessment practices from School F that can be used in School B.	Teachers will understand formative assessment practices and identify the practices in a class setting.	Formative assessment practices will allow students to receive interventions as close as possible to the delivery of the initial instruction.
	Analysis of survey data	Specific formative assessment practices that can be used with School B teachers.	Specific strategies will be identified that are formative assessment practices.	Teachers at both schools will have a better understanding of formative assessment practices.

Table 14 (continued)

Planned Implementation of Action Research			Intended Results	
Resources	Activities	Outputs	Outcomes	Impact
Results of Survey from School F and Formative Assessment Practice Theory Document.	Professional Development based on Survey Results from Teachers and Administrators in School F.	School B teachers will have professional development sessions at staff meetings and during PLCs. I will start as the lead for the professional development. The teachers will be empowered to take over conducting the professional development. I will maintain oversight of the process and will conduct interviews with individual teachers twice a month to monitor the effectiveness of the professional development and strategies.	Effective formative assessment practices identified that can be used at School B with a population comparable to that of School F.	Increased student success at School B.
i-Ready Diagnostic Assessment Results	Analysis of i-Ready BOY, MOY, and EOY Assessment Data in comparison to previous years' EOG Results.	Comparison of i-Ready BOY, MOY, and EOY and Previous Years Results to gauge the effectiveness of the action research in improving EOG Assessment Results.	Recommendations based on the results of the research which has been effective in increasing student achievement.	Increased student success at all GCS middle schools.

the next i-Ready Adaptive Diagnostic Assessment and EOG Assessment at the end of the school year.

To summarize, following IRB approval, my research study was divided into three phases. Phase One focused on identifying what formative assessment practices School F used the past three years. The purpose of identifying the practices was to implement the practices in School B during Phase Three—what I viewed as the action research phase of my study. Phase Two identified what topics would be a part of the professional development sessions. Phase Two also focused on the importance of understanding at what level of proficiency students are commencing the school year and developing a plan to ensure they either stay proficient or grow from being non-proficient to proficient. Phase Three—the action research phase—focused on helping School B determine if students are making progress after each administration of the i-Ready Adaptive Diagnostic Assessment. Professional development sessions focused on understanding the predicted scores and what interventions had to be put in place to ensure students continued to improve between each administration of the i-Ready Adaptive Diagnostic Assessment to ensure students had a great chance to be proficient on the EOG Assessment at the end of the school year. The final step of Phase Three focused on evaluating the success of my action research based on student improvement on the i-Ready Adaptive Diagnostic Assessment after each administration and my analysis of the surveys that I conducted throughout the year. Table 15 lays out my research timeline in a concise format.

Table 15

Anticipated Research Timeline

Task	Duration (Weeks)
Historical Research Predictive Value of Interim Assessments Using the i-Ready Adaptive Diagnostic Assessment and EOG Results	completed
Phase One	
Survey administered to School F	2
Phase Two	3
Understanding student potential based on previous year EOG Assessment	1
Professional Development Sessions Developed for School B based on Survey Results	1
Parent Informational Session Topics Developed	1
Phase Three: Action Research	
Cycle 1 Action Research Intervention in School B (Leader)	4
A. PLC Support and Professional Development - Interim Assessment Results	2
B. Parent Information Sessions	2
Phase Three: Action Research	
Cycle 2 Action Research Intervention in School B (Coach)	4
A. PLC Support and Professional Development - Interim Assessment Results	2
B. Parent Information Sessions	2
Phase Three: Action Research	
Cycle 3 Action Research Intervention in School B (Coach)	4
A. PLC Support and Professional Development - Interim Assessment Results	2
B. Parent Information Sessions	2
Analysis Phase	
Data analysis to determine success of the study	3

CHAPTER 4: RESEARCH FINDINGS

My study began by comparing historical de-identified EOG Math Assessment data from the 2017-18 school year with EOY i-Ready Diagnostic Assessment data from the 2017-18 school year to see if the i-Ready Diagnostic Assessment was a good predictor of student success on the EOG Math Assessment given at the end of the 2017-18 school year. The analysis sought to assess the accuracy of the i-Ready Diagnostic Assessment in predicting whether students would be proficient on the EOG Assessment (levels 3, 4, or 5) or non-proficient on the EOG Assessment (levels 1 and 2). That historical phase showed that the i-Ready Diagnostic Assessment was a good predictor of student success on the Grade 8th Math EOG for School F and B.

The results of the historical phase of the research study also helped to develop the overall design of the study in terms of using the i-Ready Diagnostic results from the BOY, MOY, and EOY testing administrations during the 2018-19 school year to predict future student success and growth between each assessment. The research design for this study employed a mixed methods approach using action research to determine if the formative assessment strategies School F implemented could be used to help improve students' outcomes on the Grade 8 Math EOG Assessment at School B. The i-Ready Diagnostic Assessment results, the i-Ready Instructional Platform (a proprietary digital window into student responses to the items on the i-Ready Diagnostic Assessment that suggest "next steps" to enrich the learning experience—to be illustrated in the following), and specific formative assessment practices constitute facets of developing an overall strategy for future success as teachers adjust their teaching practices and strategies between each assessment window.

My hypothesis was that the teaching practices and strategies that worked in School F—as indicated by steady improvement in student achievement over the past four school years—would, if implemented with fidelity in School B, would result in School B experiencing similar success at the end of the school year on the Math EOG Assessment by focusing on the results of the i-Ready Diagnostic Assessment at the BOY, MOY, and EOY testing windows. My overall study research goal was to establish the feasibility of using the i-Ready Diagnostic Assessment as a way to help teachers adjust their instruction by empowering them to use the i-Ready Instructional Platform to improve their daily formative assessment—thereby potentially improving student outcomes and eventually leading to improvement on the EOG Math Assessment. In all, there were four phases to my study—an initial historical phase, followed by survey administration (phase one), survey analysis and professional development (phase two), and three action research cycles (phase three). The following brief overview of each phase will be followed by a more in-depth discussion.

Phase One

Phase One of my study consisted of working with the principal and teachers in School F to understand and document what strategies School F has implemented over the past four years. To gather their input, I administered a survey consisting of 13 questions with a focus on identifying how PLCs in School F were conducted (see Appendix B). The aim was to identify what formative assessment practices School F implemented on a regular basis, and what best practices School F implemented to continue to improve their math EOG Assessment Proficiency rate over the past four years.

Phase Two Survey Analysis

Phase one of my study informed the next phase by identifying what was working and what was not working so adjustments could be made to the professional development sessions and PLCs during the duration of the study. Hence, the strategies and professional development that emerged from the survey in phase one were recommended for use in School B. Progress was tracked by means of routine short surveys given to teachers in School B to determine what support the Grade 8 teachers would need during this first cycle of my action research endeavor.

Phase Two Analysis of Survey Results and Identifying Formative Assessment Practices

Phase Two of the study concentrated on developing training sessions to be used in working with the Grade 8 math teachers in School B during their PLCs at the beginning of the school year. The primary emphasis of these sessions was to be how students performed on the Grade 7 math EOG assessment (identifying students that were a level 3, 4, or 5 and students who were three scale scores or less from being a level 3). The second emphasis was on reviewing my summary of the results of the survey I conducted with the teachers in School F. We discussed the best practices implemented there that would help teachers in School B improve student outcomes during the school year and on the EOG Assessment. The third emphasis was on developing materials for parents so that they could promote the use of the i-Ready Instructional Platform at home by their sons/daughters.

Phase Three Action Research

Phase Three of the research consisted of three action research cycles.

Cycle One

I served as the leader of cycle one, which consisted of inaugurating a professional learning community (PLC) based on the practices and strategies identified from School F and the

data review of the previous year's EOG Assessment results. Another topic of the PLC meeting was the results of the BOY i-Ready Diagnostic assessment. The teachers used predetermined standards to determine if students were on track to equal or better their performance on the EOG Assessment for the current year based on the i-Ready Diagnostic Assessment. I planned the PLC session and developed the materials in an effort to model what future PLC sessions should look like. My goal was to ensure that the Grade 8 math team in School B had a sound understanding of how to use the i-Ready Diagnostic and Instructional Platform and the previous year's Math EOG Assessment to improve student outcomes.

Cycles Two and Three

During cycles two and three of the action research, I served as the coach helping teachers in School B, at their regular PLC meetings during the MOY and EOY assessment windows, to review i-Ready Diagnostic Assessment data. The purpose of the PLC meetings was to evaluate whether students were on track to be proficient on the Grade 8 math EOG and to focus on what instructional strategies adjustments might ensure students improved their chance of being proficient when MOY and EOY assessment data were reviewed.

After the cycle one meeting of Phase Three, a survey was conducted to gather teachers' input on what they needed from a professional development perspective to continue to improve student outcomes and refine their teaching practices. The survey served as a way to inform the administration about what teachers needed on a regular basis to improve student performance and to help adjust instruction for students.

Figure 5 highlights the key components of each of the three phases of the study. The figure will be used to center the subsequent in-depth discussion of the three phases of my study.

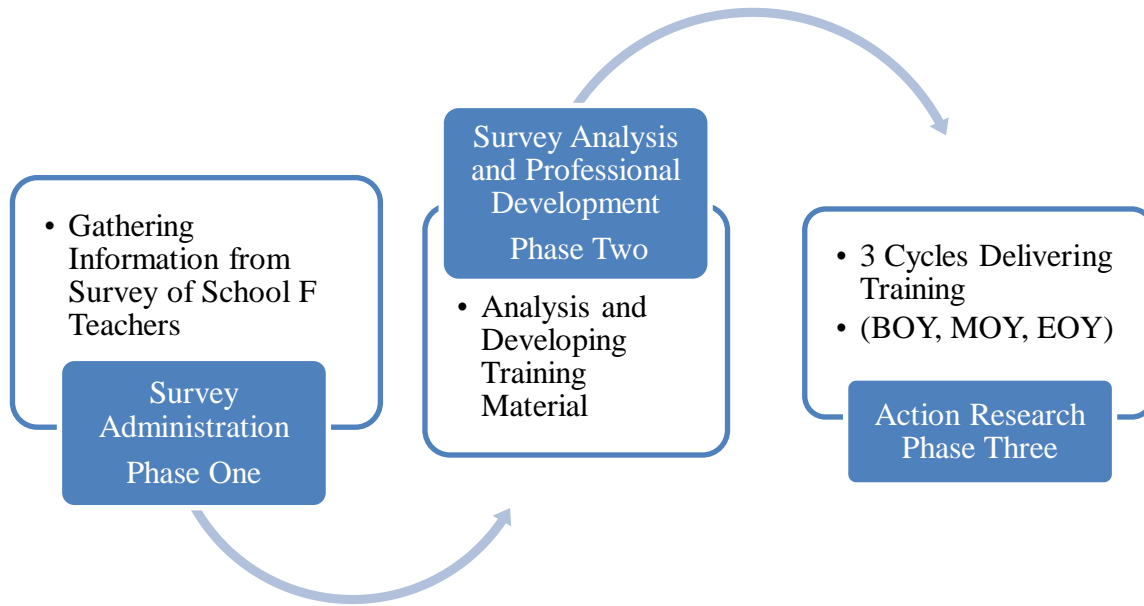


Figure 5. The key components of the three study phases and the three action research cycles integrated into Phase Three.

In-Depth Analysis

Phase One: Survey Results and Best Practices in School F

Figure 6 highlights the major step of phase one of my study which was conducting a survey with the math teachers at School F.

As mentioned above, Phase One began with administering a survey to math teachers of School F with a goal of identifying the formative assessment practices the school and teachers employed in helping the school exceed growth the past four years and improve their school performance grade from a 42 to a 56. The survey consisted of 13 questions using three major categories (Demographic, PLC, and Formative Assessment Practices; see Appendix B). Six math teachers at School F participated in the survey. Three teachers had 1- to 4-years of teaching experience, and three teachers had 4- to 10-years of teaching experience. The six teachers had worked with School F between 1 and 4 years. The three major areas of the survey were the function and structure of School B's PLCs during the school year. The second area addressed by the survey was how the school used formative assessment practices to help teachers concentrate on improving student achievement and daily outcomes. The third area addressed by the survey was how the teachers at School F used the i-Ready Diagnostic Assessment and Instructional Platform to help adjust their instruction during the school year as close as possible to when that instruction was first delivered. The survey was completed individually by the teachers.

After the teachers completed the survey, I used a coding system to identify the major areas we could use from the teacher feedback. According to Auerbach and Silverstein (2003), there are three stages in extracting meaning from qualitative survey data: (a) making the text manageable, (b) hearing what the respondents said, and (c) developing theory. Following

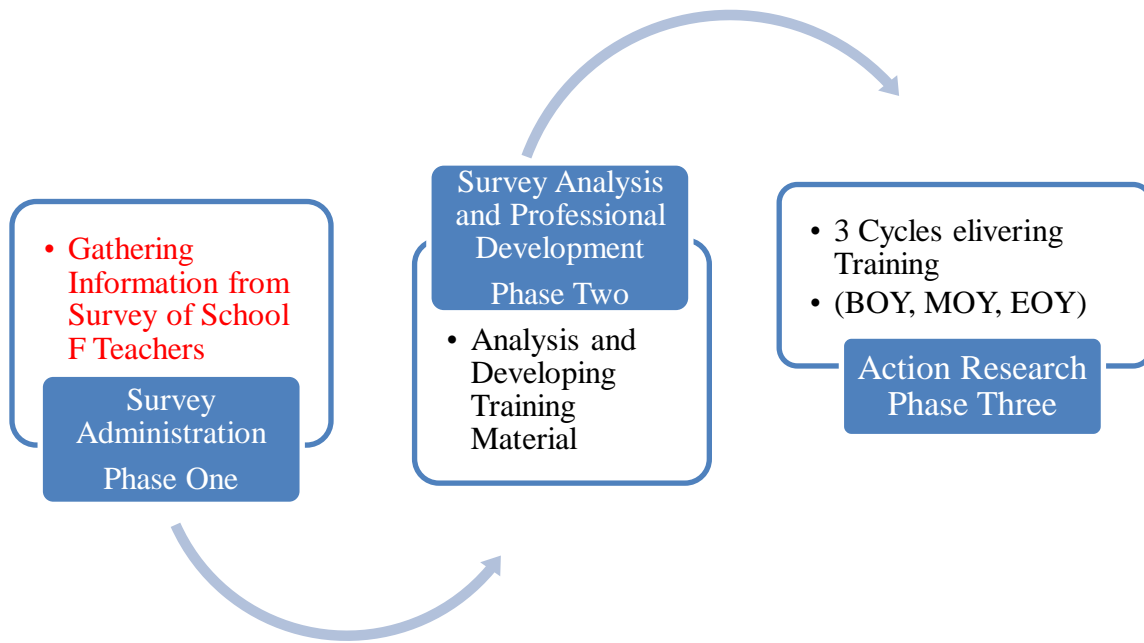


Figure 6. Highlighting of survey results in School F and the focus on identifying formative assessment practices.

Auerbach and Silverstein's (2003) process, I used these stages to develop theoretical constructs by grouping themes into more abstract concepts consistent with my study's theoretical framework. Table 16 lists the results of my analysis of the raw data and highlights the five major formative assessment practices used by School F. In selecting themes, I again followed the suggestions of Auerbach and Silverstein and paid close attention to my selection of relevant text and repeating text. My research concerns (theoretical framework) helped me select the relevant text and develop the themes from this phase of my study. Each theme provides a description of the formative assessment practices used at School F. Appendix D contains the raw data and documents the detailed process I used to establish the major formative assessment practices used by School F from the survey results.

After themes from the survey were established, it was important to summarize and highlight the formative assessment practices identified from School F. There were five formative assessment practices identified that would be recommended for use in School B during the 2018-19 school year. Table 17 provides the key component of each formative assessment practice along with a quote from the 6 teachers that completed the survey. The narratives that follow will provide additional strategies for each formative assessment practice used by the teachers of School F. The formative assessment practices: potential for growth and proficiency, using data to track student progress, mastering learning goals, reflection and student conference, and learning from others will be described from the point of view of the teachers in School F.

Potential for Growth and Proficiency

As teachers are getting to know the potential of their students for growth and attaining proficiency, whether it is at the beginning of the school year or the first day the student enters their classroom, teachers should focus on understanding the learning style of the student. One

Table 16

Stages Used to Analyze Survey Data of School F Teachers

Strategies used to Analyze Survey Results (relevant text)	Research Concerns and Theoretical Framework (repeating text)	Themes Form Analysis (selecting the theme)
Making the text manageable	How students learn and their learning potential	Potential for growth and proficiency
Hearing what they said	How is learning measured and how do you know students have learned	Using data to track student progress
	Students taking ownership for their learning	Mastering learning goals
Developing Theory	Culture of the classroom	Reflection and student conference
	Professional Development in using formative assessment concepts	Learning from each other

Table 17

Survey Results for Teachers of School F Identifying Formative Assessment Results

Theme for Survey School F	Formative Assessment Practice	Quote from Teacher School F
Potential for Growth and Proficiency	<p>It is important to have a thorough understanding of all students that enter your classroom, said one teacher, who asserted “if you don’t have a good understanding of their potential you can’t meet their needs.” Every teacher was clear during their survey response on what teachers should focus on at the beginning of the school year in an effort to get to know their students.</p>	<p>I think especially the learning potential because if you just look at a student as the score they were last year and you peg them as a failure, then you give up on them. But if you see their potential, you're constantly working towards mastery, giving them every opportunity to fix their mistakes and to get better and better.</p>
Using data to track student progress	<p>Every teacher had a strong understanding of how to use data to drive how they structured their classroom each day. The teachers consistently talked about using assessment programs that would allow them to trust that the data they were using would be an accurate measure of student success. The teachers wanted the data to be used for tracking growth and proficiency and not to provide students with a grade.</p>	<p>Lots of ways. Data, data, data. We measure learning from, if we're looking at AR, we're looking at their growth, even on test, how well are you doing on AR test? i-Ready data. Have you grown from the previous i-Ready test? Moby Max, that's measured every day.</p>

Table 17 (continued)

Theme for Survey School F	Formative Assessment Practice	Quote from Teacher School F
Mastering Learning Targets	<p>It was clear with every teacher, that was a part of the study, that the most important way to ensure students will grow and be proficient at the end of the school year is to focus on the student’s ability to master state content standards and understand when students are struggling to master the standards.</p>	<p>I think at this age, competition is just innate, and if you put them outside, they'll start racing each other, they just love to one-up the other one. So I think it's healthy as long as you celebrate everyone's successes. So when a student crosses over to the next little goal that I've set, we all clap and stop and give a reward. And so we're all celebrating each other.</p>
Reflection and Student Conference	<p>The teachers truly believe the key to successfully implementing formative assessment practices in a classroom, which will allow students to reflect after each assessment to take ownership for their learning, is allowing the student to have dedicated time to reflect and holding student led conferences.</p>	<p>So when we finish taking a i-Ready test, we will call them back and they have a sheet where they have to answer certain questions. And the questions involve things such as, why do you think you showed growth or showed a decline? What can you do to improve the next time? And they have to write out their own authentic answers. So I think that's helped.</p>

Table 17 (continued)

Theme for Survey School F	Formative Assessment Practice	Quote from Teacher School F
Learning from each other	<p>One of the outcomes from the action research is the amount of professional development a teacher has received to be able to implement formative assessment practices in the classroom. All six teachers talked about the professional development the district provides, but said their primary way of learning about formative assessment practices is from each other. This quote from one of the teachers' shows that over time teachers learn from each other more than formal professional development: "You pick up ideas, you pick up strategies from other teachers. One thing that happened last year when I came here they said, "Steal, beg, borrow and steal." Definitely beg, borrow and steal from them."</p>	<p>And not only are we analyzing our data, we're analyzing all sixth grades' math data because Teacher 1 might have a really high percentage on one question that I might be really low. So we actually have watched her do things and we just share ideas based off of those and that to me has been very beneficial.</p>

teacher said, “students have different learning styles and we have different types of learners. There are the visual learner, the auditory learner.” Understanding each student’s learning potential is important as that potential is a major part of knowing what strategies to use to help that student grow and meet his/her proficiency targets at the end of the school year.

Every teacher must be able to identify if students are on track each day with some type of measurement before the students leave the classroom. One teacher noted she has a routine process that she follows with her students each day after they take an assessment: “Have you grown from the previous i-Ready Diagnostic Assessment? Moby Max, that’s measured every day, seeing how much they’re achieving in Moby Max for language and vocabulary.” (Moby Max is) Each assessment should also provide a measure of whether the students are on track to be proficient and achieve growth for the school year. If the teacher establishes the daily assessment expectation at the beginning of the school year, it will send the message that the assessment is important and will allow the student to have a daily measurement to see if they are on track to meet their growth and proficiency goals.

When learning is measured for growth and proficiency on a regular basis, it allows teachers to adjust instruction for their students on a regular basis to meet the student’s learning and instructional needs. The two most important learning strategies that help the teacher to adjust instruction based on the data are one-on-one help and small group instruction. One teacher really focused on individualized instruction for work with the students: “ just really having that one-on-one time with them or that small group time, to try and figure out what specifically they’re not understanding, trying to help them move forward.” Those instructional strategies are what made the difference in whether students grew and achieved their proficiency target for the school year.

Using Data to Track Student Progress

Of all the feedback provided by teachers, the teachers said on a consistent basis that it was important for them to have a program that would allow them to track objectives and standards to ensure students were on track to grow and be proficient at the end of the school year. The teachers were also clear that the assessment system should be able to be used on a monthly, weekly, and daily basis to track progress. More than anything, the teachers wanted an assessment system that would allow them to collect assessment data on a daily basis. One teacher said, “it’s measured just looking at the data from i-Ready testing, data in Accelerated Math at the end of the day if we could find the particular objective for them to work on.” This ability would give the teacher a chance to work on adjusting instruction and developing individual paths for students for the next day of instruction.

The teachers also use a database of vetted questions, from school-net, that allowed them to check on the learning of students each day. The assessments were teacher made but from a vetted vendor. It was important to the teachers that any assessment they used was already normed, reliable, and validated so they would not have to worry about whether they were adjusting instruction correctly to develop individual learning paths for students. One teacher said, “giving CFAs(Common Formative Assessment) every day, not just the CFA that the county provides, but things like quizzes at the end of class just to see, did they get the skill for the day.” These programs allowed the teacher to focus on teaching because they knew the data gave them an accurate picture of what the students knew and allowed the teacher to focus on the correct standards the students needed to work on each day.

Mastering Learning Goals

To help build a culture of celebrating each other, it is important for teachers to start out ensuring everyone set goals that will allow students to have an equal starting point. This means each student will have different goals to work on in the beginning. It is also important for the goals to be set in a collaborative effort by the teacher and the student. Once the goals are set, it is important that you have a program that is reliable, validated, and robust enough to be used daily, weekly, and month to track student's mastery of goals and standards every time they are assessed.

Competition was important to the teachers. They wanted their students to work hard to meet their goal with help from their teachers and peers. The teachers constantly talked about high expectations. One teacher said:

I think right before the last i-Ready test, something that had the most impact on our kids for reading and math was them seeing their name on the boards that you'll made. We did gallery walks and they saw where they were at that motivated them to do well on the test. Competition is good but it's about responding to students' instructional needs and what they are not mastering and not understanding. This teacher summed it up really well, "Like today, I worked with a small group, and they didn't understand the meaning of the word. Then they had no idea what that sentence meant. Just really having that one-on-one time with them or that small group time. "For formative assessment practices to have the greatest effect, competition among students with a focus on mastering content standards has to be the focus of the teacher and student each day.

The teachers believe that competition is natural among middle school students and could be used as a motivation to help the students achieve their learning goal. As teachers encouraged

students to meet their individual learning goals, they also encouraged the students to help each other meet their learning goals and to celebrate when others met their individual learning goals. It was a team effort in meeting their goals, said one teacher: so it's healthy, and it causes them to want to work harder. And I've told them, "It's not about these points or the prizes, it's just fun to make it a game. It's about, if you can hit this target."

Reflection and Student Conference

The teachers also noted routine reflection and student conferences is something that should be established the first time students enter the classroom. This will establish a routine and will become a practice and function that students become responsible for every time they take any type of assessment. This is how one teacher gets her students to reflect after an assessment: "and then they graph where they are, and they can see, Am I showing growth? Am I not showing growth? And keeping up with that graph, I've seen more of an excitement. I also have them, with their goals."

The student conferences should be structured to allow the data to drive the conference discussion. The focus should be on whether students have mastered or have not mastered the concepts or standards. This allows all students to establish the next steps, next goals, and standards they have to begin working on. This is how one teacher requires her students to reflect during a student conference: "That caused a number of our kids to say, "Can I do remediation?" They wanted the paper then, so that they could come and get extra help. And the daily notebooks are a good thing as well, because they can be just, like teacher #2 says, they can see where they're at and whether they're going or no."

Learning from Each Other

Being part of an effective Professional Learning Community (PLC) plays a major role in teachers learning from each other and learning how to implement formative assessment practices in their classroom. PLCs give teachers time each week to learn what was working for other teachers and what standards and goals their students were having success with. Teachers had time to share, learn, and reflect on what was working and how other teachers were making formative assessment practices work. This teacher sums up the collective opinion of the teachers on how they learning new things: The focus on how to effectively use PLCs to move students' achievement and develop the professional knowledge of teachers was a major focus of school F. Figure 7 highlights the major step of phase two of my study which was analyzing the survey results to determine common practices that could be implemented at School B during the 2018-2019 school year—starting with the opening professional development session and continuing throughout the school year.

Phase Two: Student Potential, Professional Development, and Parent Education

Phase Two of the study concentrated on developing the framework for what data points would be used during phase three of my action research. First, the data analysis session identified students' potential based on their performance on the previous year EOG Assessment. The professional development session was based on the results of the survey completed by the teachers in School F. The parent session held by School B informed the parents on how they can help their child at home on the i-Ready Instructional Platform. Phase two took place during the month of September once the official EOG results from NCDPI were released. My major task was to get the teachers at School B to understand the individual performance of their students.

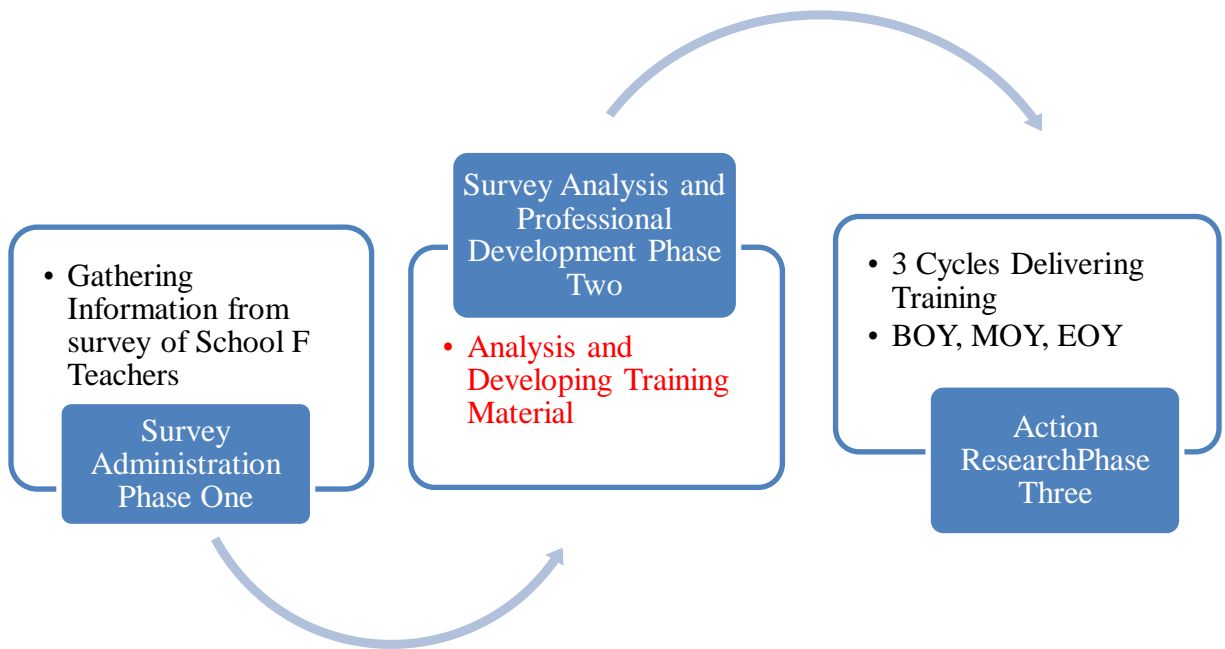


Figure 7. Highlight of the context of Phase II of my action research.

By understanding the individual performance of each student I was hoping for a better outcome on the EOG Assessment at the end of the school year.

During the month of September, NCDPI customarily releases the results of the previous year's EOG Assessment to local school districts and schools. Once the 2017-18 EOG results were released, I scheduled the initial professional development session with School B. Based on the results of the historical performance and 2018-19 performance of School B, the purpose of the initial PLC meeting was to generate an understanding of which students were proficient (level 3, 4, and 5)—which automatically involved establishing what students were non-proficient. Students who were non-proficient (level 1 and 2) were classified into two categories: “close to proficiency” (two scale scores away from being proficient) and “next level” students (five scale scores away from being proficient).

From the established criteria, I established a potential proficiency goal using the students who were proficient the year before, the students close to proficiency, and the next level students (as described above). The teachers were able to start to develop a plan on how they would work with those students to ensure we did not lose students in proficiency from one year to the next. The teachers also discussed data that helped them to understand the potential of each student and establish what seemed to be a realistic potential proficiency for their class. In foregrounding the importance of knowing students' previous history, my expectation was that teachers would realize how important it is to develop a personalized learning approach. Once the teachers had a good understanding of the 2017-18 results and the potential of each student, the next step was to establishing how teachers would respond to ensure students had the best chance to meet their learning goals. Two of the main systems used to respond to student need were the i-Ready

Diagnostic results and i-Ready Instructional Platform. The data were shared with Grade 8 teachers at School B during the PLC professional development session.

Table 18 displays what the Grade 8 students at School B are capable of based on historical EOG Data (based on 2017-18 results). The purpose of the categories in the table is to facilitate teachers' understanding of the importance of knowing their student's potential at the beginning of each school year. Knowing the potential of students allows teachers to focus on personalized learning for each student. Table 17 is a key component of this endeavor. By providing teachers in School B with these data during the month of September 2018 in PLC meetings, they were able to gain important information on their students' starting points for learning at the beginning of the school year and could determine how to tailor instruction that would meet the needs of each student. The teachers were also given a spreadsheet which listed the students' 2017-18 EOG results along with the category each fell within. The spreadsheet was updated after the BOY, MOY, and EOY window. The information offered during the initial session also allowed the teachers to develop a sense of the whole-group in addition to developing individualized instructional plans for each student.

My next step, after ensuring teachers appreciated the importance of understanding the potential of their students was the development of Professional Development Sessions to help guide the teachers throughout the 2018-19 school year. The aim was to provide teachers with an understanding of how the i-Ready Diagnostic and Instructional Platform could be used to individualize instruction for the 2018-19 school year for each student. The initial professional development session took place during the opening PLC session to start the 2018-19 school year. I shared with the teachers the major themes from the survey results from School F, which were:

Table 18

The Potential Proficiency of Students at School B, Based on 2017-18 Data

Teacher	# of Students	Proficient (2017-18)	Close to Proficiency (2017-18)	Next Level (2017-18)	Potential Proficiency Rate (2018-19)
Teacher 1	61	20	5	2	44.26
Teacher 2	64	31	7	1	60.94
Teacher 3	62	22	9	0	50.00
Overall	187	73	21	3	51.87

(a) potential for growth and proficiency, (b) using data to track student progress, (c) measuring learning goals, (d) reflection and student conference, and (e) learning from each other.

One of the formative assessment practices used by the teachers at School F was them receiving EOG results from the previous year for students at the beginning of the school year to establish the potential of each student to help them know where to start working with students to help improve student outcomes each year. Understanding student potential for growth and proficiency each year, again, is crucial in allowing teachers to establish personalized learning plans for students.

Of all the strategies used by teachers at School F, data walls and data boards were strategies they believed made the biggest difference in students making growth during the school year. The pictures of students included with the data made the data come to life for them and made the analysis more personally relevant than just looking at a number. When teachers had to move a picture of a student from one data board to the other it changed the discussion and injected a note of urgency into working to ensure that student became proficient. The data boards were also used to track the progress made at the end of the MOY and EOY i-Ready Diagnostic Assessment Windows. The data boards allowed the teachers in School F to build a data-driven culture oriented to how they would track student success and how teachers needed to adjust instruction during the school year. The data were not used for grading students but to adjust instruction and refine plans between assessments. A major focus was on ensuring the i-Ready Instructional Platform allowed the teachers to improve the outcomes for their students on a daily basis.

The teachers of School B also wanted to use the i-Ready Instructional Platform to provide data that could be used to establish how students were progressing on the state tested standards.

After a number of feedback sessions with the teachers, Curriculum Associates, in the i-Ready Teacher Toolbox, has a standards document that aligned the lesson in the i-Ready Instructional Platform with the North Carolina Standards. Appendix F contains the document house in the i-Ready teacher toolbox which allowed teachers at School B to ensure students were getting work on grade level standards since the pathway developed by the i-Ready Diagnostic tool focused on providing instruction on the skills on which students were deficient, even if these were below grade level work. The teachers in School B were consistent in inquiring if the i-Ready program would provide data that were accurate and allowed teachers to adjust instruction on a regular basis thereby ensuring that their students were on track to be proficient on the EOG Assessment at the end of the school year. The teachers at School B also wanted the i-Ready Instructional Platform to be able to track progress on a daily, weekly, and monthly basis. Based on teacher feedback, the i-Ready Instructional Platform was used to meet the needs of the teachers (on a daily, weekly, and monthly basis), referencing, in particular, the diagnostic results and the “Standards Aligned to Lesson” option in the i-Ready Instructional Platform.

Teachers in both School B and School F were adamant that there had to be a way to measure whether students were mastering learning goals that they set by referring to the i-Ready Diagnostic Report. Besides establishing growth goals, the teachers also established goals focused on students mastering the North Carolina Standard Course of Study Content Standards. Teachers allowed students to have input in setting both growth and standards mastery goals.

The teachers at School F developed a great system for helping students track goals and refining those goals throughout the schools year. They used a data tracking board and supporting data sheets (Curriculum Associates, 2019) from Curriculum Associates classroom central resource center which was adopted by School B after reviewing both documents. The data

tracking sheet is included in Appendix E, and the data tracking boards are discussed and included in Phase III of my action research section. The teachers in School B used the data sheets to help students set goals and to help the student focus on improving between each i-Ready Diagnostic Windows. This part of the professional development session focused on understand the different sections of the data tracking sheet and if the data sheet needed to be adjusted for School B.

Appendix E also includes the data reflection sheet used by the teachers and students in School B to help the students and teachers review the data on the first diagnostic test, and subsequently review progress, and set goals on how they would hope to improve during the year from the BOY, MOY, and EOY i-Ready Diagnostic Assessments. The data tracking sheet was designed by Curriculum Associates (Curriculum Associates, n.d.) to help schools track improvement in students' scale scores and track content standards to ensure they were tracking their growth and standards mastery progress and taking ownership for their learning between the BOY, MOY, and EOY i-Ready Diagnostic Assessments. There are multiple examples of data tracking spreadsheets available from the Curriculum Associates online help section called Classroom Central. Setting goals provides a great opportunity for teachers to empower students to take ownership of their learning, promote a growth mindset, and improve academic achievement. The goal-setting process recognizes that each student is different and allows him or her to choose where he or she wants to improve and what he or she wants to achieve. Goal-setting also encourages students to have a long-term vision of what they want to accomplish, together with the short-term motivation to remain inspired and to work hard along the way.

In understanding how i-Ready measures growth, the teachers taught students to establish goals as they worked on completing their assigned pathway in the i-Ready Instructional Platform. After the students completed the i-Ready Diagnostic Assessment, an instructional

remediation and enrichment plan was developed on the i-Ready platform—individualized for each student. The Curriculum Associates (Curriculum Associates, n.d.) software has the capacity to develop both an individual growth and stretch growth target for each student. The individual growth target aims to ensure that the student is growing between assessment windows, and the stretch growth aims to ensure the student is growing to meet grade level standards at the end of the school year.

Once the learning goals and pathways have been established, the teachers' role is to highlight the reason why it is important for students to track how much growth they need to exhibit to meet their proficiency target. Each individual's targets are tracked after each benchmark window. The diagram in Appendix E shows in detail how the students were able to track success in achieving their goals. The i-Ready diagnostic charts allowed the teachers and students to set clear, positive, specific, measurable, and achievable goals. With a focus on growth, the diagnostic charts allow students to gain satisfaction from seeing the progress in their performance even if they are not proficient. The goals for growth were also set collaboratively so that both the teacher and student are sure they are achievable.

Once the students, working with their teachers, had established growth goals and how those goals would be tracked, the focus moved to how School B would use the i-Ready Instructional Platform to allow students to work on the areas on which the i-Ready Diagnostic identified the students had skill deficiencies, in addition to working on grade level standards so that students were improving between assessment windows. During the initial professional development session, the teachers indicated they wanted to focus on mastering standards for the school year. The teachers used the i-Ready Teacher Toolbox document which identified what lessons in the i-Ready Platform addressed the North Carolina Math Standards. Appendix F

provides an example of what the Standards Mastery Document addressed and how the standards were aligned to individual lesson in the i-Ready Platform. The focus was also on tracking how students were progressing on their established instructional pathway and how that would allow the students to meet typical and stretch growth.

For the 2018-19 school year, Curriculum Associates (Curriculum Associates, n.d.) introduced two measures that could be used to track student growth between assessments. Figure 8 displays a report developed by Curriculum Associates teachers in School B used to help students set growth goals using the i-Ready system during the school year. Typical growth establishes how many scale scores student should grow based on what grade level the student is currently working in and what is considered typical growth for the student. The system uses a formula to establish individual growth targets for each student. When students are not on grade level based on typical growth, Curriculum Associates developed a growth target individualized to each student that allows the student and teacher to focus on how much growth is needed for the student to be on grade level. Figure 8 is an example which shows that not only did the student meet typical growth but also met their stretch growth target which means not only did the student grow but also is on grade level and should be successful in passing the Math EOG Assessment at the end of the school year.

From the survey responses from the teachers of School F, the teachers talked about how important it was to establish a culture of competition and celebration in the classroom and throughout the school year. During the initial professional development session the teachers focused on what type of celebrations would help students stay motivated in using the i-Ready Platform during the school year to help the students meet their typical and stretch growth goals. The major celebration selected by the teachers of School B would be the “i-Ready Challenge”

Diagnostic 3

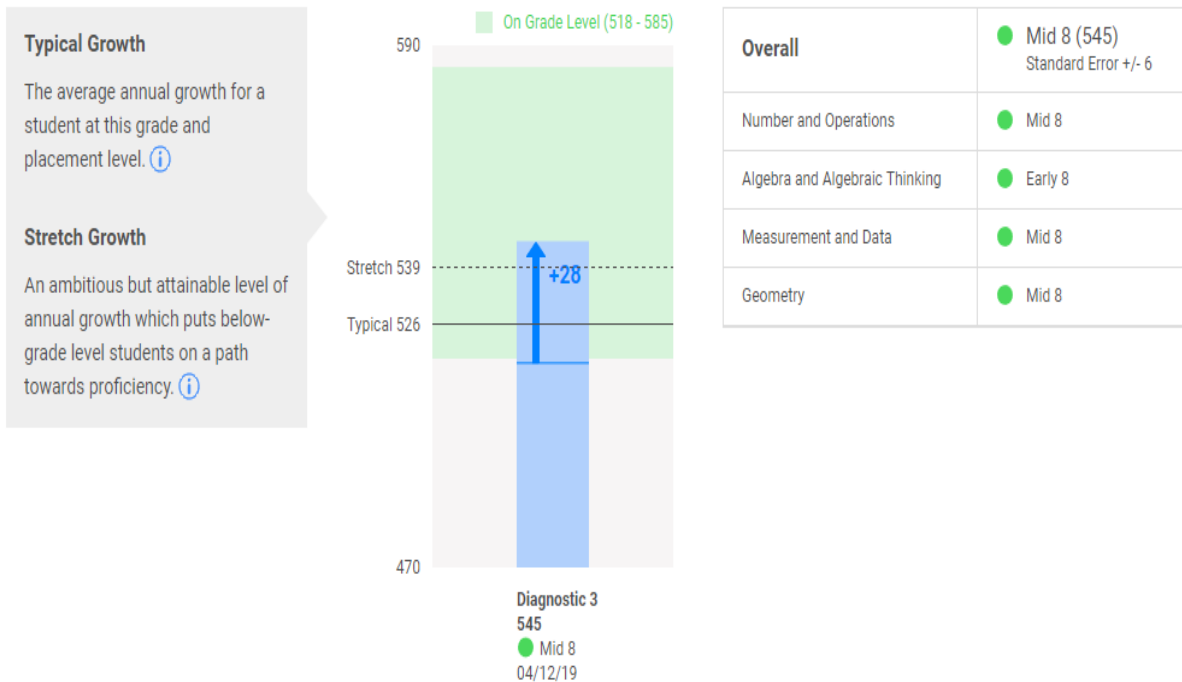


Figure 8. Screen shot of i-Ready Chart, showing a typical students' stretch growth goal.

which tracked the number of lessons the students completed each month with an average passing score of 70% on the lessons passed each week. The challenge changed each month to ensure the students stayed excited about using the i-Ready Instructional Platform. For example, during the month of November the school implemented the Lucky 7's Challenge. The challenge required the students to complete seven lessons for the month and seventy seven minutes on the instructional platform. The celebrations allowed the teachers to focus on ensuring students were getting grade level instruction and practice on skills the students were deficient in based on the results of the i-Ready Diagnostic Assessment and the lessons assigned aligned to the North Carolina Standard Course of Study.

The teachers at School F truly believe that students had to reflect on their performance and spend time conferencing with their teacher to develop additional strategies on how to improve their performance. The teachers really focused on student-led conferences. The routine should start the first day students enter the classroom. This sets the expectation of a focus on improvement each day. The students then walk into the classroom with a focus on improving. The school developed a i-Ready Instructional Monitoring Log to help the students and teacher work together to ensure students were working and reflecting on the lessons not just completing the lesson. Appendix G has the questions students were expected to answer once they completed the lesson.

Another concern of the teachers at School F was the amount of professional development they received during the school year on how to help students improve each day and know the students had learned the standards for the day. School F also had a focus on learning from each other formally and informally (learning from friends). With the analysis of the survey data from the teachers at School F, the teachers agreed some PLC sessions for the 2018-19 school year

would focus on having teachers share what has worked well in their classroom and what it would take to make the strategies work in the other teacher classrooms. Professional development also focused on allowing time during weekly staff meetings for teachers to focus on sharing what is working in their classroom and with students with teachers on their grade level.

The final focus of the professional development session was ensuring School B established how they would inform parents how students could use the i-Ready Platform at home during Parent Information Sessions during the school year. Appendix H is an example of the letter provided to parents at the parent information sessions. This was important in providing parents with information on how the school was going to provide support for their child at home using the i-Ready Instructional Platform. The parent information session included providing an overview of the i-Ready Instructional Platform and what the platform could provide for students at home. Curriculum Associates provided a comprehensive Parent Guide for parents. The guide took the parents through how they can ensure their child is working with their students at home. The parent support session was a part of the school's curriculum night that is held as part of the Title I requirements. The session included the following topics: log-in, selecting the subject, selecting lessons, and providing encouragement.

Phase two of the study focused on establishing the guidelines necessary for conducting the Action Research. First understanding the potential of students based on the EOG assessment the previous year was important to using the results of the i-Ready Diagnostic assessment to measure if students were on track to be proficient and grow from the previous year in time to do something about it and adjust instruction to change student outcomes. The survey results provided great feedback on how the teachers from School F used a number of formative assessment strategies to help improve and set the stage for improving student outcomes during

the school year and after each i-Ready Diagnostic Assessment. The parent involvement sessions during the curriculum night allow the parents to have teachers and students available so parents would have a great understanding of how they can help their child at home and track how their child is doing on a regular basis each night and able to communicate with the teacher about specific support need by the student.

Phase Three: Action Research

Phase Three of the study was conducted using action research. Phase Three was divided into three cycles which corresponded to the three i-Ready Diagnostic Assessment windows of BOY, MOY, and EOY. Each cycle consisted of gathering feedback from the teachers to see what professional development they needed to meet their and the needs of their students after each testing window closed. For the first cycle of action research, I served as the leader of the PLC and conducted the professional development session. During cycles two and three, I served as the coach guiding the teachers, principal, and data integration specialist on how those sessions should operate and what topics should be discussed. Figure 9 highlights the major step of phase three of my study which was conducting action research based on the common assessment practices that could be implemented at School B during the 2018-2019 school year.

Phase Three: Cycle 1

As mentioned above, for the first cycle, I was the leader of the PLC meeting held on September 27, 2018 and I conducted the professional development. The meeting was conducted in the meeting room in which the teachers in School B normally held their PLC meetings. The first cycle consisted of working with Grade 8 teachers to refine how they were using the i-Ready Adaptive Diagnostic Assessment to improve student achievement. The agenda for the meeting involved, firstly, reviewing the students' previous year's EOG, Beginning of the

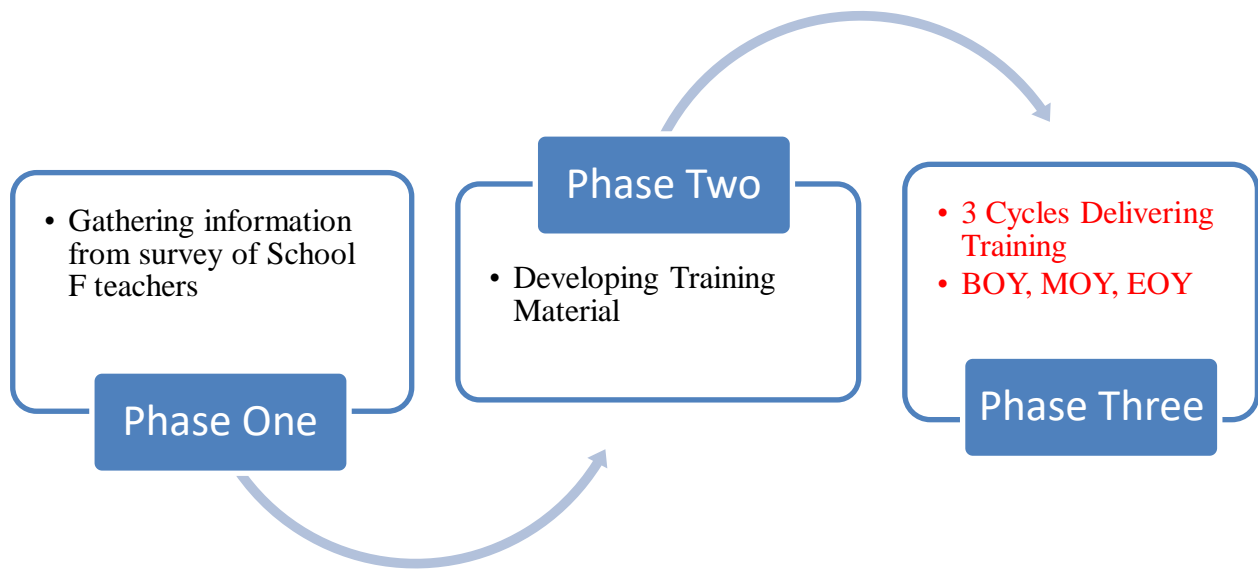


Figure 9. The key components of the action research study Phase Three.

Year (BOY) i-Ready Diagnostic Results, and goals between the BOY and MOY window, followed by developing a data wall and parent resources for the parent meeting, and designing a follow up survey that would be completed each month by the participating teachers to assist with discerning their professional development needs.

Reviewing the 2017-18 results with teachers Phase 3 Cycle 1. The first agenda item of Cycle 1 consisted of reviewing how students performed on the Grade 7 EOG math assessment during the 2017-18 school year in their previous year’s class groups. The point of this agenda item was to get teachers to look at how each individual student performed. To help with this evaluation process, I proposed three categories of students: proficient students, close to proficient students, and non-proficient students. During the professional development session, I provided teachers with a roster that I had already prepared designating what students fell into each category. During the MOY and EOY cycles, I provided the teachers with updated rosters based on the then current student enrollment. This provided teachers with continually updated information on their students—an important service in a school district with a relatively transitory student population.

The students I classified as proficient scored a level 5, 4, or 3 on the Math EOG Assessment in Grade 7 the previous year. The students I classified as close to proficiency were two scale scores away from passing the Grade 7 Math EOG the previous year. This criterion accorded with the feedback from NCDPI that established the three scale scores immediately after the lowest level three scale score (lowest proficiency level) as being a strong possibility of a student being able to pass the Math EOG Assessment. The scale scores for establishing the close to proficiency category were 449, 450, 451 (three scale scores from being proficient). Table 19 is

Table 19

Potential Proficiency Rate for Teachers in 2018-19 Based on Students' EOG and BOY i-Ready

Scores

	Total Students	Level 3-5	Level 2 Three Scale Scores	Level 2-1	Total Students Potential Proficiency	Potential Proficiency Rate
Teacher 1	64	19	5	40	24	37.5%
Teacher 2	44	11	8	25	19	43.2%
Teacher 3	65	25	10	30	35	53.8%
Total	173	55	23	95	78	45.1%

a summary of the students that had both EOG and BOY i-Ready Diagnostic Assessment data points for the 2018-19 school year.

The data displayed in Table 19 is different from the data displayed earlier in Table 18 which displayed students assigned to School B at the beginning of the school year. Table 18 tracked the progress of students who had data points on all four items (the EOG Math assessment, BOY, MOY, and EOY i-Ready Diagnostic Assessment) from 2017-18. The difference between Table 18 and Table 19 is that the latter includes the students who transferred into School B during the school year, thus providing updated data based on current enrollment of the Grade 8 students in School B. The proficiency rate for Grade 8 at School B was 39.04% for the 2017-18 school year. The potential proficiency rates shown in Table 18 and Table 19 support my anticipation that, in the context of my study, School B has a great chance of improving the proficiency rate based on the 39.04% achieved during the 2017-18 school year for their Grade 8 students over the course of the 2018-19 school year to 45.1% (from Table 19) or 51.87% (from Table 18). The purpose of having two targets is to provide a picture of how the transitory population of School B effects the proficiency rate of a school. And even with the transitory population, School B should be able to improve their proficiency rate at the end of the 2018-19 school year.

At the time I conducted the professional learning session, teachers had been instructing students for about a month. The session was the first opportunity for teachers to review the data because the i-Ready window was August 27 to September 24, 2018. Teachers were surprised to observe how poorly students were performing in their classes. They made comments like “he/she is not performing in my class like a level 2 student,” or “he/she is not performing like a level 3-5 student.”

2018-2019 BOY i-Ready Diagnostic results Phase 3 Cycle 1. Once the BOY window closed on September 24, 2018, I scheduled a meeting to review the 2018-19 i-Ready Diagnostic BOY results with the Grade 8 teachers at School B. The aim was to review the i-Ready Diagnostic results to see how many students were on track to be proficient for the 2018-2019 school year. The BOY results were also used to validate the initial placement of students on the data boards, which is how we tracked whether students were making progress toward being proficient between the BOY, MOY, and EOY i-Ready Diagnostic Assessment windows. An additional use of the i-Ready Diagnostic Results was to update the data board with a focus on whether students were improving their chance to be proficient on the EOG Assessment. Figure 10 clearly showed the work the teachers in School B had ahead of them during the 2018-19 school year with only 10% of the students showing proficiency on the BOY i-Ready Diagnostic Assessment. On the x-axis in Figure 10, numbers 1, 2, and 3 represent teachers 1, 2, and 3, and number four represents the overall results.

Figure 10 provides a striking illustration of the gap that exists between the numbers of proficient students and non-proficient students. Based on the i-Ready BOY diagnostic results, for example, Teacher 1 would have a potential 11.75% proficiency rate (based on the i-Ready BOY Diagnostic), Teacher 2 would have a 5.26% proficiency rate, and Teacher 3 would have a 11.75% proficiency rate. Overall the proficiency rate would be 10% for Grade 8 Math if the EOG were given at the beginning of the year, based on the i-Ready Diagnostic results. Based on these BOY results, the Grade 8 teachers knew they had a lot of work ahead of them for the 2018-19 school year. However, they were excited to know the i-Ready Instructional Platform would be able to individualize instruction for the students and that they would have the ability to assign grade level lessons tied to a standard that students could work on through the 2018-19 school year.

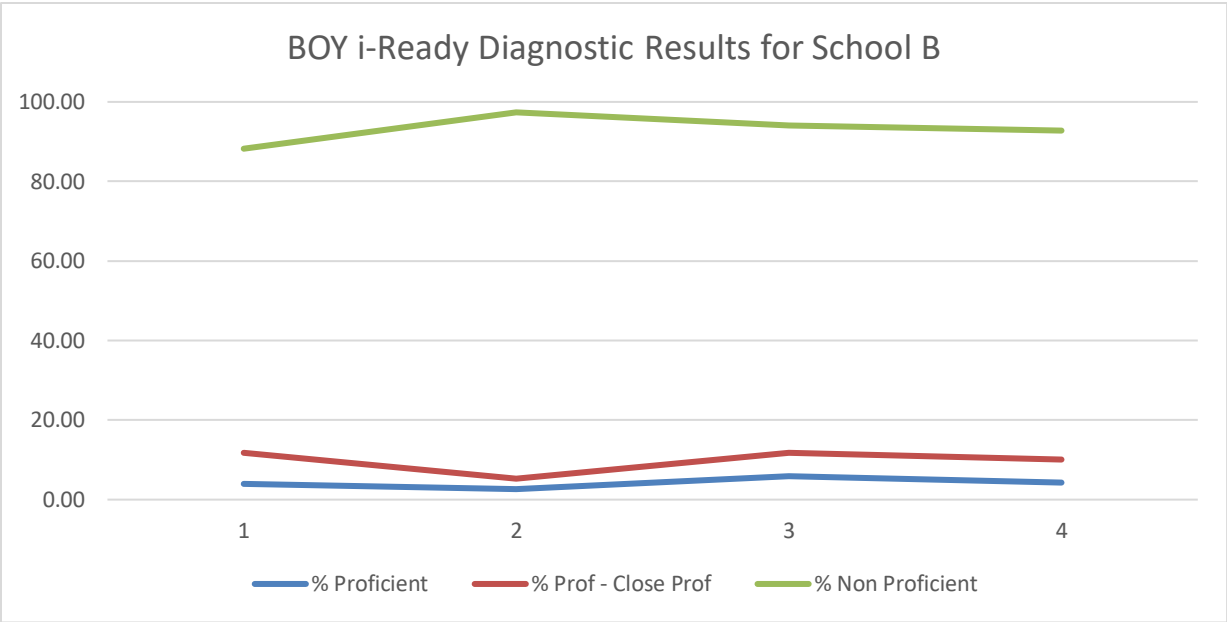


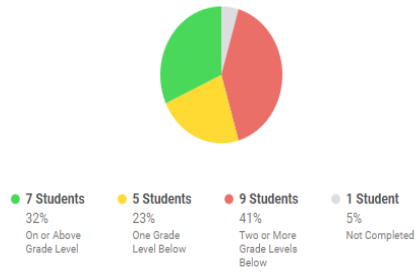
Figure 10. Displays the 2018-19 BOY i-Ready results for 8th Grade teachers at school B.

I pointed out to the teachers that my anticipation was that the task of improving based on BOY results would not be as difficult as the data might suggest because of my expectation that there would be a “good fit” between the school system and the i-Ready system when it came to identifying what the students must work on during the time between the BOY, MOY, and EOY testing windows. I explained that, once students completed the i-Ready Diagnostic Assessment, a report individualized to each student’s skill deficits and aligned to the North Carolina Standard Course of Study’s four major instructional domains (Numbers and Operations, Algebra and Algebraic Thinking, Measurement and Data, and Geometry) would be produced. Each student would also be assigned a Tier 1, 2, or 3 rating, where Tier 1 students are regarded as testing on or above grade level, Tier 2 students are one grade level below, and Tier 3 students are regarded as two or more grade levels below. Based on the i-Ready report, teachers assigned specific lessons in the domain being taught to ensure students worked on lessons pertinent to their grade level and not just on the personalized lessons assigned to them by the i-Ready system after taking the i-Ready diagnostic assessment.

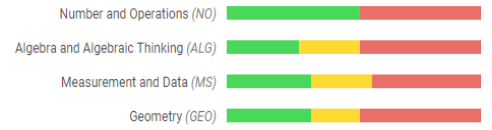
Figure 11 is a screen shot of a report from the i-Ready system that illustrates its usefulness in helping teachers and students grow and improve their chance of being proficient on the EOG Assessment at the end of the school year. This report is made available after each i-Ready Assessment and identifies students at risk overall and by each domain. This report from 2017-18 was reviewed with teachers during the initial professional development session. This report will also be used to make a comparison of progress from the BOY to MOY and MOY to EOY assessment windows.

Data boards and tracking progress from BOY to MOY and MOY to EOY Phase 3
Cycle 1. As a way of giving Grade 8 teachers a visual measure of students progress from the

Overall Placement



Placement by Domain*



*Students not completed are not included.

Student ID	Scale Score	Overall Placement	Placement by Domain				Annual Growth Measure		Date
			NO	ALG	MS	GEO	Typical Growth	Stretch Growth	
...	551	Mid 8	Mid 8	Mid 8	Mid 8	Mid 8	9	22	04/12/19
...	547	Mid 8	Mid 8	Mid 8	Mid 8	Early 8	0	??	04/11/19

Figure 11. i-Ready report on how 8th grade students performed on the i-Ready diagnostic by North Carolina Standard Course of Study domains in mathematics.

2017-18 school year, through the 2018-19 BOY, MOY, and EOY testing windows, the Grade 8 teachers in School B decided to establish data boards to track student progress toward proficiency on the EOG Assessment. These data board were reminders during PLC meetings of the work required of each teacher and student to continue to improve. Students' names and pictures cards were assigned a blue background if they scored a level 3, 4, or 5 on their Grade 7 Math EOG Assessment. Students' names and pictures cards were assigned a green background if they scored a level 2 and were two scale scores away from passing the Grade 7 Math EOG Assessment (close to proficient students). Students' names and pictures cards were assigned a red background if they scored a level 2 or 1 on their Grade 7 Math EOG Assessment. Table 20 displays the criteria for placing students' names and cards pictures on a colored background to give the teachers a visual reference for how students performed on the Grade 7 math EOG Assessment.

After the teachers reviewed the 2017-18 EOG results and the 2018-19 BOY i-Ready results, we added students' names and pictures cards to the data tracking boards. The teachers worked as a grade level team to update the boards. Once one teacher's board was completed, they moved on to another teacher's board. The power of the data boards was implicit in the conversation sparked during the session. For example, as teachers placed students' name and picture cards with blue backgrounds on green or red boards, they conjectured what they would do to ensure the students was back on the blue board at MOY. Another key topic of conversation, if a student's name and picture card had a red background, was whether the teacher had noticed the student displaying the pertinent level of competence in the classroom at the start of the school year.

Table 20

How Students were Assigned Background Colors, Based on 2017-18 Math EOG

<u>Category</u>	<u>Assignment Criteria Based on the 2017-18 EOG Results</u>
Blue	Level 3, 4, or 5
Green	Level 2 and three scales scores from proficiency
Red	Level 2 and 1 and not close to proficiency

Some teachers were surprised at how some students who did not pass the EOG assessment in Grade 7 were performing well in class. Conversely, some teachers were concerned about students who were proficient on the Grade 7 math EOG but were not performing well on grade level work and on the i-Ready BOY Diagnostic Assessment.

Once the data tracking boards were completed, the teachers began setting goals for the period between the BOY and MOY assessment window. The assessment window for MOY was December 1-18, 2018. They also made plans to help students to set goals based on the typical and stretch growth goals established on the i-Ready Diagnostic Assessment. Finally, the teachers discussed how they would help the students meet the i-Ready Challenge. This challenge involved students completing 30 minutes-a-week on their instructional platform and having a 70% pass rate on the i-Ready lessons associated with their assigned pathways. Curriculum Associates (Curriculum Associates, n.d.) have conducted research which found that students who worked on their pathway for 30-45 minutes a week and had a 70% pass rate on the lesson showed the most growth and were more likely to meet grade level standards.

Parent involvement. An important part of the effort to get students to grow and be on grade level at the end of the school year was to have parents involved in ensuring students were using the i-Ready Instructional Platform at home. This gave the teachers a way for students to complete homework at home and without their having to grade it. For students not having access to the i-Ready Platform at home, the school designed time before school started for students to complete assignments. Appendix H is the sample letter which summarized the presentation made to the parents at the school's curriculum night to begin the school year. The letter was also sent home at the beginning of the school year to each parent. Additionally, the teachers sent out

regular messages on ParentLink (an app that provides a communication channel between home and school) to parents of students who were not completing the lessons in a timely manner.

Teacher feedback and support sessions Phase 3 Cycle 1. To ensure teachers were provided the professional development and support they needed during the school year to implement the i-Ready program in a timely manner, I developed a set of questions for teachers to respond to after each PLC session with the data integration specialist. The questions are listed in Appendix B. The survey was administered to the teachers at the end of each month from October until March (the month before the last testing window). The survey was also administered at the end of the initial professional development session in September. The topics the teachers were concerned about after the initial professional development session were:

- How can lessons and groups be established in the i-Ready Platform?
- What strategies are working at other schools in terms of increasing student proficiency and growth?
- How can I find our more pertinent information on close-to-proficiency students?
- How are growth and proficiency measured in the i-Ready system?
- How is potential proficiency calculated?

Phase 3 Cycle 1 ended with a discussion of the professional development sessions to address the above five questions posed by the Grade 8 teachers at School B. The sessions will be conducted by the math coach, the data integration specialist, and me in my role as the district-level curriculum facilitator. The teachers also had access to the i-Ready Classroom Central resources site which provided them with valuable resources to support their endeavors for the 2018-19 school year. Dates for follow up monthly support sessions were established in collaboration with the principal for the 2018-19 school year.

Phase Three: Cycle 2

During Cycle 2 of my action research (based on MOY assessment data), I served as a coach to the teachers of School B. The teachers were also supported by the district data integration specialist and the district curriculum facilitator. The sessions in Cycle 2 were focused on addressing earlier feedback and gathering further feedback on what the teachers needed by way of support after PLC sessions that were conducted every two weeks. The aim was to ensure they were equipped to promote student improvement on the MOY i-Ready Diagnostic Assessment.

i-Ready Diagnostic results: Growth from BOY to MOY. The MOY i-Ready Diagnostic Window for the 2018-19 school year was December 1-18, 2018. The second cycle of this phase of my study focused on looking at each teacher's and students' results to see if the students grew and improved their proficiency from the BOY to MOY Assessment window.

Cycle 2 focused on two growth targets. The first of these concerned whether students simply improved their scale score and the second was whether they met the typical and stretch growth goals established by Curriculum Associates (Curriculum Associates, n.d.) for the 2018-19 school year. As a review, typical growth is the growth expected of students based on where the student began the school year, and stretch growth is the amount of growth a student needs to attain to be on grade level and have a good chance to be proficient on the EOG Assessment at the end of the school year. Overall, 74.29% of students improved their scale scores on the i-Ready diagnostic from BOY to MOY. A further 3.92% of the students had the same scale score from BOY and MOY. As shown in Figure 12, when looking at the growth results by teacher, Teacher 3 had 84.31% of her students grow in scale score from the BOY to MOY window. That was 14% higher than Teacher 1 and 19% higher than Teacher 2.

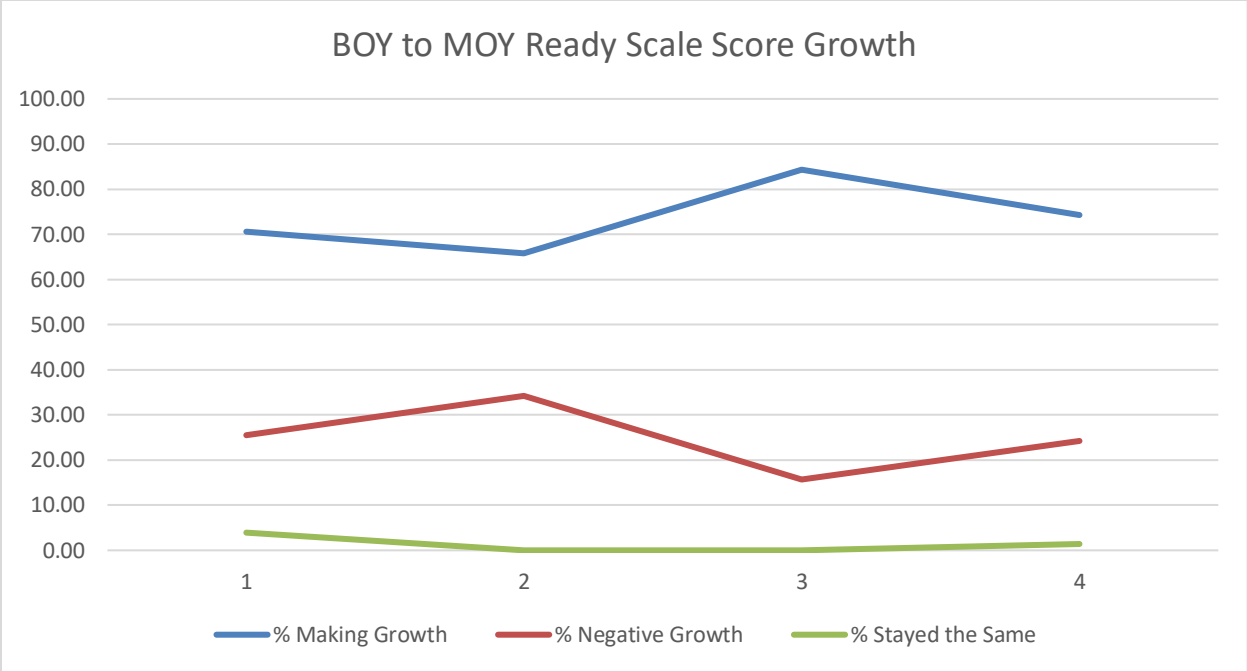


Figure 12. Displays the percent of students that improved their scale score from the BOY to MOY i-Ready diagnostic assessment.

The next question was whether students had achieved or were close to achieving their typical or stretch growth.

Curriculum Associates (Curriculum Associates, n.d.) year) introduced a new way of measuring growth for the 2018-19 school year, distinguishing between typical and stretch growth, as discussed above. Figure 13 displays student results from the BOY to MOY window. When looking at the growth results by teacher, Teacher 3 had 67.3% of her students achieve typical growth and 28% meet stretch growth. Teacher 1 had 58.3% of her students achieve typical growth and 19% meet stretch growth. Teacher 2 had 60.0% of her students achieve typical growth and 24% meet stretch growth. The importance of not just looking at whether students improve their scale score is displayed in Figure 13. For example, Teacher 3 had 84% of her students improve their scale score with 67.3% making typical growth and 28% making stretch growth. The ability to look at both stretch and typical growth is an example of why the i-Ready diagnostic is a “good fit” for School B and Gasper County Schools.

i-Ready proficiency projection results BOY to MOY. Another advantage of the i-Ready Platform is the prediction of what students are likely to be proficient at the end of the school year. When looking at MOY results, 22% of the Grade 8 students were projected to be proficient on the Math EOG Assessment. This projection was a 12.86% improvement from the BOY assessment window. Similar to the growth results, Teacher 3 had the highest projected proficiency percentage at 31.37%, which was 11% higher than Teacher 1 and 15% higher than Teacher 2. Figure 14 provides a comparison between teachers, but it also shows the improvement when comparing the BOY and MOY results.

Moving students to proficiency BOY to MOY. One of the major emphases in the PLC support sessions was moving students from being non-proficient to being proficient. Overall,

Progress to Annual Typical Growth (Median)

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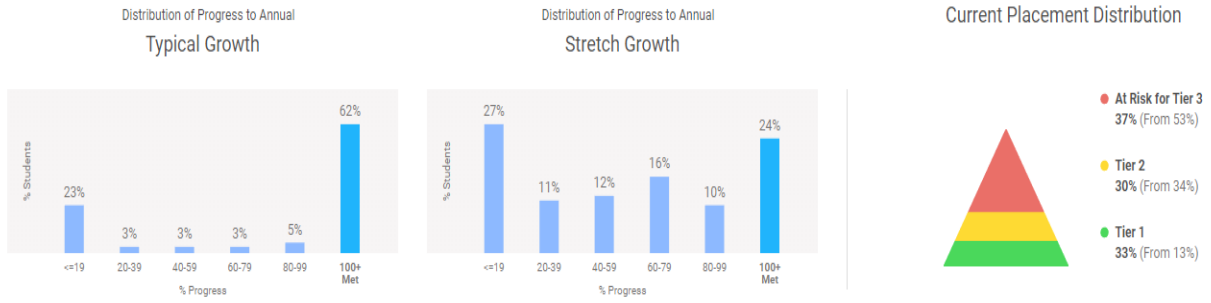


Figure 13. Displays the percent of students in School B meeting typical and stretch growth from the BOY to MOY i-Ready diagnostic assessment.

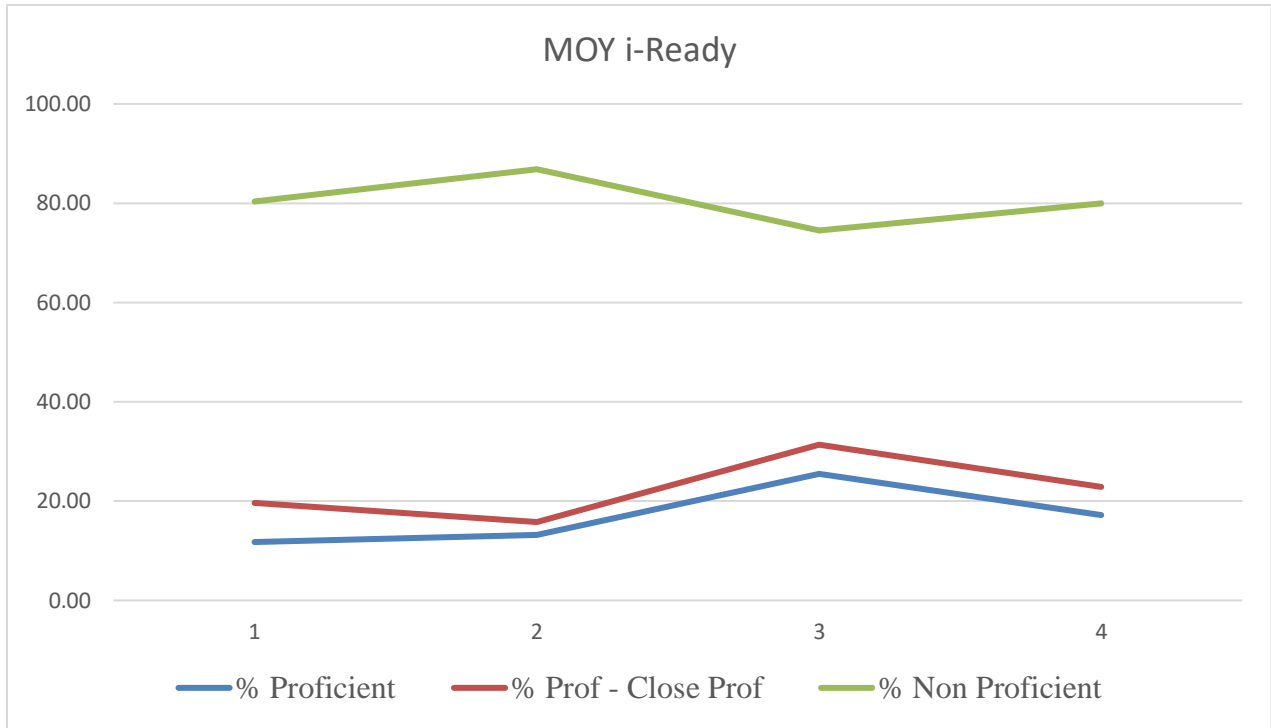


Figure 14. Displays the percent of students that improved their scale score from the BOY to MOY i-Ready diagnostic assessment.

there was a 15% increase in students moving from being non-proficient at BOY to proficient at MOY. Every teacher had students that were non-proficient at the BOY window but who had improved to the proficiency column by the MOY window. Figure 15 displays the percent of students by teacher who improved from being non-proficient to being proficient from BOY to MOY. Another key element in improving overall performance was keeping students proficient who had previously been proficient—that is, keeping students proficient for two consecutive years. For the 2017-18 school year, School B had a net gain of students who became proficient and students who were proficient the previous year but who had become non-proficient, based on the i-Ready Diagnostic results.

Moving students on the data board. The most fascinating part of Cycle 2 was when it was time for teachers to move the name and picture card of students based on the MOY results. The teachers were excited because 21 students moved from the non-proficient to the proficient category based on the MOY i-Ready Diagnostic results. There was a lot of celebration on the part of both teachers and students. The discussion centered on the students whose name and picture card had a blue background—meaning they were proficient on the Grade 7 EOG—who were not on track to be proficient based on the i-Ready Diagnostic. The focus of the discussion was on developing a plan to ensure those students would be on track to be proficient at the end of the school year.

The most powerful part of the session was when the teachers conducted a gallery walk to see what the boards looked like for their fellow teachers. They had discussions about what each was doing to move students whose name and picture card had a red background (not proficient in Grade 7) to the blue board (on track to be proficient in Grade 8).

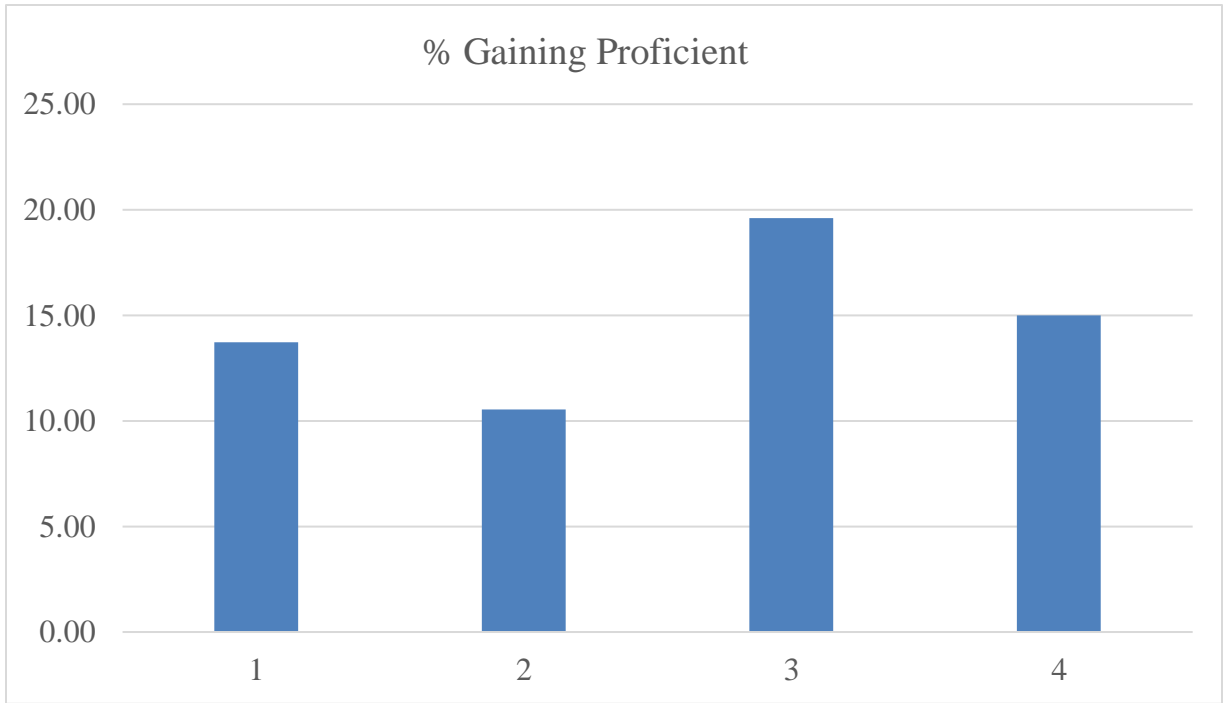


Figure 15. Percentage of students gaining proficiency from the BOY to MOY i-Ready Assessment Window.

Professional development teacher input sessions. To conclude the support session, teachers were given an opportunity again to provide input on what professional development sessions they needed to improve student outcomes. This time, the teachers completed open ended questions which are listed in Appendix C. The results were shared with the principal, math coach, data integration specialist, and district curriculum facilitator. The principal and math coach—working with the teachers—made a decision on what professional development session would be offered and what support was warranted. The topics on which the teachers from School B requested support and professional development included:

- Addressing excessive student absences,
- Addressing disruptive student behavior,
- Strategies to work effectively with educationally challenged (EC) students,
- Understanding the correlation between i-Ready and EOG scores,
- Conducting effective small group instruction,
- Applying data to improve results and using the i-Ready Instructional Platform, and
- Planning and using the i-Ready Standards Mastery Assessments developed by Curriculum Associates (year).

Phase Three: Cycle 3

The i-Ready EOY assessment window was April 1-18, 2019. The Grade 8 teachers completed the assessment by April 10, 2019. The reason for completing the assessment in the middle of the testing window was because spring break for students would begin on April 19, 2019 and the teachers wanted to have a week before spring break to develop a plan for using the data from the EOY assessment.

i-Ready Diagnostic Results Growth BOY to EOY

Cycle 3 of the study analyzed teachers' and students' results to see if students grew and improved their proficiency since the BOY Assessment window. Cycle 3 continued to measure two growth targets. One, if students simply improved their scale score and two if they meet the typical and stretch growth established by Curriculum Associates for the 2018-19 school year. Overall, 87.20% of students improved their scale scores on the i-Ready diagnostic from BOY to EOY. The increase was 13% from MOY (74.29%) and 2.4% of the students had the same scale score when comparing their BOY and EOY i-Ready Diagnostic results. When looking at the growth results by teacher, Teacher 3 had 93.88% of her students grow from the BOY to EOY window. That was 9.79% higher than Teacher 1 and 12.63% higher than Teacher 2. The gap between the percent of students making growth, closed significantly when comparing the assessment windows BOY to MOY and BOY to EOY.

Figure 16 displays the results when comparing student results from the BOY to EOY window. When looking at the growth results by teacher, Teacher 3 had 83.67% of her students achieve typical growth and 49.67% meet stretch growth from the BOY to MOY window. Teacher 1 had 75% of her students achieve typical growth and 36.67% meet stretch growth. Teacher 2 had 74.5% of her students achieve typical growth and 46% meet stretch growth.

Figure 17 displays the typical and stretch growth results when comparing student results from the BOY to EOY window. When looking at the growth results for each category 78% of students met their typical growth and 44% of student met their stretch growth targets. Each student was also assigned a Tier 1, 2, or 3 rating, where Tier 1 students are regarded as testing on or above grade level, Tier 2 students are one grade level below, and Tier 3 students are

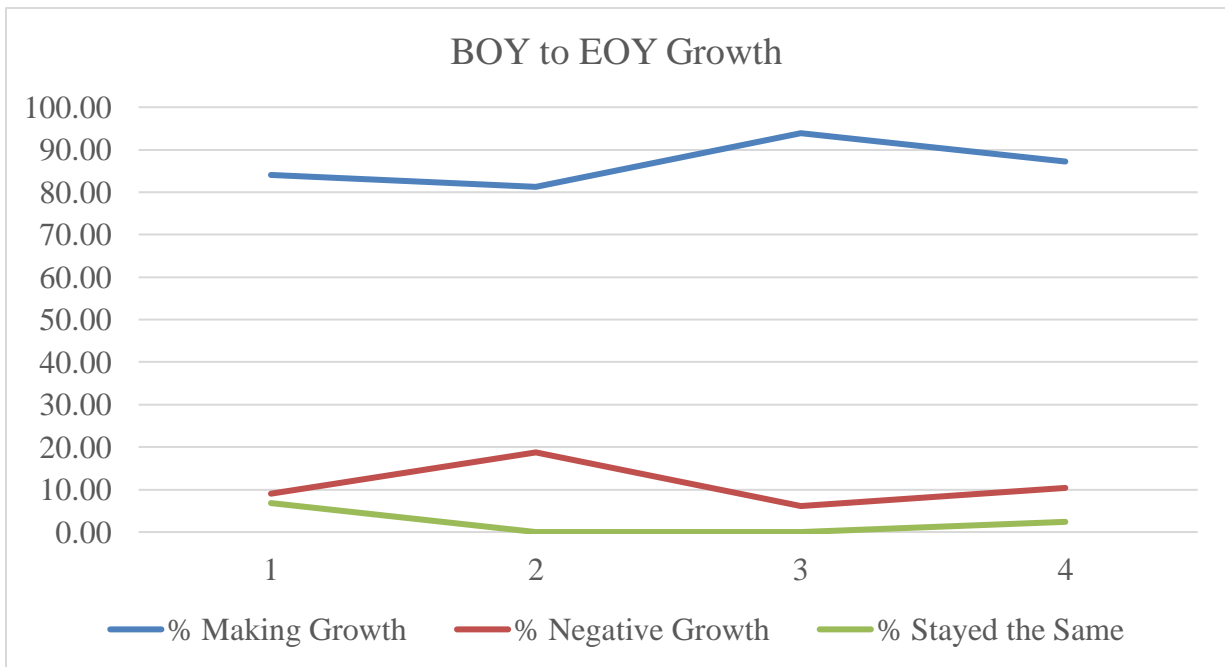


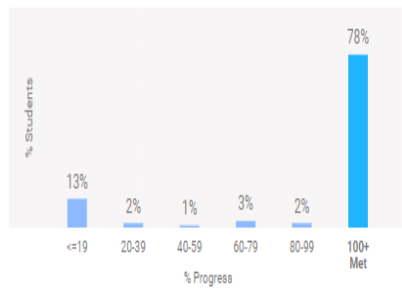
Figure 16. Displays the percent of students that improved their scale score from the BOY to EOY i-Ready Diagnostic Assessment.

Progress to Annual Typical Growth (Median)

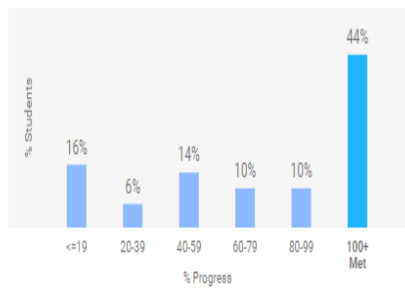
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Distribution of Progress to Annual Typical Growth



Distribution of Progress to Annual Stretch Growth



Current Placement Distribution

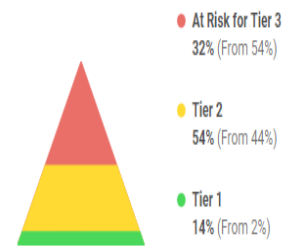


Figure 17. Displays the percent of students in School B meeting typical and stretch growth from the BOY to MOY i-Ready Diagnostic Assessment.

regarded as two or more grade levels below. Grade 8 had 32% of their students at Tier 3, 54% at Tier 2, and 14% at Tier 1.

i-Ready Proficiency Results BOY to EOY

When looking at EOY results, 22% of the Grade 8 students were projected to be proficient on the Math EOG Assessment. This was a 12.86% improvement from the BOY assessment window. Similar to the growth results, Teacher 3 had the highest projected proficiency percentages. Teacher 3 proficiency rate was 31.37%, which was 11% higher than Teacher 1 and 15% higher than Teacher 2. Figure 18 provides comparison between teachers, but it also shows the improvement when comparing the BOY and EOY results.

Gaining Students to Proficiency BOY to EOY

Overall there was a 21.60% increase in students moving from being non-proficient at BOY when compared to the EOY results. Every teacher had students that were non-proficient at the BOY window and improve to the proficiency column by the EOY window. Figure 19 displays the percent of students by teacher that improved from being non-proficient to being proficient. One of the focuses has been on keeping students proficient and moving students to proficiency and keeping students proficient two straight years. For the 2017-18 School Year School B had a net gain of three students when comparing students who became proficient and students that were proficient the previous year and became none proficient.

Review of Study Findings

The focus on formative assessment practices and understanding students' learning potential to being the school year was a fun journey during the duration of the study. School B's EOY results showed a lot of growth when comparing the BOY and EOY assessment results. I am excited to see what the Math EOG results will be for the Grade 8 teachers at School B for the

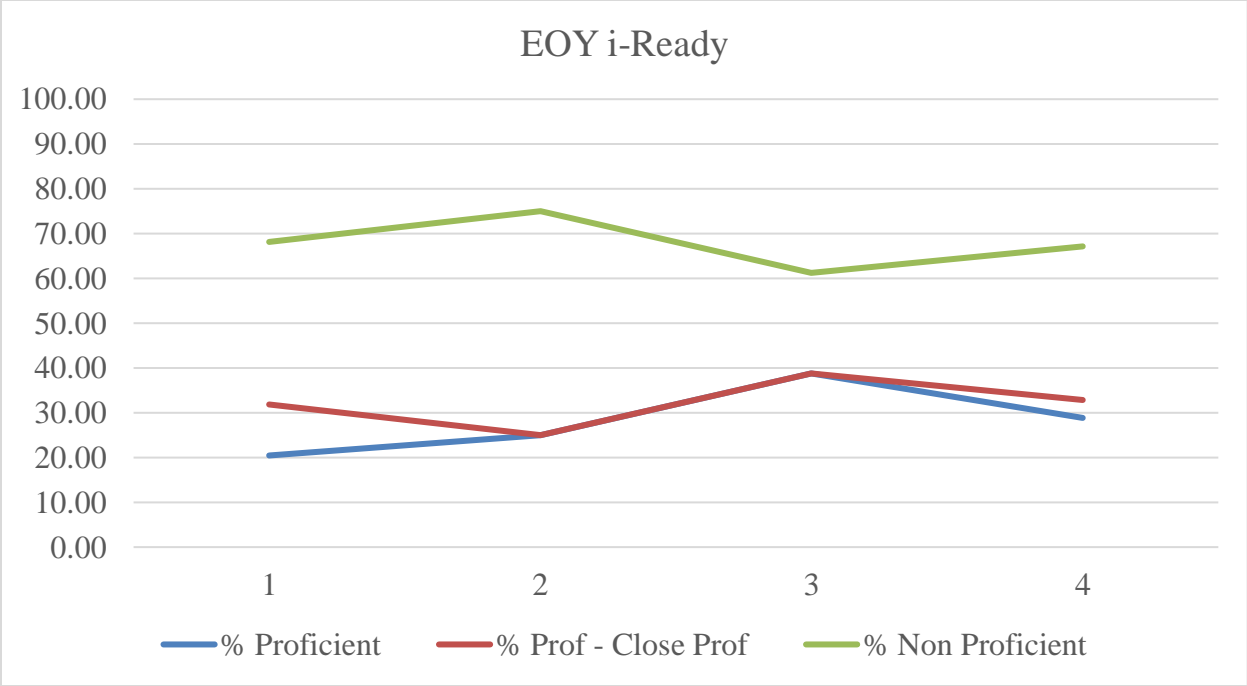


Figure 18. i-Ready EOY proficiency results for school B.

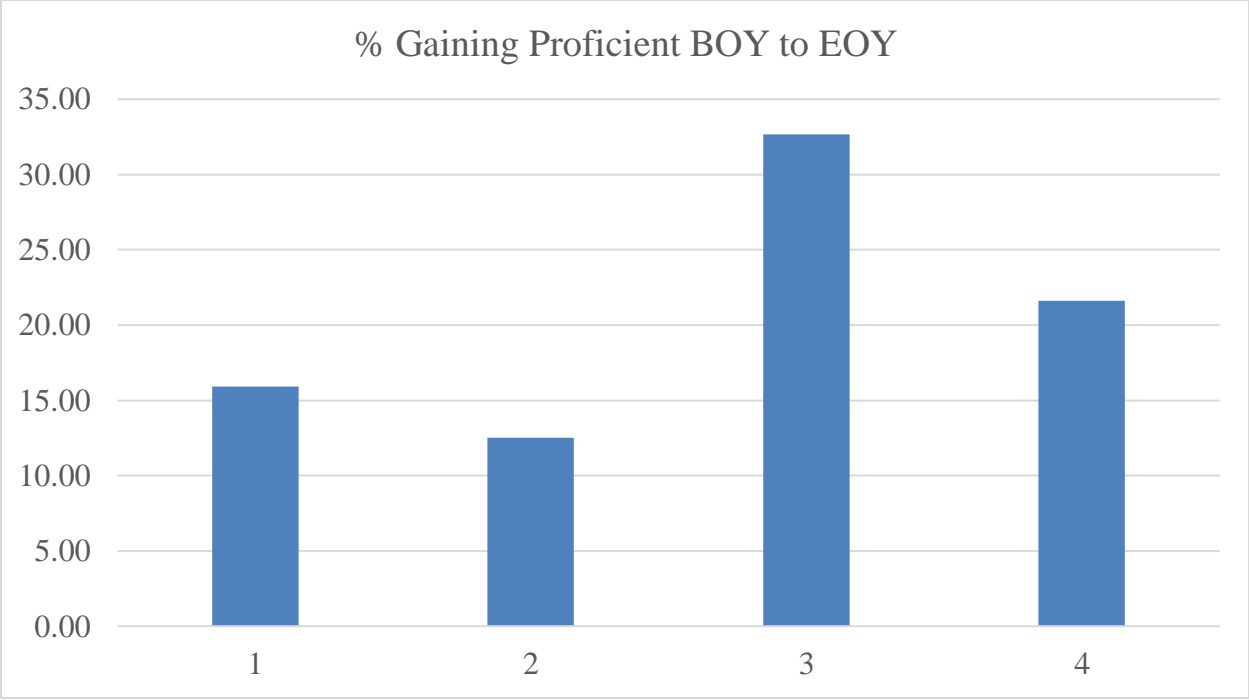


Figure 19. Percentage of students gaining proficiency from the BOY to EOY i-Ready assessment window.

2018-19 school year. Teachers have had a focus on understanding what each student needed to be successful during the school year. The teachers have used the previous year EOG results, i-Ready diagnostic, i-Ready Instructional Platform, learning from each other, and individualized professional development to give students what they need to be successful. There was a number of strategies implemented during the school year based on what the teachers at School F had done to continue to improve the academic achievement of the students at school F and growth the past four years. The focus was on formative assessment practices and ensuring the i-Ready Platform was a “good fit “to ensure teachers could individualize instruction for students.

Another important part of the study was the implementation of the i-Ready assessment for the school district. As part the literature review we talked about looking at any assessment system and instructional platform being a “good fit”. I have listed below why the i-Ready system is a good fit for School B and Gasper County Schools.

- Projected proficiency component tied to our EOG results
- Typical and Stretch Growth Component
- Diagnostic Assessment
- Instructional Platform that is adaptable to skill deficient and grade level lessons
- Report function which allows teachers to print a report that tiers students for interventions by North Carolina Instructional Domains. This truly individualizes instruction for students using the i-Ready instructional platform.

CHAPTER 5: SIGNIFICANCE AND REFLECTION

The outcomes of my study showed that my confidence that the procedures (formative assessment practices) in place at School F would assist the math teachers in School B to teach more effectively was well founded. In addition to the more effective instructional procedures which the teachers in School B implemented, the improved achievement of the students was associated also with the implementation of new instructional software that enabled the teachers to individualize instruction for their students. The combination of these two changes led to greatly improved outcomes for the students—which was the major aim of my study.

The focus of my study was on using formative assessment practices to help improve the Grade 8 Math EOG results for School B. A goal of the study was being able to determine if the i-Ready Assessment and Instructional Platform selected by a district was a “good fit” for the district and School B. The i-Ready Instructional and Assessment platform was instrumental in helping School B implement formative assessment practices. In working with the Grade 8 teachers at School B, I can say the i-Ready Diagnostic Assessment in conjunction with the i-Ready Instructional Platform is a “good fit” for Gasper County Schools. The reason why I can say the i-Ready Platform is a “good fit” is that, based on past experiences with the school district, having one platform for assessments and a different platform for instructional lessons and student instructional pathways and was not a “good fit.” My study also gave me a chance to see what formative assessment practices worked for both Schools B and F.

There were a number of different formative assessment practices School F used as strategies to help the students improve their proficiency rate and exceed growth each year. According to Black and Wiliam (2001), there are four key concepts that underpin a good understanding of how to implement formative assessment practices in classrooms effectively.

First, students must have a clear understanding of what learning should take place and how mastery of the learning will be measured. Second, teachers must be able to engineer effective classroom discussion activities and learning activities that provide evidence that learning has taken place each class period. Third, teachers must develop a system that provides students with constructive feedback and which can be used to help identify the learning targets not mastered and what an individual student has to do to master those learning targets. Last, teachers must find creative ways to help students take ownership of their learning. Every strategy School B used during the study fit all four categories and was key to School B having a high number of students make both typical and stretch growth from the BOY to EOY assessment window.

School F had a strong focus on celebrating the success of teachers on a regular basis and this became a focus for School B as they implemented the i-Ready Challenge during the 2018-19 school year. The i-Ready Challenge was one way students were celebrated when they passed a certain number of lessons each week together with attaining a certain passing average. This quote from a teacher at School F captures how important celebration was throughout the school year:

I think at this age, competition is just innate, and if you put them outside, they'll start racing each other, they just love to one-up the other one. So I think it's healthy as long as you celebrate everyone's successes. So when a student crosses over to the next little goal that I've set, we all clap and stop and give a reward. And so we're all celebrating each other.

Comer (1995) put it well: “No significant learning occurs without a significant relationship”. School F truly focused on this each day of the school year. What I learned from

School F allowed me to propose specific strategies at every support session with School B during the 2018-19 school year.

Another important practice implemented by School F to a high level was understanding the learning potential of each student. It is important to have a thorough understanding of all students who enter your classroom, said one teacher: “if you don’t have a good understanding of their potential you can’t meet their needs.” Every teacher was clear in his or her survey response about what teachers should focus on to begin the school year in an effort to get to know their students. This quote sums-up what the focus should be:

I think especially the learning potential because if you just look at a student as the score they were last year and you peg them as a failure, then you give up on them. But if you see their potential, you're constantly working towards mastery, giving them every opportunity to fix their mistakes and to get better and better.

With all of the formative assessment practices discussed during the study, individualizing instruction for students is most important. The i-Ready Instructional Platform played a major role in helping School B individualize instruction for each student. By individualizing instruction, teachers were measuring student progress. Every teacher emphasized using data to drive how he or she structured their classroom instruction each day. The teachers consistently talked about using assessment programs that would allow them to trust the data they were using and that would be an accurate measure of student success. The teachers wanted the data to be used for tracking growth and proficiency—not to provide students with a grade. This quote from a participant in my study shows the importance of data and how data should be used:

Lots of ways. Data, data, data. We measure learning from, if we're looking at AR, we're looking at their growth, even on test, how well are you doing on AR test? i-Ready data. Have you grown from the previous i-Ready test? Moby Max, that's measured every day. Of all the feedback provided by teachers, the most consistent theme was that it was important for them to have a program that would allow them to track objectives and standards to ensure students were on track to grow to be proficient at the end of the school year.

The improvement goals for my study focused on looking at the three major adoptions of North Carolina Standards for math during the 2000-2001, 2005-2006, and 2013-2014 school years. My problem of practice revolved around understanding why proficiency rates under the current adoption of North Carolina Math Standards had not returned to the levels of the previous two adoptions. Student achievement returned to previous achievement level under the past two standards adoptions within four years after the standards adoptions. The 2013-14 adoption was different because the reduction in proficiency was twice that of the previous standards adoptions and the recovery was two times less than the level of previous recoveries. My study focused on the following two improvement goals:

Improvement Goal 1

Improvement Goal 1 concerned the use of i-Ready Diagnostic Assessment as a means of predicting proficiency and growth during the year in order to ascertain whether students were on track to be successful on the Math EOG Assessment at the end of the school year. A major challenge was getting teachers to trust that the i-Ready Diagnostic would be able to predict the success students would have on the EOG Assessment at the end of the year. Most of the distrust emanated from GCS's focus the three years prior to selecting the i-Ready Diagnostic as the assessment platform. At that time, GCS used the Renaissance Learning STAR Assessment to

help predict student success on the Math EOG Assessment. When students earned a Normal Curve Equivalent (NCE) score of a 60 on the STAR Assessment, they were assigned a certain percentage chance of being successful on the EOG Assessment at the end of the school year. The prediction was made using each school's EOG data and the STAR Assessment Results.

Transitioning to the i-Ready Diagnostic Assessment

By contrast, the i-Ready Diagnostic Assessment did not focus on establishing a score for students to achieve. Curriculum Associates (Curriculum Associates, n.d.) conducted a linking study which allowed the scale scores established by the i-Ready Diagnostic Assessment to be linked to the scale score on the EOG math assessment. The i-Ready Diagnostic also established achievement Levels 1 through 5 analogous to the EOG Assessment. Time was spent, during the data support sessions, to ensure that the teachers were comfortable using the i-Ready predicted proficiency rate to gauge whether their students were on track to be proficient and growing during the school year. There were two differences to which the teachers and students at School B had to adjust: the length and time the i-Ready Assessment would be given versus the STAR Assessment. The STAR Assessment was given every thirty days, whereas the i-Ready Assessment would be given at designated BOY, MOY, and EOY assessment windows. My focus was also on getting the teachers to use the results of the i-Ready Diagnostic effectively.

Effectively Using the i-Ready Diagnostic Assessment as a Predictor of Student Success and Individualizing Instruction

Using the results effectively required the use of the detailed report developed by Curriculum Associates (Curriculum Associates, n.d.). The detailed report made all the difference in motivating the teachers to make the transition to using the results to improve

Number and Operations

● Mid 8
566

Algebra and Algebraic Thinking

● Mid 8
550

Measurement and Data

● Mid 8
537

Geometry

● Mid 8
545

Developmental Analysis

At placement levels 6-8 this domain addresses operations with whole numbers, fractions, decimals, and positive and negative rational numbers, as well as exponents. [redacted] indicates an appropriate understanding of operations with positive and negative rational numbers, and integer powers of ten. [redacted] may be ready to extend this understanding to irrational numbers, integer exponents, and problem-solving with rational numbers.

Can Do

The Number System

Subtract positive and negative rational numbers.

Standards

Multiply positive and negative rational numbers.

Standards

Divide positive and negative rational numbers.

Standards

Next Steps & Resources for Instruction

The Number System

- + [Solve mathematical problems involving the four operations with both positive and negative rational numbers, ...](#)
- + [Understand and identify irrational numbers.](#)
- + [Use rational numbers to approximate and compare irrational numbers.](#)
- + [Use properties of integer exponents to simplify and evaluate expressions.](#)
- + [Solve equations with squares and cubes \(](#)



Figure 20. i-Ready Diagnostic Assessment report used to ensure the effective use of the assessment results. (The student's name is blanked-out to preserve anonymity.)

proficiency and growth for School B. Figure 20 gives an example of how detailed the report was—based on the North Carolina Domains and Standards down to the basic skill level.

The report also provided a detailed plan to help the teachers use the i-Ready Instructional Platform effectively to improve EOG achievement by the end of the school year. The report empowered the teachers to use the platform in an effective manner and to use the report to develop intervention plans and conduct conferences with students and parents. The report focused on what students could do (knowing student potential) and “next steps” for instruction. The i-Ready Instructional Platform allowed teachers at School B to assign lessons in the i-Ready Instructional Platform to address the next steps for instruction. The teachers also used the i-Ready Instructional Platform as part of their whole group and small group instruction during the school day.

School B 2018-19 EOG Projections

Based on the EOY results for School B on the i-Ready Diagnostic Assessment, Grade 8 could have a EOG proficiency rate of +/- 10% from what the i-Ready projected proficiency report is showing—which would be 31%. This means School B’s 2018-19 EOG results could be between 21% - 41%. Grade 8 had a 39% proficiency rate for the 2017-18 school year. Thus, the improvement could be two percent, or there could be a decrease of 18%. Based on the growth displayed by the students during the year, there is more likely to be a 2% increase verses an 18% decrease.

Improvement Goal 1 for my study was to work with teachers to use the results of the assessment to help improve student results on the next i-Ready Adaptive Diagnostic Assessment taken by students. Students at School B improved following the MOY and EOY i-Ready Diagnostic Assessment. Grade 8’s projected proficiency after the BOY assessment window was

21%. After the MOY assessment window, Grade 8's projected proficiency was 28%. After the EOY assessment window, Grade 8's projected proficiency was 31%. Thus, Grade 8 students improved their proficiency rate for each assessment window. Based on the i-Ready projected proficiency rate, Grade 8 should have had a 2% increase in their 2018-19 Math EOG proficiency rate.

Improvement Goal 2

Improvement Goal 2 focused on students being proficient two years in a row. Reaching this goal would greatly help School B improve their students' proficiency and growth. In looking at historical EOG data for School B, one issue that was glaring was the inability of Grade 8 students to be proficient two years in a row. The data were compiled to see if students who passed the EOG Assessment the previous year maintained proficiency one year later. I also looked at the converse situation: which students who were non-proficient the previous year became proficient one year later. Implementing data boards with colored backgrounds to illustrate how students performed on the previous year's EOG gave teachers a new perspective on keeping students proficient or increasing the number of students in the proficient category.

Tracking Projected Proficiency Rates During the 2018-19 School Year

For reference, Table 21 shows how School B gained and lost Grade 8 students to and from proficiency from the 2016-17 to the 2017-2018 school year on the math EOG. It shows that when the same students take the EOG assessment in Grade 7 and Grade 8, School B only added 3 students to proficiency from Grade 7 to Grade 8. This would be acceptable if the school had a high proficiency rate in the first place. Part of the review of the i-Ready diagnostic results focused on comparing what the i-Ready Diagnostics predicted the students would score, compared to what they scored on the EOG the previous year. It was important to get teachers to

Table 21

School B Transition Table for the 2016-17 and 2017-2018 School Year

Math	Gain Was Level 1or 2 2016-17	Loss Was Level 3,4,5 2016-17	Difference
Grade 7 to Grade 8	10	7	+3

understand what they needed to do for each student to improve during the school year so that they would be proficient for two years in a row or for the first time. There are always students who move from non-proficient to proficient, but losing students from being proficient one year to non-proficient the next is keeping School B's performance statistics graph flat during the current standards adoption which began during the 2012-2013 school year.

EOY Results: Gains and Losses and Data Board Support Session

Based on the EOY i-Ready results, School B would have a gain of 20 students. This would be an increase from the previous school year. One of the main strategies used by School F involved constructing data boards to help give teachers a visual representation of how students performed the previous year compared to how they were performing currently and were predicted to perform on the EOG at the end of the school year. The colored name plate at the top left corner of each board tracked how students were performing and whether they were on track to be proficient, based on the i-Ready Diagnostic. Of all the strategies used during the study, this strategy had the biggest impact on the teachers. When they had to add a picture to a red background it changed their attitude about doing more for that student so that he/she would have a chance to change his/her background color at the end of the year. The teachers also became motivated to change the students from one board to the other after the testing window; it was a time to celebrate or reflect on how to get better for the next testing window.

Research Question 1

Research Question 1 concerned observing to what extent, if teachers were provided with how their students performed in the past, these data would help them change their approach to teaching their students. The focus was on getting teachers to individualize instruction for students to begin the school year and maintain this approach throughout the school year. The

rationale for this invoked the Hawthorne effect (also referred to as the observer effect)—a type of reactivity by which individuals modify an aspect of their behavior in response to their awareness that they are being observed (Noland, 1959).

Hawthorne Effect

The original research on the Hawthorne effect was conducted at the Hawthorne Works in Cicero, Illinois, and involved lighting changes and work structure changes such as working hours and break times. It was originally interpreted by Elton Mayo and others to mean that paying attention to overall worker needs would improve productivity. Later interpretations, such as that done by (Weber, 2015), suggested that the novelty of being research subjects and the increased attention from such could lead to temporary increases in workers' productivity. This interpretation was dubbed "the Hawthorne effect," after the name of the factory in which the original research was conducted.

In this instance, the biggest change to the teachers' attitudes toward believing all students can be proficient came during the exercise to place background colors on the student pictures and place the picture on the data boards. The placement of the student pictures on the board—indicating how they performed on the EOG and i-Ready Diagnostic Assessment—really got the teachers on board with the project and encouraged them to use the strategies identified as working in School F as modifications to ensure they worked for the students in School B. In cases in which there was a discrepancy, every teacher commented on how what he or she observed the students doing in class was not aligned with where the student was placed on the data boards. Some students were performing better than expected and some were not. The data boards contribute to changing the teachers' mindset to work harder for students. One teacher had so many students that had a red background that it took two red data boards to track her students.

She continually said during the exercise “I have a lot of work ahead of me.” In her case, the goal was to have one red data board by the EOY window. Facilitating teachers’ looking at their data—particularly via the data boards—motivated them to maintain a consistent mindset. When they have to place a picture with a background color on a proficient, on-track, or not proficient board throughout the year, that changes the student achievement conversation.

Individualizing Instruction

After the data board exercise, teachers were open to individualizing instruction and using the i-Ready Platform to help them with the individualization. Professional development sessions throughout the year, after the first data session, also helped the teachers use the platform to assign grade level standards so they could encourage students to work on skills and grade level standards to close gaps after lessons were taught each day. One teacher said “students have different learning styles and we have different types of learners. There are the visual learner, the auditory learner.” Understanding the student learning potential is important so that teachers know what strategies to use for each student so that they can help him or her grow and meet his or her proficiency targets at the end of the school year.

Research Question 2

Research Question 2 concerned whether formative assessment practices would help students master content standards and improve their learning outcomes. The formative assessment practice used by the teachers after each i-Ready Diagnostic Assessment involved using the data reflection sheet. The data reflection sheet is displayed in Appendix E and was used to conduct student conferences and help students track their success and set future proficiency and growth goals on the i-Ready Diagnostic Assessment. The i-Ready Diagnostic data was not the only formative assessment practice used by teachers, since every teacher must be able to

identify whether students are on track each day with some type of measurement before the students leave the classroom each day. One teacher noted that she had a routine question for her students each day after taking an assessment: “Have you grown from the previous i-Ready Diagnostic Assessment? Moby Max, that’s measured every day, seeing how much they’re achieving in Moby Max for language and vocabulary.”

Formative Assessment Practices

When learning is measured for growth and proficiency on a regular basis, it allows teachers to adjust instruction for their students on a regular basis to meet the students’ learning and instructional needs. The two most important learning strategies that help the teacher to adjust instruction based on the data are one-on-one help and small group instruction. In their feedback after each data support session, the teachers continually asked how they could use the data provided to develop small group instruction sessions for their students. One of the sessions conducted in relation to small group instruction concerned using the instructional grouping report generated by the i-Ready Platform after each diagnostic assessment.

Instructional Grouping for Individualized Instruction

The instructional grouping report grouped the students by similar needs for instruction. The report provided detailed instructions and lesson plans, along with where to find resources and what resources to use during the small group sessions. Figure 21 provides a picture of how powerful the report was for the teachers to use in forming and instructing their small groups. The teachers saw what grade level their students were on along with what instructional domain the students were struggling. Once the report was explained to the teachers, they wanted follow up sessions to learn how to use the instructional grouping report more effectively after each i-Ready Diagnostic Assessment.

[- Hide Grouping Description](#)

Students in this Grouping are two or more grade levels below in Number and Operations or Algebra and Algebraic Thinking.

*** Student Needing Additional Differentiated Instruction**

Results indicate that these students are significantly behind in the quantitative areas of number, operations, and algebraic thinking. These students are likely to need review of many other foundational skills in the quantitative areas of number, operations, and algebraic thinking before they are ready for the level of instruction described here.

For more information about differentiating instruction to meet their needs, see their individual Student Profiles.

Instructional Priorities

Students in this profile are having difficulty with skills and concepts related to quantitative reasoning and representation; this ...

Those students with a low score in Number and Operations probably need concrete or visual reinforcement of numbers syste...

[Read more](#)


Recommendations for Teacher-Led Instruction	Resources
<p>The Number System</p> <ul style="list-style-type: none">• Perform operations with positive whole numbers, decimals, and fractions.• Understand integers and absolute value.	<p>Tools for Instruction</p> <p>Number and Operations</p> <p>Find the Least Common Multiple </p>

Figure 21. i-Ready instructional grouping report.

Of all the feedback provided by teachers, the teachers said on a consistent basis that it was important for them to have a program that would allow them to track objectives and standards to ensure students were on track to grow and be proficient at the end of the school year. The teachers were also clear that the assessment system should be able to be used on a monthly, weekly, and daily basis to track progress. More than anything, the teachers wanted an assessment system that would allow them to collect assessment data on a daily basis. One teacher said, “it’s measured just looking at the data from i-Ready testing, data in Accelerated Math at the end of the day if we could find the particular objective for them to work on.” This ability would give the teacher a chance to work on adjusting instruction and developing individual paths for students for the next day of instruction.

The teachers also used a database of vetted questions (SchoolNet; this tool gives teachers the ability to create and modify assessments as well as receive results in real-time with relevant data for reporting purposes) that allowed them to check on the learning of students each day. The questions were teacher-made, but from a vetted vendor. It was important to the teachers that any assessment they used was already normed, reliable, and validated so they would not have to worry about whether they were adjusting instruction correctly to develop individual learning paths for students. One teacher said, “giving CFAs every day, not just the CFA that the county provides, but things like quizzes at the end of class just to see, did they get the skill for the day.” (A CFA is “an intentional assessment used for the purpose of monitoring student attainment of essential learning targets throughout the instructional process) SchoolNet and the i-Ready Instructional Platform.) These programs allowed the teacher to focus on teaching because they knew the data gave them an accurate picture of what the students knew and allowed them to focus on the correct standards the students needed to work on each day.

The teachers truly believed the key to successfully implementing formative assessment practices in a classroom, which would allow students to reflect after each assessment and to take ownership for their learning, was allowing the students to have dedicated time to reflect on their work by holding student-led conferences. The quote below is just one teacher's way of getting her students to take ownership for their learning on a normed i-Ready Math Assessment:

So, when we finish taking a i-Ready test, we will call them back and they have a sheet where they have to answer certain questions. And the questions involve things such as, "Why do you think you showed growth or showed a decline? What can you do to improve the next time?" And they have to write out their own authentic answers. So I think that's helped.

The teachers also noted routine reflection and student conferences is something that should be established the first time students enter the classroom. This will establish a practice that will become a routine and function so that students become responsible for every time they take any type of assessment. This is how one teacher gets her students to reflect after an assessment: "and then they graph where they are, and they can see, 'Am I showing growth? Am I not showing growth?' And keeping up with that graph, I've seen more of an excitement. I also have them, with their goals."

i-Ready Diagnostic and Instructional Platform a "good fit"

One of the major focuses of my study was getting teachers to concentrate on using the results of the i-Ready Diagnostic Assessment and using the i-Ready Instructional Platform in an effective manner. An important way to get the teachers' buy-in to using the platform on a regular basis was to show them that the system was a "good fit." The teachers at School B had a history of using the Renaissance Learning Assessment in which the results of the assessment were used

to establish a learning pathway in the Compass Learning Instructional Platform (two distinct software systems). In this new single system, the i-Ready Diagnostic and Instructional Platform is a “good fit” for Gasper County Schools and School B. I have listed why the Curriculum Associates (n.d.) Platform is a “good fit”:

- When using the STAR Assessment and Compass Learning Instructional Platform, the two companies could never work together in a timely manner to upload the data to develop individualized learning pathways for students. Since Curriculum Associates (Curriculum Associates, n.d.) developed both the assessment and instructional platforms, students can begin working on their instructional pathway immediately after the diagnostic assessment is complete.
- The reports lay out the individualized instructional plan for each student. The system also easily allows the teacher to adjust the instructional plan for students, if needed. The instructional grouping report helps the teachers develop small groups by grade-level skill deficits and by the North Carolina Instructional Domains.
- Curriculum Associates (Curriculum Associates, n.d.) conducted a linking study in 2016 to match the scale score generated from the i-Ready Diagnostic to the scale scores on the North Carolina EOG Assessment. The assessment also produces an achievement level analogous to the North Carolina EOG Assessment, levels 1-5. This is an upgrade from when Gasper County Schools used the Renaissance STAR Assessment.
- The i-Ready Diagnostic Assessment also provides teachers and students feedback on performance on the EOG by the major Instructional Domains tested on the math EOG assessment.

- The teachers are enabled to align lessons to the North Carolina Standard Course of Study. Working with the curriculum department of Gasper County Schools, the teachers were provided with a document showing what lesson would give student practice on the Standards along with an assessment tied to the standards that teachers could use to establish small groups and intervention plans for students.

As a reference point, Table 22 has the scale score ranges by achievement levels. This is comparable to how NCDPI assigns scale scores. This was a huge selling point to get teachers' buy-in to using the i-Ready Platform in an effective manner. Teachers kept the table in their PLC data notebook and kept it displayed for students to use as they prepared for the i-Ready student conferences with their teachers.

Standards Lesson Document

One of the requests by teachers from one of their feedback sessions was to have students work on individual lessons aligned to a North Carolina Tested Standard. The Standards chosen were the priority standards (heavily tested on the EOG Assessment). School B decided to use the Standards Mastery Assessments in the Curriculum Associates (Curriculum Associates, n.d.) Platform. Curriculum Associates developed assessments where schools or teachers could assess a single standard and receive detailed feedback on where to both focus instruction daily and develop intervention plans. School B also wanted to use the Standards Mastery Assessments to focus on the heavily tested Standards for Grade 8 Math. Appendix H contains a sample document developed for School B. There are two categories for the document standards assessed with a description of the standard and what i-Ready lesson addressed the standard. The purpose for adding the i-Ready lessons was to give the teachers the opportunity to assign lessons to students who did not perform well on the Standards Mastery Assessments. Once the EOY i-

Table 22

Curriculum Associates i-Ready Adaptive Diagnostic Assessment Math Score Equivalents for Each NC EOG Achievement Level Scale Score

i-Ready Adaptive Diagnostic Assessment Score Ranges per Proficiency Level					
Grade	EOG Level 1	EOG Level 2	EOG Level 3	EOG Level 4	EOG Level 5
3	100-426	427-449	450-458	459-482	483-800
4	100-426	453-475	476-481	482-508	509-800
5	100-461	462-485	486-491	492-518	519-800
6	100-482	483-504	505-510	511-534	535-800
7	100-490	491-513	514-520	521-544	545-800
8	100-500	501-527	528-533	534-561	562-800

Ready Diagnostic Assessment was completed, a similar document was developed that assigned what lessons matched all of the tested standards. Appendix H contains a sample of what the teachers were provided. Being able to align the North Carolina Standards to i-Ready lesson is another reason why the i-Ready Platform is a good fit for Gasper County Schools in general and School B in particular.

Importance of Individualized Professional Development

The professional development sessions conducted in conjunction with my study were based on the feedback from teachers and from working with their math coach. Part of my study asked teachers on a regular basis what type of professional development was needed to help improve their professional knowledge and then providing the teachers with strategies to help improve student outcomes. To keep the feedback secure, the teachers completed a survey at the end of each data support session—which were held twice a month. The first feedback session took place during the month of October. The results were shared with the principal, math coach, and other personnel in the district who could help provide professional development for teachers, with the approval of the teachers and principal. I have listed the major professional development sessions requested by the teachers.

- Establishing lessons and groups in the i-Ready Platform
- Strategies that are working at other schools in terms of increasing student proficiency and growth
- More information on close-to-proficiency students
- More information on how growth and proficiency are measured in the i-Ready system
- More information on how students' potential proficiency is calculated

This is an approach that I recommend for implementation at other schools in Gasper County Schools. It allowed the teachers to let everyone know what they needed to support students and allowed the teachers to know they were supported as professionals.

Summary of Findings

Grade 8 math students have struggled to improve at the same rate as Grade 6 and Grade 7 math students. Grade 8 teachers' understanding how students performed on the Grade 7 math assessment was an important part of the study. If students can pass the Grade 7 math assessment, they should be able to continue to have the same success in Grade 8. The Hawthorne effect highlights how people can change their behavior if they know and they are being observed. The students at School B knew they were being observed to begin the school year and they knew that the hope was they would become and stay proficient using formative assessment practices. After the initial data board exercise, teachers were surprised at how students were performing in class compared to what the EOG results and i-Ready Diagnostic Assessment showed. This simple exercise alone motivated teachers to go back and work hard for students to ensure they would be successful on the Grade 8 math assessment at the end of the year.

Learning what strategies School F implemented was an important part of my study. School F continually focused on individualized instruction for students and refining the learning environment on a regular basis. They focused on constantly celebrating even for the smallest success students and teachers had during the school year. Teachers in School F constantly learned from each other and celebrated each other when students succeeded. School F used a number of programs to individualize instruction for students and continued that focus by embracing the i-Ready platform. The focus on continuous improvement by teachers and students set the stage for growth and proficiency increases for School F over the past four school years.

My study tried to equip School B with the same strategies and to use the i-Ready Instructional Platform to help manage learning and growth for students.

Finally, the potential proficiency exercise with the teachers at School B was one of the most significant part of the study. To be able to define how students performed on the previous year's EOG assessment made all the difference in changing the mindset of teachers. When the teachers had to place the students' pictures with a background on a data board based on the i-Ready assessment, it completely changed their mindset regarding those students. The teachers were motivated to use the instructional platform and ensure that students accessed what they needed to be successful during the school year and on the EOG at the end of the school year.

Recommendations for Further Study

To further focus on improving Grade 8 EOG math assessment results, my recommendations for further research are:

- First, the proficiency rates for Grade 8 math for School B, Gasper County Schools, and the State of North Carolina are still much lower than they were on previous standards adoptions (2001-2002, 2005-2006, and 2012-2013). A detailed study to investigate the root cause for the lack of improvement would have the potential to benefit all 115 North Carolina school districts. The state added a fifth achievement level with the 2012-13 adoption, but scores still remained flat across the state of NC. Students can now be considered proficient with a level 3-5 versus a level 3 or 4 under previous adoptions. The addition of the additional level has not made a difference. My recommendation would be for a future study to delve into why the results have remained flat—especially given the number of programs focused on improving early learning.

- The state of North Carolina realigned the Math Standards for K-12 for the 2018-19 school year. With the realignment, NCDPI has created a new math EOG for K-12. The new EOG Assessment will be administered at the end of the 2018-19 school year. This would be a perfect time to focus on test score recovery to see if there will be the same drop in scores as the 2012-13 adoption.

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APPENDIX A: INSTITUTIONAL REVIEW BOARD APPROVAL



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 Initial Approval: Expedited

From: Social/Behavioral IRB

To: [Derrick Jackson](#)

CC: [Robert Reardon](#)

Date: 10/15/2018

Re: [UMCIRB 18-001482](#)

Interim Assessment and Formative Assessments

I am pleased to inform you that your Expedited Application was approved. Approval of the study and any consent form(s) is for the period of 10/15/2018 to 10/14/2019. The research study is eligible for review under expedited category #6, 7. The Chairperson (or designee) deemed this study no more than minimal risk.

Changes to this approved research may not be initiated without UMCIRB review except when necessary to eliminate an apparent immediate hazard to the participant. All unanticipated problems involving risks to participants and others must be promptly reported to the UMCIRB. The investigator must submit a continuing review/closure application to the UMCIRB prior to the date of study expiration. The Investigator must adhere to all reporting requirements for this study.

Approved consent documents with the IRB approval date stamped on the document should be used to consent participants (consent documents with the IRB approval date stamp are found under the Documents tab in the study workspace).

The approval includes the following items:

Name	Description
Consent form	Consent Forms
Interim Assessments and Formative Assessment Practices	Study Protocol or Grant Application
Interview Questions	Surveys and Questionnaires
Interview Questions	Interview/Focus Group Scripts/Questions

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

APPENDIX B: INTERVIEW QUESTIONS FOR SCHOOL F

Semi-Structured Interview Questions for Formative Assessment Practices

Demographic Questions

How long have you have been a teacher?

How long have you worked at your current school?

PLC Questions

How often do you meet with your PLC group during the week?

How are student outcomes discussed during PLC meetings?

What data are discussed during PLC meetings to measure student success?

Formative Assessment Practice Questions

How do you obtain an initial understanding of how your students learn?

How do you measure the learning potential of your students?

How do you establish learning targets for your students during the school year?

How is learning measured in your classroom on a daily basis?

How do you get students to take ownership of their learning?

What is the culture of your classroom? For example, is the culture built on competition or on students getting better at mastering learning targets?

What is used to measure whether students are mastering state content standards during the week and month?

What professional development on how to improve student learning outcomes in your classroom have you attended in the past year?

APPENDIX C: INTERVIEW QUESTIONS FOR SCHOOL B

1. Are the strategies from the professional development sessions being implemented with fidelity?

If the strategies are not being implemented with fidelity, what support do you need to implement the strategies with fidelity?

2. Which professional development sessions and strategies have helped you improve student outcomes this year?
3. Are the topics discussed during PLC meetings focused on students' learning and improving student outcomes?
4. What topics have been discussed during PLC meetings?
5. What additional professional development is needed to help you support improving student outcomes?
6. Do you need professional development specific to your content area to improve student outcomes in your classroom.

APPENDIX D: SURVEY DATA FROM SCHOOL F TEACHERS

Three Steps

Step 1: Making the text manageable

- **Explicitly state your research concerns and theoretical framework**
- Choose what part of the text should be included in your analysis
 - Use your research concerns (Step 1) to select/highlight relevant text (Step 2)

Step 2: Hearing what they said

- Level of subjective experience of the research participants
- Repeating ideas from step 2
- Organize repeating ideas into general themes by grouping repeating ideas into coherent categories

Step 3: Developing Theory

- Develop theoretical constructs by grouping themes into more abstract concepts consistent with your theoretical framework
- Create a theoretical narrative by retelling the participant's story in terms of the theoretical constructs

Research Concerns and Theoretical Framework

- How students learn and their learning potential
- How is learning measured and how do you know students have learned
- Students taking ownership for their learning
- Culture of the classroom
- Professional Development in using formative assessment concepts

The results of the coding process produced five themes that were aligned to the review of literature, formative assessment practices theory, and the study's research questions: student's potential for growth and proficiency, using data to track student progress, mastering goals and concepts, getting students to take ownership for their learning, and learning from each other.

Color Codes for Repeating Ideas – Survey Results

Green - Understanding student learning potential to help them grow academically

Gray - Data (Accelerated Math and Reading, i-Ready Assessment, Moby Max, Common Formative Assessments (CFAs), Quizlets, etc....)

Orange - Mastery of targets and goals (What's Important)

Red - Reflection and Students Conference - use the help students take ownership for their learning

Yellow - Learning from others (Teachers) -- How they learned to use formative assessment concepts in the classroom.

Blue - Culture of Competition based on celebrating self and classmates

Survey Data Relevant Text and Repeating Ideas

Teacher #1

- Teach them so they to become proficient
- Everyone learns different
- Understanding their potential helps you help them grow and move on to the next step
- Using data, data to measure growth everyday using (AR Test- i-Ready Assessment- Moby Max)
- How many goals have they mastered

- **Data Conferences(reflection)** - what have they learned for the day - where they fall on the proficiency line - help them own up to it they're **responsible for the actions**
- Class built on **mastering learning targets** - that's **what's important**
- They are pushing each other - they are **excited for each other when they master concepts**
- Competitions with Mobi-Max - **how many targets have they mastered**
- We have an instructional facilitator that helps with **CFAs** we **learn from each other we help each other**

Teacher #2

- By seeing their potential you never give up on them - you're constantly **working towards mastery** - **giving them a chance to fix their mistakes to understand better**
- **Looking for conceptual misunderstanding and understandings** here - **using CFA** a every day - **did they get that skill today**
- **They have a reflection sheet after every assessment** - what can you improve on next time- **why did you show growth or did not show growth**
- If they **have 100 or more objectives mastered** they get their picture posted - they don't want to be left out
- Using a **graph to show growth and mastery**
- **Competition is good as long as we celebrate everyone's success** - it causes them to work harder
- It's not just about the prizes in the **end it's about hitting your target and on the EOG** -it's about mastery
- **We share ideas on using data** -- **looking at questions students don't get** - **we learn from each other to get better**

Teacher #3

- Adjust your teaching style to accommodate them - you have to know their learning style to

adjust

- If they can teach it they can grasp it
- Setting the expectations for their learning at the beginning of the school year
- They will work hard to reach that high bar
- Reflection after each assessment ---- how you did ---- did you study ---- --- what strategies

did you use during the assessment

- We have competition -- but we cheer each other on
- Mastering learning targets they have embraced that
- We learn from each other --- strategies and materials

Teacher #4

- Understanding their potential to meet their needs
- Understanding how they learn to meet individual needs
- Don't limit the students have high expectations
- With assessments formal and informal -- CFAs to see if they have learned this standards
- Asking questions to check if they understand the standards
- Setting goals at the beginning of the school year -- remind them weekly --- they are responsible for their own learning
- Constantly seeing where they are --- are they growing -- they have their charts -- are the green - red- blue --- let them be accountable for that
- They need to be competitive with themselves --- do better than you did before(growth)

- They compete against each other --- measured with Mobi Max --- i-Ready --- Accelerated Reader

- Who has done the most practice --- who has the most correct --- They cheer each other on
- You learn from other teachers -- pick up strategies from other teachers

Teacher #5

- Looking at their strengths to build them up in the classroom
- Small groups when they don't understand it allows you to individualize instruction one on one --- the data helps you to do this --- help move them forward and grow
- What specifically they are not understanding --- working with them to see where they are and what they need to do to improve and meet their goals (using data i-Ready - CFAs ...etc --- having accountability).
- We are competing to master learning targets === looking to continue to growth each time
- We cheer each other --- we stop to cheer when they meet their goals -- Assessments and measurement where they grow
- We learn from each other -- strategies --

Teacher #6

- It's important to understand how they learn --- understanding what they are missing -- then tweak instruction to help the students grow
- One on One instruction to help when they are struggling with specific standard -- individualized to each student and standard
- Using Quizlet -- use to track how they are doing and what they are improving with
- Once they know what they have to do they ask for remediation
- There daily notebooks and reflection help them take ownership for their learning

- We celebrate success when they meet their goals every week --- they realize they have to work hard to achieve their goal
- Learning from each other as a team --- looking at data to see who is doing something well and go to them to learn what they are doing

Themes and Outline for Narrative

Theme number one: Understanding students potential for growth and proficiency to help students grow during the year.

Growth is important to being proficient at the end of the year

- Measured Daily
- Measured to see if students are trending toward mastering standards and proficiency

Understanding students potential and what they know and don't know helps students grow

- Helps teachers adjust instruction to meet students instructional needs
- Helps teachers accommodate students learning style
 - One on One
 - Small Group Instruction

Theme number two: Using data to track student progress

- Assessments aligned to objectives and standards (accountability for teachers and students)
 - Teacher made
 - Vendor made assessments
 - Used to measure growth
 - Used to measure mastery

- Daily - Weekly - Monthly

Theme number three: The key to improving proficiency is the mastery of goals and concepts

- Setting Goals
- Using programs to track mastery of goals and concepts
- Used for competitions with class and themselves
- Used to set high expectations
- Used to help respond to students instructional needs

Celebrating

- Each other
- Individuals(self)

Theme number four: Using reflections and conferences to get students to take ownership for learning

- Student Conferences
- Student Reflections

Theme number five: Learning from each other -Teachers

- Team Approach
- PLC Time used to review data and share strategies with each other

APPENDIX E: DATA REFLECTION SHEET






Name: _____

Scale Score	Typical and Stretch Growth (type score within range) BOY	Typical and Stretch Growth (type score within range) MOY	Typical and Stretch Growth (type score within range) EOY	Reflection on improvement
0				1) My Strengths are:
50				
100				2) I need to improve on:
150				
200				
250				3) My goal for this year is (Scale Score) _____.
300				
350				
400				4) To achieve my goal I will:
450				
500				
550				

Scale Score	Typical and Stretch Growth (type score within range) BOY	Typical and Stretch Growth (type score within range) MOY	Typical and Stretch Growth (type score within range) EOY	Reflection on improvement
600				
650				5) I will track my goal by:
700				
750				
800				

APPENDIX F: STANDARDS DOCUMENT FOR TESTED STANDARDS

Unit 1: Expressions and Equations (Exponents) and the Number System

		Whole Class				Small Group Differentiation	
		Instruct		Practice	Assess	Reteach	Teacher-led Activities
	NCSCS	Interactive Tutorials	Ready Instruction Book	Practice & Problem Solving Book	Lesson Quizzes, Unit Assessments	Prerequisite Ready Lessons	Tools For Instruction
Unit 1: Unit Opener							
Lesson 0: Lessons for the First Five Days							
Lesson 1: Properties of Integer Exponents	NC.8.EE.1 (M)						
Lesson 2: Square Roots and Cube Roots	NC.8.EE.2 (M)						
Lesson 3: Understand Rational and Irrational Numbers	NC.8.NS.1 (M) NC.8.NS.2 (M)						
Lesson 4: Approximate Irrational Numbers	NC.8.NS.2 (M)						
Lesson 5: Scientific Notation	NC.8.EE.3 (M)						
Lesson 6: Operations and Scientific Notation	NC.8.EE.4 (M)						
Unit 1: End-of-unit Resources							

APPENDIX G: ONLINE LESSON REFLECTION

1. Name
2. Title of i-Ready Lesson
3. What was the lesson about?
4. What did you learn today?
5. What questions do you have? What do you want to learn more about?
6. What did you score on the lesson?
 - a. 96-100
 - b. 91-95
 - c. 86-90
 - d. 81-85
 - e. 76-80
 - f. 70-75
 - g. 69 - below

APPENDIX H: PARENT LETTER

Dear Parents,

Gaston County Schools has implemented a program called ***i-Ready Diagnostic & Instruction*** that provides our students with an innovative diagnostic assessment and engaging instruction. The focus of this online program is reading and math. ***i-Ready Diagnostic & Instruction*** helps teachers effectively assess their students and provide individualized instruction based on each student's unique needs.

i-Ready Diagnostic & Instruction assesses and provides instructional resources in the following skill areas:

Math

- Number and Operations
- Algebra and Algebraic Thinking
- Measurement and Data
- Geometry

All students at School B took the ***i-Ready Diagnostic Adaptive Assessment*** in September and will take it again in December and April. An adaptive assessment is a test that automatically adjusts the difficulty of the questions according to each student's performance in order to determine his or her abilities in reading and math. *i-Ready* is a very different kind of test that presents students with questions that can be both too easy and too hard. It is designed to do this until the assessment finds exactly the level at which the student is performing. Each time a student gets an item incorrect, he or she is presented with a simpler question until the diagnostic finds the grade level at which the student is performing.

Once your child completed the assessment, he or she was assigned online instruction to support his or her progress in mastering each skill. The online instruction is designed to be both challenging and engaging. These lessons are proven to help students grow academically.

Your child will complete lessons at school, and they will additionally be able to complete lessons at home. To use iReady on a digital device at home, follow these steps:

- For Gr 6-8 students: Go to the website **my.ncedcloud.org**
- Students will enter their username and password
- Students will click on the blue Clever icon
- Students will click on "Login with NCEdCloud"
- Students will click on the iReady app

Your child should be familiar with his or her school login and password; however, a copy of your child's login information is attached. It is important that your child completes the work in *i-Ready* **independently** to the best of his or her ability. Parents should assist with technical issues, such as adjusting your computer speakers, but not provide answers or assist students in completing the activities. Encourage your child to check his or her "My Progress" to track the work completed in *i-Ready*.

If you have questions about *i-Ready*, please contact your child's teacher.

XXXXXXXXXXXX, Principal

